TEXAS A&M
UNIVERSITY®

TAMU Design Standards
Architectural & Landscape

2023

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Executive Summary

The Texas A&M University System's published Facility Design Guidelines (FDG's) are the baseline minimum requirements for design professionals to follow during the design and construction of Texas A&M University System projects. **The "TAMU Design Standards – Architectural & Landscape" apply specifically to Texas A&M University's main campus** and are consolidated with the FDG's to supplement, reinforce, and strengthen FDG requirements. **Combined, these two sets of documents represent the minimum standard for design and construction on Texas A&M University's main campus.**

The "TAMU Design Standards – Architectural & Landscape", when found to be in conflict with the FDG's, shall supersede the requirements contained in the FDG's and apply specifically to Texas A&M University's main campus.

The Design Standards establish a toolkit and uniform reference to guide architectural and engineering professionals to appropriately incorporate the expectations of the University and the 2017 Campus Master Plan into the design of construction projects on TAMU's main campus. Interpretation of these standards and approval of proposed projects is enforced by TAMU's Campus Planning, Design & Construction, and the University Architect.

Design professionals assume responsibility for selection, reference, and appropriate application of these resources. It is the design professional's responsibility to verify that the most recently published standards are utilized during design by checking https://universityarchitect.tamu.edu/ regularly for revisions.

The TAMUS Facility Design Guidelines can be found at:
https://assets.system.tamus.edu/files/fpc/pdf/Facility%20Design%20Guidelines.pdf

Roofing

Texas A&M University facilities currently use built-up roof systems with Coal-Tar Elastomeric Membrane (CTEM), Sprayed Polyurethane Foam (SPF) Roof Systems and Standing Seam Metal Roofs. Single-ply membrane roof systems are also used and can be specified, but should only be specified for low-traffic roofs with few penetrations and very little rooftop equipment. Specified roof systems shall carry a manufacturer's 20-year warranty.

The 20 year manufacturer's warranty shall not be voided by winds below 91 miles per hour, roof access by authorized personnel, use of products from different manufacturers that are substantially the same as products by the membrane manufacturer, or any chemicals that will be exhausted by the equipment installed with the building such as food oil, grease, lab exhaust, or any oils or greases that may be required to maintain roof top equipment. The Architect shall verify roof capability with all roof uses and roof top equipment exhaust chemicals to ensure the 20 year warranty will remain valid. Roofs shall not be required to be inspected more than yearly to comply with the warranty.

Design shall minimize roof-mounted equipment where possible. Otherwise the design shall include "passive" fall protection such as parapets and/or guardrails and may require appropriate screening as determined by TAMU Campus Planning, Design & Construction, and the University Architect.

Urethane Foam Roof System

1.3 WARRANTY

A. Warranty period is twenty (20) years after the date of substantial completion.

General Information

All general use building entrances shall have a vestibule. At least one door at primary entrances shall be power operated. Primary entrances shall be designated by the User Coordinator and Building Access Services.

One or more entrance doors may require card key access. These entrances shall be selected by the User Coordinator. The door frames shall be prepped as a part of the design and construction of the building. The card key devices shall be acquired by the Campus and delivered to the Contractor for installation or installed by Building Access Services.

The use of daylighting in the building design is strongly encouraged. Use of skylights is not allowed unless approved in writing by TAMU Campus Planning, Design & Construction and the University Architect. Use of protected clerestory glazing is allowed.

Doors and Frames

Exterior and interior personnel doors shall not be taller than 7 feet high unless approved by TAMU Campus Planning, Design & Construction and the University Architect.

Hardware

Specify all finish hardware. Locksets in new construction and major renovations will be Medeco (MC) and shall be heavy duty mortise type with key removable core cylinders.

Door closers by LCN, or Sargent are acceptable; hinges by McKinney, Hager, Stanley are acceptable; equal quality hardware of other manufacturers will be acceptable with approval from Building Access Services.

The A/E shall investigate the security requirements for the project and develop an appropriate keying system. The specifications shall call for two (2) keys for each lockset, One (1) control keys along with an appropriate quantity of grandmaster, master and sub-master keys to be provided. A Bitting Schedule and set number of key blanks will also be required. Final keying functions shall be established during a key conference conducted by FP&C, with the A/E, User Coordinator, Building Access Services, Contractor, and successful hardware supplier during construction.

Verify other requirements such as extra key blanks, key box, etc. with User Coordinator and Building Access Services.

All request substitutions must be approved by Building Access Services.

Always verify hardware specifications with TAMU Building Access Services.

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Automatic operators.
4. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 08 Section “Door Hardware Schedule”.
2. Division 08 Section “Hollow Metal Doors and Frames”.
3. Division 08 Section “Automatic Door Operators”.
4. Division 08 Section “Access Control Hardware”.

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
8. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards:

1. ANSI/BHMA Certified Product Standards - A156 Series
2. UL10C – Positive Pressure Fire Tests of Door Assemblies

F. For all renovations where hardware is not discontinued hardware shall match existing. If building is to be a complete remodel it shall be treated the same as new construction.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:

a. Type, style, function, size, label, hand, and finish of each door hardware item.
b. Manufacturer of each item.
c. Fastenings and other pertinent information.
d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
e. Explanation of abbreviations, symbols, and codes contained in schedule.
f. Mounting locations for door hardware.
g. Door and frame sizes and materials.
h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified

hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
b. Complete (risers, point-to-point) access control system block wiring diagrams.
c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: Following a mandatory keying meeting with the owner or owner's designate; prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

D. Automatic Operator Supplier Qualifications: Power operator products and accessories are required to be supplied and installed through by approved manufacturer installers. Suppliers are to be factory

trained, certified, and a direct purchaser of the specified power operators and be responsible for the installation and maintenance of the units and accessories indicated for the Project.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.

2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct a mandatory conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization from the General Contractor.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:

1. Ten years for mortise locks and latches.
2. Five years for exit hardware.
3. Twenty five years for manual surface door closer bodies.
4. Ten years for heavy duty floor closers.
5. Two years for shallow depth floor closers.
6. Five years for motorized electric latch retraction exit devices.
7. Two years for electromechanical door hardware.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware as required for the project by TAMU and TAMUS RELLIS Building Owner.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:

C. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity, unless otherwise indicated:

a. Two Hinges: For doors with heights up to 60 inches.
b. Three Hinges: For doors with heights 61 to 90 inches.
c. Four Hinges: For doors with heights 91 to 120 inches.
d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following where indicated in the Hardware Sets or on Drawings:

a. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

5. Acceptable Manufacturers:

a. Hager Companies (HA).
b. McKinney Products (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge. with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Acceptable Manufacturers:

a. Bommer Industries (BO).
b. McKinney Products (MK).
c. Pemko Manufacturing (PE).

C. Floor Closers: ANSI/BHMA A156.4 certified floor closers. Provide independent and adjustable valves for closing speed, latch speed, and backcheck with built-in dead stop and hold open features as specified. Provide finished cover plates or thresholds as indicated in door Hardware Sets.

1. Acceptable Manufacturers:

a. Dorma Products (DO).

b. Rixson Door Controls (RF).

D. Sliding and Folding Door Hardware: Hardware is to be of type and design as specified and should comply with ANSI/BHMA A156.14.

1. Acceptable Manufacturers:

a. Hager Companies (HA).
b. Pemko Manufacturing (PE).

2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Acceptable Manufacturers:

a. Hager Companies (HA) - ETW-QC (# wires) Option.
b. McKinney Products (MK) - QC (12 wires) Option.

B. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a 12" removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

1. Acceptable Manufacturers:

a. McKinney Products (MK) - SER-QC (# wires) Option.
b. Pemko Manufacturing (PE) - SER-QC (# wires) Option.

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
a. McKinney Products (MK) - Electrical Connecting Kit: QC-R001.
b. McKinney Products (MK) - Connector Hand Tool: QC-R003.

2. Acceptable Manufacturers:

a. McKinney Products (MK) – QC-C Series.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.

1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.

5. Acceptable Manufacturers:

a. Ives (IV).
b. Rockwood Manufacturing (RO).
c. Trimco (TC).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Acceptable Manufacturers:

a. Ives (IV).
b. Rockwood Manufacturing (RO).
c. Trimco (TC).

C. Door Push Plates and Pulls: ANS/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.

5. Acceptable Manufacturers:

a. Ives (IV).
b. Rockwood Manufacturing (RO).
c. Trimco (TC).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinders: Original manufacturer cylinders complying with the following:

1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
5. Keyway: Match Facility Restricted Keyway.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1, certified patented cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.

1. Acceptable Manufacturers:

a. Medeco (MC) – No substitution.
b. All Keys Stamped to Texas A&M College Station Standard
c. **'Key Meeting Mandatory on all projects for Texas A&M College Station and Texas A&M SYSTEM RELLIS Campuses**. Contacts are Texas A&M Jennifer Bomnskie/Andrew Astle 979-458-1335. Medeco Representative Stephen Fox 281-433-0302
d. Key meeting attendees required to attend key meeting: A. General Contractor B. Hardware Distributor Supplying Medeco Keys and Cores and hardware C. Assa Abloy Representative. D. Texas A&M College Station/RELLIS Representative
e. **All Medeco Products to be shipped to Building Access Andrew Astle 600 Agronomy Road. Suite 130 1371 TAMU College Station, TX 77843**

E. Keying System: Each type of lock and cylinders to be factory keyed.

1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. New System: Key locks to a new key system as directed by the Owner.

F. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).
5. Permanent Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. Key Registration List (Bitting List):

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1. Provide transcript list in writing or electronic file as directed by the Owner.

I. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Acceptable Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 certified. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.

1. Acceptable Manufacturers:

a. Sargent 8200 – LW1L/LL-26D
b. Best 45H - 15H - 626

2.7 ELECTROMECHANICAL LOCKING DEVICES

A. Electromechanical Mortise Locksets, Grade 1 (Heavy Duty): Subject to same compliance standards and requirements as mechanical mortise locksets, electrified locksets to be of type and design as specified below.

1. Electrified Lock Options: Where indicated in the Hardware Sets, provide electrified options including: outside door lock/unlock trim control, latchbolt and lock/unlock status monitoring, deadbolt monitoring, and request-to-exit signaling. Support end-of-line resistors contained within the lock case. Unless otherwise indicated, provide electrified locksets standard as fail secure.

2. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.

3. High Security Monitoring: Provide lock bodies which have built-in request to exit monitoring and are provided with accompanying door position switches. Provide a resistor configuration which is compatible with the access control system.

4. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) - 8200 Series. Basis of Design no substitution

2.8 AUXILIARY LOCKS

A. Mortise Deadlocks, Small Case: ANSI/BHMA A156.36, Grade 1, small case mortise type deadlocks constructed of heavy gauge wrought corrosion resistant steel. Steel or stainless steel bolts with a 1" throw and hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other specified locksets.

1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) - 4870 Series. Basis of Design
b. Stanley Best (BE) - 48H Series.

2.9 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Auxiliary Deadlocks: BHMA A156.36.
3. Dustproof Strikes: BHMA A156.16.

2.10 BORED LOCKS

A. A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.

1. Locks shall meet or exceed the requirements of ANSI/BHMA A156.2 Series 4000, Grade 1 with all standard trims, as follows:
   a. Cycle Test: ANSI/BHMA A156.2 Grade 1 requirements with no lever sag.
   b. Abusive Locked Lever Torque: Exceed 3,100 in-lb with no entry; lock to maintain egress functionality in compliance with BHMA certification requirements.
   c. Offset Lever Pull: Exceed 1,600 lbs with no entry (8 times ANSI/BHMA A156.2 requirements).
   d. Latch Retraction with Preload: Exceed 100 lb preload while maintaining ANSI/BHMA requirements for operation in warped doors (2 times ANSI/BHMA A156.2 requirements).

2. Heavy duty cylindrical locks shall have a seven-year warranty.

3. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).

4. Furnish with solid cast levers, standard 2 3/4” backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.

5. Locks are to be non-handed and fully field reversible.

6. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.2 requirements to 20 million cycles or greater.

   1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) – 10X Series. No Substitution

2.10 CONVENTIONAL Mechanical and Electrified EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.

2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.

3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.

4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Electromechanical Options: Subject to same compliance standards and requirements as mechanical exit devices, electrified devices to be of type and design as specified in hardware sets. Include any specific controllers when conventional power supplies are not sufficient to provide the proper inrush current.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.

9. Rail Sizing: Provide exit device rails factory sized for proper door width application.

10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless steel, pullman type, with deadlock feature.

C. For any deviation from Sargent please contact Texas A&M Building Access 979-458-1335

D. For Electrified Exits have security coordinate with Texas A&M Building Access 979-458-1335

Acceptable Manufacturers: Sargent Manufacturing No Substitution’s

A.	Rim Mounted	88 series – ETL Trim
B.	Rim Mounted Fire rated	12-88 series – ETL Trim

C.	Surface Vertical	87 series – ETL Trim
D.	Surface Vertical – Fire-rated	12-87 series – ETL Trim
E.	Mortise	89 series – ETL Trim
F.	Mortise Fire-rated	12-89 series – ETL Trim
G.	Removable Mullion	980
H.	Removable Mullion Fire	12-980

I. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.

1. Provide keyed removable feature where specified in the Hardware Sets.

2. Provide stabilizers and mounting brackets as required.

3. Provide electrical quick connection wiring options as specified in the hardware sets.

4. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) - 980S Series.

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2.11 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.

2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.

3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.

5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) - Sargent 1430, Sargent 1431
b. LCN - 4040

2.12 AUTOMATIC DOOR OPERATORS

A. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.

1. Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.

B. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.

C. Standard: Certified ANSI/BHMA A156.19.

1. Performance Requirements:

a. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
b. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.

D. Configuration: Surface mounted. Door operators to control single swinging and pair of swinging doors.

E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as

required by ANSI/BHMA A156.19. When not in automatic mode, door operator to function as manual door closer with fully adjustable opening and closing forces, with or without electrical power.

1. On-off switch to control power to be key switch operated.

F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.

G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.

H. Activation Devices: Provide activation devices in accordance with ANSI/BHMA A156.19 standard, for condition of exposure indicated and for long term, maintenance free operation under normal traffic load operation. Coordinate activation control with electrified hardware and access control interfaces. Activation switches are standard SPST, with optional DPDT availability.

I. Signage: As required by cited ANSI/BHMA A156.19 standard for the type of operator.

1. Acceptable Manufacturers:

a. LCN Closers (LC) - 4640 Series.
b. Norton Door Controls (NO) - 6000 Series.
c. Record (RE) – 6100 Series

2.13 ARCHITECTURAL TRIM

A. Door Protective Trim

1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.

2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.

3. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:

a. Stainless Steel: 300 grade, 050-inch thick.

4. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.

5. Acceptable Manufacturers:

a. Ives (IV).
b. Rockwood Manufacturing (RO).
c. Trimco (TC).

2.14 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Acceptable Manufacturers:

a. Ives (IV).
b. Rockwood Manufacturing (RO).
c. Trimco (TC).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Acceptable Manufacturers:

a. Rixson Door Controls (RF).
b. Rockwood Manufacturing (RO).
c. Sargent Manufacturing (SA).

2.15 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

E. Acceptable Manufacturers:

1. National Guard Products (NG).
2. Pemko Manufacturing (PE).
3. Reese Enterprises, Inc. (RE).

2.16 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) – 3280 Series.
b. Securitron (SU) - DPS Series.

B. Power Supplies: Provide Nationally Recognized Testing Laboratory Listed 12VDC or 24VDC (field selectable) filtered and regulated power supplies. Include battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Acceptable Manufacturers:

a. Sargent Manufacturing (SA) – 3500 Series.

C. Switching Power Supplies: Provide UL listed or recognized filtered and regulated power supplies. Provide single, dual, or multi-voltage units as shown in the hardware sets. Units must be expandable up to eight Class 2 power limited outputs. Units must include the capability to incorporate a battery backup option with integral battery charging capability in addition to operating the DC load in event of line voltage failure. Provide the least number of units, at the appropriate amperage level, sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Acceptable Manufacturers:

a. Securitron (SU) - AQ Series. AQL (No Substitutions)

D. For any deviation from Securitron please contact Texas A&M Building Access 979-458-1335

2.17 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.18 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

D. Typical finishes and materials, unless otherwise specified.

1. Butts: Out Swinging Exterior Doors:
    a. US32D (BHMA 630) on Stainless Steel.
2. Butts: Interior Doors and In-swinging Exterior Doors:
    a. US26D (BHMA 652) on Steel.
3. Continuous Geared Hinges:
    a. US28 (BHMA 628) on Aluminum.
4. Continuous Pin & Barrel Hinges:
    a. US32D (BHMA 630) on Stainless Steel.
5. Flush Bolts:
    a. US26D (BHMA 626) on Brass or Bronze.
6. Exit Devices:
    a. US32D (BHMA 630) on Stainless Steel.
7. Locksets:
    a. US26D (BHMA 626) on Brass or Bronze.
8. Push Plates, Pulls and Push Bars:
    a. US26D (BHMA 626) on Stainless Steel.
9. Coordinators:
    a. USP (BHMA 600) on Steel.
10. Kick Plates, Armor Plates, and Edge Guards:
    a. US32D (BHMA 630) on Stainless Steel.

11. Overhead Stops and Holders:
    a. US26D (BHMA 626) on Brass or Bronze.
12. Closers: Surface mounted.
    a. US28 Sprayed Aluminum Lacquer (BHMA 689).
13. Latch Protectors:
    a. US32D (BHMA 630) on Stainless Steel.
14. Miscellaneous Hardware:
    a. US26D (BHMA 626) on Brass or Bronze.
15. Butts: Out Swinging Exterior Doors:
    a. US32D (BHMA 630) on Stainless Steel.
16. Butts: Interior Doors and In-swinging Exterior Doors:
    a. US32D (BHMA 630) on Steel.
17. Continuous Geared Hinges:
    a. US28 (BHMA 628) on Aluminum.
18. Continuous Pin & Barrel Hinges:
    a. US32D (BHMA 630) on Stainless Steel.
19. Flush Bolts:
    a. US26D (BHMA 626) on Brass or Bronze.
20. Exit Devices:
    a. US32D (BHMA 630) on Stainless Steel.
21. Locksets:
    a. US32D (BHMA 630) on Stainless Steel.
22. Push Plates, Pulls and Push Bars:
    a. US32D (BHMA 630) on Stainless Steel.
23. Coordinators:
    a. USP (BHMA 600) on Steel.
24. Kick Plates, Armor Plates, and Edge Guards:
    a. US32D (BHMA 630) on Stainless Steel.
25. Overhead Stops and Holders:
    a. US32D (BHMA 630) on Brass or Bronze.
26. Closers: Surface mounted.
    a. US28 Sprayed Aluminum Lacquer (BHMA 689).
27. Latch Protectors:
    a. US32D (BHMA 630) on Stainless Steel.
28. Miscellaneous Hardware:
    a. US32D (BHMA 630) on Stainless Steel.

2.19 ELECTRIC STRIKES

A. Standard Electric Strikes: Heavy duty, cylindrical and mortise lock electric strikes conforming to ANSI/BHMA A156.31, Grade 1, UL listed for both Burglary Resistance and for use on fire rated door assemblies. Stainless steel construction with dual interlocking plunger design tested to exceed 3000 lbs. of static strength and 350 ft-lbs. of dynamic strength. Strikes tested for a minimum 1 million operating cycles. Provide strikes with 12 or 24 VDC capability and supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Acceptable Manufacturers:

a. Folger Adam EDC (FO).
b. HES (HS).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Power Operator products and accessories are required to be installed through current members of the manufacturer's "Power Operator Preferred Installer" program.

D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

Description: Exterior Alum Pair - Access Control/Operator

2	Elec Continuous Hinge McKinney	MCK-12HD SER	CL	
1	Removable Mullion Sargent	L980A	US28	
1	Elec Exit Device - EL/RX Sargent	55 56 70 AD8504	US32D	
1	Elec Exit Device – EL/RX Sargent	55 56 AD8510	US32D	
1	Cylinder Sargent	72 41	US32D	
2	Small Format Inter Core Medeco	33700006N	26	
2	Offset Pull Rockwood	RM3411-60	US32	
1	Drop Plate Sargent	351D	EN	
1	Closer w/ Spring Stop Arm Sargent	1431	EN	
1	Door Operator	6020	689	Norton
1	Lip Threshold	2005AT		Pemko
1	Perimeter Seal	By door mfgr		
1	Rain Guard	346C		Pemko
2	Sweep w/ Drip	345ANB		Pemko
2	Elec Cables - Exit to Hinge McKinney	QC-C006P		
2	Elec Cables - Hinge to Above McKinney	QC-C1500P		
2	Position Switch Securitron	DPS-M-BK		
2	Actuator	501		Norton
1	Power Supply Securitron	AQL		
1	Card Reader	By Security Contractor.		

Notes: Door normally latched and secured by exit device. Authorized swipe (card reader under security section) will temporarily retract the latchbolt allowing entry. Then operator will then allow door to open. Door position switch monitors the opening for door prop or force open. Request to exit switch in the exit device rail shunts door position alarm. Door defaults to locked upon loss of power. Cylinder over-ride provided. Please refer to section 2.11 Note C/D. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Exterior Alum monitored

1	Elec Continuous Hinge McKinney	MCK-12HD SER	CL	
1	Elec Exit Device- RX Sargent	55 72 AD8504 862	US32D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Offset Pull Rockwood	RM3411-60	US32	
1	Closer w/ Stop Arm Sargent	1431	EN	
1	Drop Plate Sargent	351D	EN	
1	Lip Threshold	2005AT		Pemko
1	Perimeter Seal	By door mfgr		
1	Rain Guard	346C		Pemko
1	Sweep w/ Drip	345ANB		Pemko
1	Elec Cables - Exit to Hinge McKinney	QC-C006P		
1	Elec Cables - Hinge to Above McKinney	QC-C1500P		
1	Position Switch Securitron	DPS-M-BK		
1	Power Supply Securitron	AQL		

Notes: Door position switch monitors the opening for door prop or force open. . Please refer to section 2.11 Note C/D. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Exterior HM - Access Control

2	Elec Hinge McKinney	T4A3386 4-1/2" x 4-1/2" QC	US32D	
1	Hinge McKinney	T4A3386 4-1/2" x 4-1/2" NRP	US32D	
1	Elec Exit Device - EL/RX Sargent	55 56 72 8804 FSW	US32D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Closer w/ Stop Arm Sargent	1431	EN	
1	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Lip Threshold	2005AT		Pemko
1	Rain Guard	346C		Pemko
1	Perimeter Seal	2891APK		Pemko
1	Sweep w/ Drip	345ANB		Pemko
1	Elec Cables - Exit to Hinge McKinney	QC-C006P		
1	Elec Cables - Hinge to Above McKinney	QC-C1500P		
1	Position Switch Securitron	DPS-M-BK		
1	Power Supply Securitron	AQL		
1	Card Reader	By Security Contractor.		

Notes: Door normally latched and secured by exit device. Authorized swipe (card reader under security section) will temporarily retract the latchbolt allowing entry. Door position switch monitors the opening for door prop or force open. Request to exit switch in the exit device rail shunts door position alarm. Door defaults to locked upon loss of power. Cylinder over-ride provided. . Please refer to section 2.11 Note C/D. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Exterior HM Pair- Access Control

1	Elec Hinge McKinney	T4A3386 4-1/2" x 4-1/2" QC	US32D
5	Hinge McKinney	T4A3386 4-1/2" x 4-1/2" NRP	US32D
1	Self Latching Bolts - MD Rockwood	2845	US26D

1	Fail Secure Electric Lock Sargent	RX 72 8271-24V LL	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Coordinator Rockwood	2672	US28	
2	Mounting Bracket Rockwood	2601AB	US28	
2	Closer w/ Stop Arm Sargent	1431	EN	
2	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Lip Threshold	2005AT		Pemko
1	Rain Guard	346C		Pemko
1	Perimeter Seal	2891APK		Pemko
2	Sweep w/ Drip	345ANB		Pemko
1	Astragal	357C		Pemko
1	Elec Cables - Hinge to Above McKinney	QC-C1500P		
1	Elec Cables - Lock to Hinge McKinney	QC-C306P		
2	Position Switch Securitron	DPS-M-BK		
1	Power Supply Securitron	AQL		
1	Card Reader	By Security Contractor.		

Notes: Door normally latched and secured by lock. Authorized card swipe (card reader under security specification) will temporarily allow lever to be turned and door opened. Door position switch monitors the opening for door prop or force open. Request to exit switch in the lockset shunts door position alarm. Door defaults to locked upon loss of power. Cylinder over-ride provided. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Exterior HM- Access Control Rated

1	Elec Hinge McKinney	T4A3386 4-1/2" x 4-1/2" QC	US32D	
2	Hinge McKinney	T4A3386 4-1/2" x 4-1/2" NRP	US32D	
1	Fail Secure Electric Lock Sargent	RX 72 8271-24V LL	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Closer w/ Stop Arm Sargent	1431	EN	
1	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Lip Threshold	2005AT		Pemko

1	Rain Guard	346C		Pemko
1	Perimeter Seal	2891APK		Pemko
1	Sweep w/ Drip	345ANB		Pemko
1	Elec Cables - Hinge to Above McKinney	QC-C1500P		
1	Elec Cables - Lock to Hinge McKinney	QC-C306P		
1	Position Switch Securitron	DPS-M-BK		
1	Power Supply Securitron	AQL		
1	Card Reader	By Security Contractor.		

Notes: Door normally latched and secured by lock. Authorized card swipe (card reader under security specification) will temporarily allow lever to be turned and door opened. Door position switch monitors the opening for door prop or force open. Request to exit switch in the lockset shunts door position alarm. Door defaults to locked upon loss of power. Cylinder over-ride provided. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Exterior HM- Access Control – Wide Oversized

2	Hinge McKinney	T4A3386 5" x 4-1/2" NRP	US32D	
1	Elec Hinge McKinney	T4A3386 5" x 4-1/2" QC	US32D	
1	Fail Secure Electric Lock Sargent	RX 72 8271-24V LL	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Closer w/ Stop Arm Sargent	1431	EN	
1	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Lip Threshold	2005AT		Pemko
1	Rain Guard	346C		Pemko
1	Perimeter Seal	2891APK		Pemko
1	Sweep w/ Drip	345ANB		Pemko
1	Elec Cables - Hinge to Above McKinney	QC-C1500P		
1	Elec Cables - Lock to Hinge McKinney	QC-C306P		
1	Position Switch Securitron	DPS-M-BK		
1	Power Supply Securitron	AQS2410-16C16R2		
1	Card Reader	By Security Contractor.		

Notes: Door normally latched and secured by lock. Authorized card swipe (card reader under security specification) will temporarily allow lever to be turned and door opened. Door position switch monitors the opening for door prop or force open. Request to exit switch in the lockset shunts door position alarm. Door defaults to locked upon loss of power. Cylinder over-ride provided. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Vest Alum Pair - Operator

1	Elec Continuous Hinge McKinney	MCK-12HD SER	CL	
1	Continuous Hinge McKinney	MCK-12HD	CL	
1	Removable Mullion Sargent	L980A	US28	
1	Exit Device - EO Sargent	55 56 AD8510	US32D	
1	Elec Exit Device - EL/RX Sargent	55 56 70 AD8504	US32D	
1	Cylinder Sargent	72 41	US32D	
1	Small Format Inter Core Medeco	33700006N	26	
2	Offset Pull Rockwood	RM3411-60	US32	
1	Drop Plate Sargent	351D	EN	
1	Closer w/ Spring Stop Arm Sargent	1431	EN	
1	Door Operator	6020	689	Norton
1	Lip Threshold	2005AT		Pemko
1	Perimeter Seal	By door mfgr		
1	Rain Guard	346C		Pemko
2	Sweep w/ Drip	345ANB		Pemko
1	Elec Cables - Exit to Hinge McKinney	QC-C006P		
1	Elec Cables - Hinge to Above McKinney	QC-C1500P		
2	Actuator	501		Norton
1	Power Supply Securitron	AQL		

Notes: Pressing actuator button on either side of door will send a signal to exit device to retract the latch and allow the operator to open the door. . Please refer to section 2.11 Note C/D. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Pair - Corr - Access Control

4	Hinge McKinney	T4A3786 4-1/2" x 4-1/2"	US26D
2	Elec Hinge McKinney	T4A3786 4-1/2" x 4-1/2" QC	US26D
1	Elec SVR Exit Device - EL/RX Sargent	55 56 72 NB8706 ETL	US32D
1	Elec SVR Exit Device - RX Sargent	55 56 NB8710 ETL	US32D
1	Small Format Inter Core Medeco	33700006N	26
2	Closer w/ Stop Arm Sargent	1431	EN
2	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D
2	Silencer Rockwood	as required.	
2	Elec Cables - Exit to Hinge McKinney	QC-C006P	
2	Elec Cables - Hinge to Above McKinney	QC-C1500P	
2	Position Switch Securitron	DPS-M-BK	
1	Power Supply Securitron	AQL	
1	Card Reader	By Security Contractor.	

Notes: Door normally latched and secured by exit device. Authorized swipe (card reader under security section) will temporarily retract the latchbolt allowing entry. Door position switch monitors the opening for door prop or force open. Request to exit switch in the exit device rail shunts door position alarm. Door defaults to locked upon loss of power. Cylinder over-ride provided. . Please refer to section 2.11 Note C/D. For all keying refer to section 2.5 Note D. For Power Supplies please refer to section 2.17 Note D

Description: Pair - Mech/Boiler

6	Hinge McKinney	TA2714 4-1/2" x 4-1/2"	US26D
1	Dust Proof Strike Rockwood	570	US26D
1	Automatic Flush Bolts - MD Rockwood	2842	US26D
1	Storeroom Lock Sargent	72 8204 LL	US26D
1	Small Format Inter Core Medeco	33700006N	26

1	Coordinator Rockwood	2672	US28	
2	Mounting Bracket Rockwood	2601AB	US28	
2	Closer w/ Stop Arm Sargent	1431	EN	
2	Kickplate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Perimeter Seal	S773BL		Pemko
1	Astragal	355CS		Pemko

Description: Pair - Main Elec/Switch fire rated 76 function on required electrical on mechanical where requested and required on elevator machine For all keying refer to section 2.5 Note D.

6	Hinge McKinney	T4A3786 4-1/2" x 4-1/2"	US26D	
1	Removable Mullion Sargent	12-L980	PC	
1	Exit Device - Dummy Lever Sargent	12 8810 ETL	US32D	
1	Exit Device - NL Lever Sargent	12 72 8804 ETL	US32D	
1	Cylinder Sargent	72 41	US32D	
2	Small Format Inter Core Medeco	33700006N	26	
2	Closer w/ Stop Arm Sargent	1431	EN	
2	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
2	Perimeter Seal	S773BL		Pemko

Description: Pair – Storage . Please refer to section 2.11 Note C. For all keying refer to section 2.5 Note D.

8	Hinge McKinney	TA2714 4-1/2" x 4-1/2"	US26D	
1	Dust Proof Strike Rockwood	570	US26D	
2	Flush Bolt Rockwood	555 - 12"/72" A.F.F.	US26D	
1	Storeroom Lock Sargent	72 8204 LL	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
2	Surface Overhead Holder/Stop Sargent	590S	US26D	
2	Kickplate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
2	Silencer Rockwood	as required.		
2	Auto Bottom	420 APKL		Pemko

Description: Elev- Inswing For all keying refer to section 2.5 Note D.

3	Hinge McKinney	TA2714 4-1/2" x 4-1/2"	US26D	
1	Storeroom Lock Sargent	72 76 8204 LL	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Concealed Overhead Holder/Stop Sargent	690S	US26D	
1	Door Closer - pull side Sargent	1431	EN	
1	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Perimeter Seal	S773BL		Pemko

Description: Office/Conf For all keying refer to section 2.5 Note D.

3	Hinge McKinney	TA2714 4-1/2" x 4-1/2"	US26D	
1	Office Lock Sargent	72 8205 LL	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Wall Stop Rockwood	409	US32D	
3	Silencer Rockwood	as required.		
1	Coat Hook Rockwood	RM803	US26D	

For all keying refer to section 2.5 Note D.

Description: Staging/Scrub/Sterile Classroom

3	Hinge McKinney	TA2714 4-1/2" x 4-1/2"	US26D	
1	Classroom Lock Sargent	72 8237 LL	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
1	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Wall Stop Rockwood	409	US32D	
3	Silencer	as re		

Description: Surgery - Dbl Acting For all keying refer to section 2.5 Note D.

1	Dbl Act Floor Closer	30A	626	Rixson
1	Deadlock w/ Thumbturn Sargent	72 4875	US26D	
1	Small Format Inter Core Medeco	33700006N	26	
2	Push Plate Rockwood	70E	US32D	
2	Kick Plate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
2	Wall Stop Rockwood	409	US32D	

Description: Sgl Restroom/Quiet For all keying refer to section 2.5 Note D.

3	Hinge McKinney	TA2714 4-1/2" x 4-1/2"	US26D	
1	Privacy Set w/ Indicator Sargent	V21 8265 LNL	US26D	
1	Door Closer - pull side Sargent	1431	EN	
1	Kickplate Rockwood	K1050 10" x 2" LDW 4Best CSK	US32D	
1	Wall Stop Rockwood	409	US32D	
1	Perimeter Seal	S773BL		Pemko

For all keying refer to section 2.5 Note D.

Renovations and Additions

All locksets and keying must match what is already in place in the existing building. Contact Texas A&M Building Access Department for correct hardware that **MUST** be installed. Any hardware installed that was not previously approved by Texas A&M Building Access that does not match existing will not be accepted by the University until that hardware has been replaced with the appropriate hardware for the building. Texas A&M Building Access Services must sign off on all Hardware Schedules prior to start of project.

The Hardware Schedule for every project must be approved in writing by TAMU Building Access Services prior to construction beginning.

Resilient Tile Flooring

Installed resilient tile flooring shall receive the manufacturer's recommended initial maintenance after installation. If this recommended initial maintenance is not provided by the installing contractor, then SSC Custodial shall be hired as an additional service to provide the recommended initial maintenance.

General Information

SITE PAVING

CONCRETE WALKWAYS

Concrete walk placement shall be in accordance with contract drawings. Walk layout and size should be approved by the Owner prior to proceeding with excavation. Any work done without written approval of the Owner will be corrected at the contractor's expense. Pedestrian sidewalks shall be PCRC with a minimum thickness of 4" and a minimum width of 12' and be sized appropriately to facilitate projected pedestrian use levels. Pedestrian sidewalks that may also be service and/or emergency vehicle pathways shall be a minimum of 6" thick and appropriate width. The finish shall typically be a medium broom finish.

CONCRETE EDGING

Concrete pavement shall typically be edged with a 6" concrete curb. Preferably the curb shall be poured monolithically with the pavement, but doweled curb sections are allowed. If poured separately the curb section shall be recessed 1" into the pavement and attached with dowels of sufficient spacing and length to hold the curb firmly to the pavement.

DRAINAGE

Drainage shall not sheet flow over pedestrian walkways per the 2017 Campus Master Plan.

LANDSCAPE IRRIGATION

DOCUMENT INTENT

to cover a complete irrigation system from design to installation for the Texas A&M University

SCOPE OF WORK

Furnish all labor, materials, equipment, transportation, and services necessary to furnish and install the irrigation system complete in place, as shown on the architectural drawings and specified herein.

REQUIREMENTS

Prior to commencement of any involvement such as design, or installation with an irrigation project, identify the person or persons properly authorized to make project decisions. TAMUS Facilities Planning and Construction (FP&C), TAMU Campus Planning, Design & Construction, SSC Grounds Operations, or SSC Engineering Design Construction Services are to identify this individual. All plans for new or renovated irrigation systems are to be reviewed and approved by TAMUS FP&C, TAMU Campus Planning, Design & Construction, SSC Grounds Operations, or SSC Engineering Design Construction Services.

The irrigation system shall have head to head coverage. The irrigation system should also be designed for matched precipitation rates. The contractor shall follow all of the manufacturers operating and performance specifications. All irrigation heads need to be flush with the final grade of the soil. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, etc. which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all their work and plan their work, accordingly, furnishing such fittings as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting, and architectural features.

Obtain or prepare a scaled design of the proposed irrigation system which meets Irrigation Association Design Standards and standards set by this document herein. All construction drawings shall have licensing seal affixed to the document by a licensed Irrigator. All plans must be approved by TAMUS Facilities Planning and Construction (FP&C), TAMU Campus Planning, Design & Construction, and SSC Services Irrigation Department. Provide a digital version for the university at no additional expense. A suitably scaled as built drawing shall be provided upon project completion prior to final walkthrough. All components of the irrigation system shall be shown as installed, with clear measurements from an identifiable reference point to the location of the controller and its circuit breaker, master valve, zone

control valves, main water connection, blow out connection, pump and its electrical connections, and any other similar features. Furnished As-Built Drawings shall be two hard copies as well as an electronic file such as AutoCAD or other software capable of providing the electronic files in a readable and scaled printable format.

Provide clear instructions for operating the irrigation system " in season", showing the relative timing differences between zones of different precipitation rates, and a schedule of run times suggested for various weather conditions. Division of the system into "Hydrozones", or areas with different water requirements, whether based on gardens/grass, sun exposure, drainage patterns, or distinct areas is encouraged. Also consider slopes in the design of the system so that runoff water from higher elevations can be beneficial to middle and lower elevations.

DEFINITIONS

Owner: Texas A&M University

Architect: Architect or Architect's Representative

Contractor: General Contractor or any sub-contractor responsible for the work specified herein.

Final Acceptance of Installation: This acceptance will be granted upon completion of installation of the complete irrigation system according to the plans and as specified herein. Final Acceptance of Installation will not occur before the Final Inspection.

Final Inspection: The last inspection immediately prior to Final Acceptance of Installation.

STANDARDS

ASTM D1785 (ANSI B72.7): Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

ASTM D2241 (ANSI B72.2): Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).

ASTM D2466: Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

ASTM D2564 (ANSI B72.16): Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings.

ASTM D2855 (ANSI K65.55): Standard Recommendation Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

QUALITY ASSURANCE AND REQUIREMENTS

All irrigation work shall be done by a suitably experienced and qualified licensed irrigation contractor, having trained and competent personnel adequate for the scope of work, utilizing Staff certified by the IA in such disciplines as Certified Irrigation Technician (level 1 or 2), Certified Designer. The contractor shall be a member in good standing of the Irrigation Industry Association and or TCEQ (Texas Commission on Environmental Quality), and have met the qualification standards currently applied to licensed contractors by that organization.

Permits and Inspections

In all cases, where inspection of the irrigation system is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Owner, the Contractor shall notify the Owner at least 48 hours in advance of the time when inspection and/or direction is required, or as specified under "Observation Schedule". Any necessary re-excavation or alterations to the system needed because of the failure of the Contractor to have the required inspections shall be performed at the Contractor's expense. Obtain and furnish copies of all permits and licenses applicable to the intended work to be done. Copies of these documents to be a part of the Project Documents.

Ordinances and Regulations:

All local, municipal and state laws, and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these specifications, and their provisions shall be carried out by the Contractor. The design and installation of the irrigation must meet the requirements of TCEQ (Texas Commission on Environmental Quality). The irrigation system must be installed under the supervision of a Licensed Irrigator. Anything contained in these specifications shall not be construed to conflict with any of the above rules and regulations or requirements of the same. However, when these specifications and drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of the specifications and drawings shall take precedence.

Manufacturer's Directions:

Supply and install the components required for an automatic irrigation system to provide supplemental water to the intended landscape efficiently and uniformly. All material shall

be installed in strict accordance to the manufacturer's installation specifications, which shall be considered a supplement to these specifications.

Explanation of Drawings:

Piping layout is diagrammatic only and piping shall be routed to avoid plants and structures when possible. No machine trenching, unless approved by the University Architect, or SSC Arborist, is to be done within drip line of trees. Trenching in the tree line must be done by hand, tunneling, boring, or other methods approved by Architect/Arborist. Obtain properly informed agreement from the owner's representative as to the inclusion or not of desirable features in the design which exceed IA Design Standards and/or are site specific.

All work called for on the drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the specifications.

The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered. Such obstructions or differences should be brought to the attention of the Owner. In the event this notification is not performed, the Contractor shall assume full responsibility for any revision necessary.

Damage to Existing Site Amenities

Damage to existing irrigation and electrical lines to remain shall be repaired within 24 hours of damage occurrence. If not repaired within the specified time, the Owner has the right to make such repairs as necessary and all costs incurred shall be charged to the Contractor.

Existing Structures: Contractors working on campus shall at their expense preserve and protect turf, trees, plants, monuments, structures, paved areas, and any other site amenities that may not be identified here from damage during the irrigation installation. Repair all damages to the original condition immediately and notify Owners representative of the repair complete with photo documentation of before and after.

Existing Trees: Trenching and excavations within the drip lines of existing trees are to be performed by hand or compressed air excavation. Exercise extreme care to ensure clean cuts through any and all roots encountered. Close trenches showing exposed roots within 24 hours. Any and all excavations within the critical root zone and drip line shall follow the Operational Overview of Tree Protection Procedures from Campus Planning, Design & Construction, and the University Architect.

Existing Utilities: Coordinate staking and identification of utilities with all agencies prior to excavations. Take the necessary precautions to protect underground utilities during construction. Repair any damage immediately at no additional cost to Owner and provide photo documentation of the repair.

Existing irrigation components: Any irrigation components i.e. head's, valves, controllers, backflow devices, removed or demolished are the property of the Owner and shall be returned to Owners Representative or disposed of at their discretion.

Any discrepancies involving the preexisting site conditions and return thereof will refer to the Uniform General Conditions of Texas A & M University.

CONTRACTOR'S RESPONSIBILITY

Prior to submittal of bids, Contractor shall acquaint himself with all matters and conditions concerning the site and existing conditions.

Contractor shall be responsible for coordinating his work with the other trades so that all phases of the work may be properly coordinated without delays or damage to any parts of the work.

The Contractor shall be responsible for all sleeves and chases under paving, through walls, etc., unless otherwise noted on the plans.

Pre-construction Irrigation Audit

A mandatory pre-construction audit will be performed for all projects involving any, and all existing irrigation system or systems to be impacted by construction projects in the vicinity. This audit will identify and document issues in the existing system to provide a baseline for the final inspection.

Contractor will be responsible for maintaining fully functioning irrigation system to adjacent properties that are affected by the construction project, for the duration of the project.

It is the duty of all contractors to provide proper notice to SSC Services to complete the irrigation audit or it is assumed that the system is 100% functional and operational, and any

damage found or incurred after this date will be repaired to the Owners satisfaction at contractor's expense.

SUBMITTALS

Material List:

The Contractor shall furnish the articles, equipment, materials, or processes specified by name in the drawings and specifications. No substitution will be allowed without prior written approval by the Owner. Complete material list shall be submitted prior to performing any work if different from the plans. Material list shall include the manufacturer, model number and description of all materials and equipment to be used.

Equipment or materials installed or furnished without prior approval of the Owner may be rejected and the Contractor is responsible for removing such materials from the site at their own expense.

Approval of any item, alternate or substitute indicates only that the product or products apparently meet the requirements of the drawings and specifications in the approved instance based on the information or samples submitted.

Manufacturer's warranties shall not relieve the Contractor of their liability under the guarantee. Such warranties shall only supplement the guarantee.

Record Drawings:

The Contractor shall provide, and keep up to date, a complete set of printed and annotated drawings which reflect all corrections/changes made to the original approved drawings and specifications and annotate daily, the exact "as-built" locations, sizes, and kinds of equipment installed. Prints for this purpose may be obtained from the Owner. This set of drawings shall be kept on the site and shall be used as a working set. These drawings will be used as a record of changes to be incorporated into a final "as-built" set of drawings following substantial completion.

These drawings shall also serve as work progress sheets and shall be the basis for measurement and payment for work completed. These drawings shall be available at all times for inspection and shall be kept in a location designated by the Owner. Should this working set progress sheets not be available for review or not be kept up-to-date at the time of any inspection, it will be assumed that no work has been completed. The Contractor shall make neat and legible notations on the working set progress sheets daily as the work proceeds, showing the work as actually installed. For example, should a piece of equipment be installed in a location that does not match the plan, the Contractor must indicate that equipment has been relocated in a graphic manner so as to match the original symbols as

indicated in the irrigation legend. The relocated equipment and dimensions will then be transferred to the original Record plan at the proper time.

As-Built Drawings:

After final inspection, but before final acceptance, the Contractor shall submit to the Owner the "as-built" prints. These prints shall be submitted before final payment will be made. As-built drawings must include the following:

Scale of the drawing, complete with legend of all components.

Date of the installation/ As-Built Plan Affix licensee stamp to hard copies of irrigation As- Built drawings.

Minimum system requirements (e.g. 60 USGPM @ 55 PSI)

Location of the main connection referenced to a permanent structure. Information included shall be:

The size and type of the pipe the system is connected to

Size and type of backflow prevention device;

Location and type of winterization point.

Locations of all sprinklers used on the property, including the make and manufacturer of all sprinkler types used. The plan shall indicate what type is used in what location (usually done in the Legend)

Locations of all underground irrigation pipe including type and size of pipe. No PEX or Gray conduit pipe will be accepted.

Location of all valves and valve Boxes, including make, model and size; as well as an indication of the operation (e.g. Manual operation or Automatic.)

Location of all irrigation controllers, including make and model.

Location of all buried wire and connection points.

Location and function of other irrigation equipment used on the project (e.g. Fertilizer injectors, Rain Shut-off Devices, Booster pumps, Weather Stations, Backflow Prevention devices, etc.)

Location of all underground sleeves including the size and type of pipe.

Name and contact phone number and address of the installing contractor.

Include final flow readings from flow calibration via chart listing design flow and actual calibrated flow by zone, listing type and quantity of heads.

The Contractor shall dimension from two (2) permanent points of reference, building corners,

sidewalk, or road intersections, etc., the location of the following items:

Connections to water lines.

Connection to electrical power.

Gate valves.

Routing or sprinkler pressure lines (dimension maximum. 100 along routing.)

Sprinkler control valves.

Routing of control wiring.

Quick coupling valves.

Other related equipment as directed by the Owner.

Operation and Maintenance Manuals

Prepare and deliver to the Owner within ten calendar days prior to final inspection, one digital copy and two hard cover binders with three rings containing the following information and:

Index sheet stating Contractor's address and telephone number, list of equipment with name and address of local manufacturer's representative.

Catalog and parts sheets on every material and equipment installed under this contract.

Complete operating and maintenance instructions on all major equipment.

In addition to the above-mentioned maintenance manuals, provide the Owner with instructions for major equipment.

Equipment to be furnished upon final acceptance:

Supply as a part of this contract the following:

Two (2) sets of special tools required for removing, disassembling and adjusting each type of irrigation head and valve supplied on this project, including solenoid wrenches.

Two (2) keys for each automatic controller.

Two (2) quick coupler keys with valves.

The above-mentioned equipment shall be turned over to the Owner at the conclusion of the

project before final inspection can occur.

DELIVERY, HANDLING, AND STORAGE

Delivery and Handling

Contractor is cautioned to exercise care in handling, loading, unloading, and storing of PVC pipe and fittings. All PVC pipe shall be transported in a vehicle which allows the length of pipe to lie flat so as not to subject it to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded and, if installed, shall be replaced with new piping at the expense of the Contractor.

Storage

If a storage site is necessary, the Owner will determine the storage site at the Pre-Construction Meeting after the award of the contract. Contractor shall erect a temporary fence and store material inside of the fenced area. Contractor shall be fully responsible for the storage site. Storage at the irrigation site shall not be permitted without written consent of the Owner. All PVC pipe shall be covered or otherwise protected from ultraviolet light during storage. Contractor shall maintain the storage area in a neat and orderly manner. If, in the opinion of the Owner, the storage area becomes unsightly, the Contractor shall clean up the storage area within two (2) days of notification.

At the completion of the contract, the Contractor shall remove the temporary storage fence and all debris in the area. The Contractor shall restore the storage area to original condition including, but not limited to, grading and turf re-establishment.

PUBLIC CONVENIENCE AND SAFTEY

Materials stored in or around the worksite shall be placed and work shall always be conducted as to cause no greater obstruction to the travelling public than is considered necessary by the Owner. The materials excavated, and the construction materials used in the construction of the work, shall be placed so as not to endanger the work or prevent free access to all fire hydrants, water valves, gas valves, manholes for the telephone, telegraph signal or electric conduits, sprinkler systems, sanitary sewers, and fire alarm or police call boxes in the vicinity. The Owner reserves the right to remedy any neglect on the part of the Contractor as it relates to the public convenience and/or safety which may come to its attention, twenty-four hours after written notice is given to the contractor and the issue is not remedied , save in cases of emergency, when it shall have the right to remedy any neglect without notice and,

in either case, the cost of such work done by the Owner shall be deducted from the monies due the Contractor. Projects are located on the Texas A&M Campus property in areas that could be used by the public during the course of construction. For this reason, the Contractor must observe the utmost care in regards to the public's safety. Any possible hazards which could result in injury must be eliminated as soon as possible. No trenches, ditches, etc. shall remain open overnight without approval from the Owner, and appropriate safety precautions in place.

Any ditches which are left open must be covered securely so as to prevent any possibility of injury. It shall be the Contractor's responsibility to eliminate any hazards during and after working hours, and the Contractor must have personnel available who can eliminate hazards which are discovered after normal working hours and on the weekends and holidays. Contractor assumes all responsibility for open trenches, ditches etc.

SUBSTITUTIONS

If the Contractor wishes to substitute any equipment or materials for the equipment or materials listed on the irrigation drawings and specifications, they must meet the following requirement and conditions:

Substitution requests will be considered only after award of the contract.

Substitution requests must be made within 30 days after award of the contract.

Provide a written statement indicating the reason for requesting the substitution.

Only one substitution item may be requested per sheet.

Provide descriptive catalog literature, performance charts, and flow charts for each item to be substituted.

Provide the amount of cost savings if the substituted item is approved.

This information must be provided to the Irrigation Supervisor and he shall have the sole responsibility in accepting or rejecting any substituted item as an approved equal to those equipment and materials listed on the irrigation drawings and specifications. Decisions on substitutions by the Irrigation Supervisor are final.

CHANGES IN THE WORK

The Owner may, without invalidating the contract, order additional work or alterations to the contract. Minor changes, such as head locations and controller location, which do not involve extra cost and are consistent with the purpose of the work may be ordered by the

Owner and no claim for an addition to the contract sum or time schedule will be considered.

Any changes which affect the contract price shall be requested in writing and the contract sum shall be adjusted. Any extension of time due to additions in work must be requested and shall be adjusted at the time of the change order.

FINAL INSPECTION

Upon completion of the irrigation system installation, all pressure regulation, arcs, distances of throw, sprinkler locations and height, controller zones, etc., must be adjusted so as to optimize the operation of the system and make it ready for inspection and testing.

Inspection will be carried out with the owner's representative and installation contractor to ensure that the work has been done in a neat and workmanlike fashion, and meets the intent of the installation standards previously agreed upon in the design documents and the pre – construction meeting. Hydrostatic Test: Test irrigation main line, before backfilling trenches, to a hydrostatic pressure of not less than operating pressure for 6 hours. Piping may be tested in sections to expedite work. Remove and repair or replace piping and connections which do not pass hydrostatic testing. Pressure shall be maintained for a 24-hour leak test. The test will require that the system be operated sequentially with the controller, in the presence of the owner's representative. The purpose of the test is to ensure that the system adequately covers the landscape to be irrigated and meets the design criteria previously agreed upon.

Coverage requirements are based on operation of one (1) circuit at a time. However in larger systems where University Representatives has specified the need to operate multiple zones concurrently during the design phase multiple zones will be tested at once to determine hydrologic capabilities.

A punch list will be created during the final inspections identifying any items in need of correction or repairs. Any deficiencies noted during the inspection and testing will be rectified by the installation contractor promptly and signed off by the owner's representative.

Any disputes arising from the use or implementation of these standards may be referred to the TAMU Campus Planning, Design & Construction, TAMUS FP&C, SSC Irrigation Department for arbitration or recommendations.

GUARANTEE

Materials and workmanship shall be fully guaranteed for one year after final acceptance. All

material will be new and the current production model of the material specified. Guarantee is limited to repair and replacement of defective materials or workmanship, including repair of backfill settlement. The Contractor, at his expense, shall repair any defects or replace any defective parts found or occurring during the one year guarantee period within 48 hours of notification by the Owner.

MATERIALS

General:

All materials and accessories shall be of new and unused material. Any section of pipe found to be defective before or after installation shall be replaced with new pipe at the expense of the Contractor. All new irrigation equipment shall be essentially the standard product of the manufacturer. All new equipment furnished shall have in-service performance records sufficient to verify published capabilities.

PVC Pressure Main Line Pipe and Fittings:

Pressure main line piping 3" and below shall be PVC Schedule 40, gasketed or solvent weld joints. Pressure main line piping 4" and larger to be class 200 gasketed pipe. Pipe shall be made from an NSF approved Type I, Grade II, PVC compound conforming to ASTM resin specification D1785. All pipe must meet requirements as set forth in Federal Specification PS-22-70, with an appropriate standard dimension ratio (SDR) (Solvent-weld pipe). PVC solvent-weld fittings shall be Schedule 40, 1-2, II-I NSF approved conforming to ASTM test procedure D2466. Solvent cement and primer for PVC solvent-weld pipe and fittings shall be of type and installation methods prescribed by the manufacturer. Primer must be purple IPS Weldon P-68 or approved equal. All PVC pipe must bear the following markings:

Manufacturer's name

Nominal pipe size

Schedule or class

Pressure rating in P.S.I.

NSF (National Sanitation Foundation) approval

Date of extrusion

All fittings shall bear the manufacturer's name or trademark, material designation, size, applicable I.P.S schedule, and NSF seal of approval.

PVC Non-Pressure Lateral Line Piping:

Non-pressure lateral line piping shall be PVC Schedule 40, solvent-weld joints. Pipe shall be made from NSF approved, Type I, Grade II PVC compound conforming to ASTM resin specification D1785. All pipe must meet requirements set forth in Federal Specification PS-22-70 with an appropriate standard dimension ratio.

Sleeves and Conduit:

All new sleeves shall be schedule 80 PVC pipe, unless the circumstances of its installation require a stronger material to ensure its survival during ongoing construction activity by other trades.

Sleeves crossings any hard surface such as roadways, sidewalks, driveways, or other impenetrable surfaces will be identified by a 3/8" X 3" inch Brass carriage bolt at each end of the crossing for future locations.

PVC Solvents:

Solvent cement and primer for PVC solvent-weld pipe and fittings shall be of type and installation methods prescribed by the manufacturer. Solvent type must be blue, and Primer must be purple IPS Weldon P-68 or approved equal. All solvent glue and primer must be made available for inspection and acceptance by SSC Irrigation personnel. SSC Irrigation's decision on product acceptance shall be final.

Ball Valves:

Ball valve shall be McDonald or approved equal. Gate valves will not be permitted. Ball valves must be installed 12" before the RPZ Reduced Pressure Zone. Isolation ball valve shall be installed 12" before each zone. It is acceptable to install 2 to an isolation valve if necessary. McDonald ball valve shall be installed at the RPZ (See Backflow), master valve (See Control Valves), and flow meter (See Flow Meter).

Quick coupling Valves:

Quick coupling valves shall have a brass two-piece body designed for working pressure of 150

P.S.I. with a ¾ inch diameter outlet. Key size and type shall match the valve. Rainbird 33DRC with 33DK valve key or approved equal.

All Quick Couplings shall have a ball valve no less than 12" and no further than 24" from the valve.

Backflow Prevention Device: Reduced Pressure Zone Device (RPZ)

The approved Reduced Pressure Zone (RPZ) is the Febco 860. Enclosures for 2" and less shall be in a 24"x36" metal cage. (RPZ) Reduced Pressure Zone need to be installed on a concrete Slab on grade with metal enclosure to accommodate the size of the RPZ backflow prevention unit. All back-flow preventers will be installed on the outside of the building. Back flow preventers shall be tested and provide certificate to the responsible party.

Backflow prevention device assemblies (RPZ) shall be in new condition and installed according to the local plumbing code, manufacturers specifications, and sized to accommodate the flow requirements present, and successfully tested by a licensed Certified Backflow Prevention Tester.

A line sized ball valve shall be installed 12 inches before the RPZ.

Control Wiring:

Two Wire Systems: The irrigation wiring shall be minimum 14 AWG direct burial WeatherMatic two-wire for two-wire irrigation systems. Final AWG shall be determined by manufacturer's specifications. Different color jackets must be used for cables installed in the same trench and for the feeder circuit.

Traditional Wired Systems: For traditional wired systems, 14 AWG minimum, between controllers and automatic control valves; with jackets of different colors for multiple cable installation in same trench. NO MULTISTRAND WIRING.WILL BE ACCEPTED.

Grounding rods shall be placed to manufactures recommendations. Weathermatic SLGDT lightening arrestors shall be installed according to manufacturer's specifications for all two-wire systems.

All wire splices shall be made with Wade, DBY (Direct Bury) Splice by 3M or approved equal.

Use one (1) splice per connector sealing pack. All splices must use UL approved connector. DBRY-6. All splices shall be installed in a 10" valve box.

An expansion curl shall be provided within 3' of each wire connection. Expansion curl shall be of sufficient length at each splice connection at each electric control, so that in case of repair, the valve bonnet may be brought to the surface without disconnecting the control wires. Control wires shall be laid loosely in trench without stress or stretching of control wire conductors.

Where more than one (1) wire is placed in a trench, the wiring shall be taped together at intervals of 10'.

Automatic Controller:

Controllers shall be either Weathermatic Smartlink SL1600 or SL4800 for conventional wiring, or SL9600TW for two-wire. The air card shall be WeatherMatic SLAIR-GSM/FLOW. The controller must not require software to be installed locally. Connection to controller through the Smartlink system shall be through a web-enabled appliance such as a PC, Smart Phone, Tablet, etc. If more than 25 controllers are installed, the contractor will provide one Smart Phone or a Tablet.

Install as per manufacturer's instructions. Remote control valves shall be connected to controller in numerical sequence as shown on the drawings. A three-year warranty on all hardware and one-year warranty on labor. The manufacturer is solely responsible for all warranty issues and will be the only point of contact with TAMU.

Affix a non-fading copy of irrigation diagram to the inside cabinet door below controller's name. Irrigation diagram shall be sealed between two (2) plastic sheets, 20 mils. Minimum thickness. Irrigation diagram shall show clearly all valves operated by the controller, showing station number, valve size, and type of planting irrigated.

Lighting Protection and Grounding: Provide full grounding and lighting protection per system manufacturer's recommendations. Grounding network shall measure 10 OHMS or less when measured with a vibra-ground instrument. The use of Weathermatic SLDGT lightening arrestors shall be required on two wire systems, installed to manufacturer's specifications.

Power to Controller and Locations: Locations shown on plan for controllers is approximate. Final location shall be determined on site by owner. Contractor shall supply 120 VAC to controller from adjacent existing power sources. Follow local governing codes in electrical

work.

All controllers must be mounted on outside building walls. Consult final location with SSC Irrigation Department.

Weather Station:

Weather station shall be WeatherMatic SLW5 or most current model wireless and suitable for outdoor mounting. Weather Station shall be installed in the open as much as possible along the eaves of nearby structures identified as the most suitable location by owner's representative

Master Valve and Flow Sensors:

A master valve must be installed on all mainlines. Install in-line sized combination master valve with flow meter on the mainline near the point of connection and after the backflow prevention device. For mainlines below 3 inches in diameter use a WeatherMatic master valve and flow sensor (See "Flow Meter"), and for lines 3inches and above utilize Rainbird or Hunter brass body master valves. Master valves and flow meters to be installed per manufacturer's specifications, including but not limited to straight pipe length requirements. Wire rides are only to be used as a last resort and may only be used with explicit written permission from Owner's Rep.

Flow Meter:

The flow meter shall be WeatherMatic SLFSI. The flow meter shall be size as the same size of the mainline. Flow meter must have a flow range of 0.25 to 12 FPS. Flow meter shall be a 4-blade impeller (paddle wheel). The flow meter shall also be an in-line type, compatible with the WeatherMatic, SmartLink Controller.

Pedestal

The pedestal assembly shall be stainless steel WeatherMatic SLPED-ENC or equal.

Electrical Control Valves:

All 3" valve shall be Hunter ICV-301 or Rainbird 3" brass valve.

All 1 ½ " and 2" valve shall be WeatherMatic Black Max 11000.

All 1" valve shall be WeatherMatic N100S.

Drip irrigation valves shall be Weathermatic SCZ-N-100F-H-25. Larger valves are acceptable where required by larger flows are necessary but must be submitted to the owner for approval.

Remote Control Valve Tags: One (1) remote control valve tag shall be attached to stem of each electric remote-control valve. Tags shall be numbered sequentially. Numbers shall correspond to station numbers in electric controller. Provide tags and corresponding numbers for wires pulled for future valves.

All valves must have at least 18" spacing before any fitting. This will allow for future repairs.

All electric control valves shall be as called for on the plans. All electric control valves shall have a manual flow adjustment. Provide and install one control valve box for each electric control valve. A master valve shall be installed on all water sources. All electric control valves shall be labeled with zone identification tags

Control Valve Boxes:

1 ½ "and 2", and Drip valves shall be installed in 14"x19" boxes, NDS or approved equal.

1" valve boxes shall be 10" box and installed one valve box per valve.

Irrigation valve boxes must be to flush with the final grade of the soil and supported by bricks beneath the boxes and plastic sheeting wrapped around the base of boxes. to reduce infiltration of soils and sediment around components within. No gravel shall be placed in the valve boxes. Gravel may only be placed in the double check vault.

Spray Heads:

Hunter Pro spray (PRS -40) with MP rotary nozzles 1000, 2000, 3000 series with check valve shall be the standard spray head and nozzle combination used. Specific conditions of specification are as follows:

Turf area should be 4"

Shrub heads shall be 6" or 12".

Side inlets shall not use on any heads.

MP Rotators shall not be mixed on a zone with any other type of nozzle.

Fixed spray heads may be used in specialized circumstances, approved by SSC Irrigation.

For spray nozzles, Hunter Pro spray (PRS-30) spray heads shall be used.

Fixed nozzles are preferred to VAN nozzles.

Nozzle size no less than 8' and no more than 15'.

VAN nozzle will be permitted in only area that a fix nozzle will spray on the hardscape.

Install the irrigation heads as designated on the drawings. Spacing of heads shall not exceed the maximum indicated on the drawings and shall achieve head to head coverage. In no case shall the spacing exceed the maximum recommended by the manufacturer.

Rotor Heads:

Rotor heads will be WeatherMatic T3, PGJ, and I-25. The following exceptions may apply:

Hunter PGJ will only be accepted in areas less than 20'.

WeatherMatic T3 nozzles shall be low angle for flat surfaces. For berms, the nozzles shall be no smaller than a 7.

All heads shall have a check valve installed before the head or a check valve shall be internal to the irrigation head. I-25 nozzles smaller than a 15 are not permitted. All rotors must be installed with 1" or greater pipe diameter.

Install the irrigation heads as designated on the drawings. Spacing of heads shall not exceed the maximum indicated on the drawings and shall achieve head to head coverage. In no case shall the spacing exceed the maximum recommended by the manufacturer.

Tree Bubblers:

Tree bubblers shall be Hunter fixed flow flood bubblers unless otherwise approved. If adjustable bubbler is required, it shall be Irritrol 533. Bubblers shall be installed on 12"Hunter swing joints. Tree Bubblers shall be the only acceptable method of irrigating trees. No other forms of drip will be accepted.

Drip Irrigation:

Drip tubing should be installed on the uphill side of all plants. All drip zones shall be pressure-regulated at the valve using manufacturer's specifications. Automatic line flushing valve shall be installed at the end of each independent zone. The valve shall be capable of flushing one (1) gallon of water at the beginning of each irrigation cycle. Drip lines shall consist of nominal sized 1/2" low density, linear polyethylene tubing, housing internal pressure compensating, continuously self-flushing, and integral drip emitters. The tubing shall have an outside diameter (O.D.) of 0.67", and an inside diameter (I.D.) of 0.57". The emitters shall have the ability to independently regulate discharge rates, with an output pressure of 7-70 psi, at a constant flow of 0.6 gph. The dripper line shall have factory install emitters 12" on center. All fittings to be RainBird's compression fittings. Header and footer rows shall be used for inline installations.

Ground cover areas and densely planted areas: Drip shall be Hunter drip tube with 12" spacing. Drip shall also have a 6" pop-up indicator.

Other sparse or intermittent plantings of shrubs, ornamental grasses, etc.: Blank drip tubing should be used and individual drip emitters installed so that only the root zone of the individual plants is irrigated.

Fittings:

All threaded fittings shall be schedule 80. All other fittings shall be schedule 40.

Swing Joints:

Swing Joints will be installed at every sprinkler heads. Hunter SJ swing joints will be permitted for sprinkler heads with ½" or ¾" inlet. Hunter HSJ swing joints or equal shall be used for heads with 1" inlet. No cut off risers will be permitted. Funny pipe / Flexible tubing is not permitted.

Copper Piping:

Any irrigation piping inside of a building must be Copper pipe and labeled IRRIGATION.

EXECUTION

GENERAL

All scaled dimensions are approximate. The Contractor shall check and verify all size dimensions and receive Owner's approval prior to proceeding with work under this section.

Exercise extreme care in excavating and working near existing utilities. Contractor to call Texas 811 prior to any digging. Contractor shall be responsible for damages to utilities which are caused by their operations or neglect. Verify existing utilities with the appropriate utility owner i.e. electricity, gas, cable, telephone.

Damaged utilities shall be repaired by the Contractor the same day they are damaged.

Coordinate installation of irrigation materials including pipe, so there shall be NO interference with utilities or other construction or difficulty in planting trees, shrubs, and ground covers.

The Contractor shall carefully check all grades to satisfy themselves that they may safely proceed before starting work on the irrigation system.

PREPARATION

Physical Layout:

Prior to installation, the Contractor shall stake out all pressure supply lines, valve locations, and locations of heads for approval by the Landscape Architect or Owners Representative before proceeding with installation of irrigation components.

Any Turf area designated as a "Fire Lane" shall be independently zoned and isolated by ball valve from the rest of the system in the event of an emergency and for repairs.

All components shall be made available for the Owner's Representative for inspection.

Water Supply:

Landscape Irrigation system shall be connected to water supply points of connection as indicated on the drawings. Contractor shall verify static water pressure prior to commencement of construction/installation. Should there be a discrepancy between the design pressure and the actual pressure, contact the Owner before proceeding with the work. Failure to do so will result in the Contractor making necessary changes to the irrigation system without additional cost to the Owner. The Contractor shall provide all required water taps and water meters necessary for the project as indicated on the plans. Connections shall be made at approximated locations as shown on drawings. Contractor is responsible for minor changes caused by actual site conditions.

Electrical Supply:

Electrical service must be provided to the controllers by the Contractor. The Contractor shall make the final wiring of the controller. Electrical work shall conform to all applicable codes. Connections shall be made at approximate locations as shown on drawings. Contractor is responsible for minor changes caused by actual site conditions.

INSTALLATION

Trenching:

Dig trenches straight and support pipe continuously on bottom of trench. Lay pipe to an even grade. Trenching excavation shall follow layout indicated on drawings and as noted.

For pressurized mainline Provide 6-inch-wide trenches with 18 inches minimum earthen cover. For all gasketed pipe Install concrete thrust blocks in areas where the rubber-gasket irrigation main changes direction such as at elbows and tees and where the rubber-gasket main terminates.

For non-pressurized lateral lines provide Lateral Lines: install in 4-inch-wide trenches with

12 inches minimum cover.

Provide for a minimum cover of eighteen (18) inches for all control wiring and Install pipe so that writing on pipe can been seen during inspection.

Backfilling:

The trenches shall not be backfilled until all required tests are preformed and inspections are made by Texas A&M University. Partial backfilling between joints is acceptable to prevent pipe from floating. Trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand, or other approved materials, free from large clods of earth, stones or construction debris. Backfill shall be mechanically compacted in landscaped areas to a dry density equal to adjacent undisturbed soil areas. Backfill will conform to adjacent grades without dips, sunken areas, humps or other surface irregularities.

Hand tamp and water jet to prevent settling. Hand rake trenches and adjoining areas to leave grading condition equal to before installation.

If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn or planting, or other construction are necessary, the Contractor shall make all required adjustments without cost to the Owner.

Trenching and Backfill Under Paving:

All piping and wiring under existing and proposed paving shall be in appropriately sized sleeves. The minimum sleeve size under pavements is 4". Coordinate sleeving with the Landscape Architect of record.

Trenches with pipe and wire to be located under areas where paving, asphaltic concrete or concrete will be installed shall be backfilled with sand (a layer three {3} inches below the pipe and six {6} inches above the pipe) and compacted in layers to 95% of maximum dry density, using manual or mechanical tamping devices. Trenches for piping shall be compacted to equal the compaction of the existing adjacent undisturbed soil and shall be left in a firm unyielding condition. All trenches shall be left flush with the adjoining grade. The Contractor shall set in-place, cap, and pressure test all piping under paving.

Generally, piping under existing walks is done by jacking or boring, but where any cutting or

breaking of sidewalks and/or concrete is necessary, it shall be done and replaced by the Contractor to match existing as a part of the contract cost. Permission to cut or break sidewalks and/or concrete shall be obtained from the Owner.

Provide for a minimum cover of eighteen (18) inches between the top of the pipe and the top of pavement for all pressure and non-pressure piping installed under any paving.

NO MACHINE TRENCHING IN THE CRITICAL ROOT ZONE IS AUTHORIZED.

Sleeves and Conduit:

All sleeves in soil shall be installed and backfilled with the same considerations for protection of the material as if it were water pipe. Compaction shall be to the same standard as the adjoining undisturbed soil and the sleeves shall project at least 12" on either side of the hard surface being crossed.

Sleeves being installed beneath roads or driveways for later use shall have the necessary pipe installed at the same time with each end elbowing to at least 36inchesabove grade

Sleeves shall be sized to be no less than twice the size of the pipe being protected if lateral line and three times the size if main line. Install at every 150 linear feet of paving, driveway, roadway or any hard surface that may be encountered, a minimum of two sleeves at each location. Any pipe installed under a sidewalk, driveway, or concrete area should be in a sleeve. An extra 2" sleeve should be installed under any sidewalk, driveway, or concrete area.

Assemblies:

Routing of irrigation lines as indicated on the drawings is diagrammatic. Install lines (and various assemblies) in such a manner as to conform with the details and plans. Install NO multiple assemblies in plastic lines. Provide each assembly with its own outlet. Install all assemblies specified herein in accordance with respective detail. In absence of detail drawings or specifications pertaining to specific items required to complete work, perform such work in accordance with best standard practice with prior approval of Owner.

PVC pipe and fittings shall be thoroughly cleaned of dirt, dust, and moisture before installation. Installation and solvent welding methods shall be as recommended by the pipe and fitting manufacturer.

On PVC to metal connections, the Contractor shall work the metal connections first. Teflon paste shall be used on all threaded PVC to PVC, and on all threaded PVC to metal joints. Light wrench pressure is all that is required. Where threaded PVC connections are required, use threaded PVC adapters into which the pipe may be welded.

Point of Connection:

Each point-of-connection (POC) shall utilize a normally closed master valve with pressure regulating capabilities not to exceed more than 60 psi and a real time flow sensor to communicate and respond to both high flow and low flow events.

If there are two POCs used for one controller, a Weathermatic Combi-flow shall be added to the system. If two controllers use the same POC, a Weathermatic Iso-Flow shall be used. Under no circumstances shall more than 2 POCs be used for one controller. Additionally, 1 POC cannot be used for more than 2 controllers.

Flushing of System:

After all new irrigation pipe lines and risers are in place and connected, all necessary diversion work has been completed, and prior to installation of irrigation heads, the control valves shall be opened and full head of water used to flush out the system.

Irrigation heads shall be installed only after flushing of the system has been accomplished to the complete satisfaction of the Owner.

Retrofits and repairs to existing systems:

Retrofits and repairs to existing irrigation systems must follow these design guidelines and specifications and be completed to the satisfaction of the Owner's representative.

NOTE: Any project, new construction, or renovation will adequately provide irrigation coverage to all areas affected by said project previously irrigated at the start of the project.

TEMPORARY REPAIRS

The Owner reserves the right to have made temporary repairs as necessary to keep the

irrigation system equipment in operating condition. The exercise of this right by the Owner shall not relieve the Contractor of their responsibilities under the terms of the guarantee as specified herein. Costs incurred from these repairs shall be charged to the Contractor or withheld from monies due to the Contractor.

FIELD QUALITY CONTROL

Adjustment of the System:

The Contractor shall flush and adjust all irrigation heads for optimum performance and to prevent over-spray onto walks, roadways, and buildings. If it is determined those adjustments in the irrigation equipment will provide proper and more adequate coverage, the Contractor shall make such adjustments. Adjustments may also include changes in nozzle sizes and degrees of arc as required. Any and all changes shall be recorded on the Record Drawings. All irrigation heads shall be set perpendicular to finished grades unless otherwise designated on the plans.

Testing of Irrigation System:

All hydrostatic testing shall be made in the presence of the Owner. No pipe shall be backfilled until it has been inspected, tested, and approved in writing. It is permissible to backfill between pipe joints to prevent pipe float. Any leaks or component failures to be corrected within 72 hours and retest immediately thereafter.

The Contractor shall request the presence of the Owner in writing at least 48 hours in advance of testing for inspection and witness of test. Test all pressure lines under hydrostatic pressure at operating pressure and prove watertight. Testing of pressure mainlines shall occur after installation of electric control valves.

All piping under paved areas shall be tested under hydrostatic pressure at operating pressure and proved watertight.

Test all mainlines for 24 hours in open trenches and at the point of connections for a minimum of one hour to ensure components are sealed and no leaks are present. All testing to be performed under the direction of SSC irrigation personnel. Any leaks or component failures to be corrected within 72 hours and retested immediately thereafter.

When the irrigation system is completed, perform a coverage test in the presence of the

Owner, to determine if the water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from plans, or where the system has been willfully installed as indicated on the drawings when it is obviously inadequate, without bringing this to the attention of the Owner. This test shall be accomplished before any planting takes place.

Upon completion of each phase of work, the entire system shall be tested and adjusted to meet site requirements.

An irrigation audit shall be completed on the irrigation zones for DU (Distribution Uniformity) with all zones having at least 65% DU. The audit should be done by a certified Irrigation Auditor and a formal report shall be delivered to Landscape Services at final inspection.

Maintenance

The entire irrigation system shall be under fully automatic operation for a period of seven (7) days prior to any planting. The Owner reserves the right to waive or shorten the operation period.

Clean-up

Clean-up shall be made as each portion of work progresses. Refuse and excess dirt shall be removed from the site and disposed of at the Contractors expense.

At the end of each workday, the Contractor shall leave the site area broom-clean and shall wash down all paved areas within the contract area, leaving the premises in clean condition. All sidewalks, paths, curbs and roads shall be left in a clean, safe condition.

All scars, ruts or other marks in the ground or surrounding area caused by this work shall be repaired to the original condition.

FINAL INSPECTION PRIOR TO FINAL ACCEPTANCE

The Contractor shall operate each system in its entirety for the Owner at time of final inspection. Any items deemed not acceptable by the Owner shall be reworked to the complete satisfaction of the Owner.

OBSERVATION SCHEDULE

Contractor shall be responsible for notifying the Owner in advance for the following observation meetings, according to the time indicated:

Pressure supply line installation and testing--48 hours

Automatic controller installation--48 hours

Control wire installation--48 hours

Lateral line and head installation--48 hours

Coverage test--48 hours

Final inspection--7 days

BICYCLE RACKS

The number of racks required will be determined during the schematic design stage with the TAMUS FP&C or SSC Project Manager and TAMU Transportation Services.

TRASH REMOVAL

Verify method of disposal in conjunction with TAMU Utilities and Energy Services.

LANDSCAPING

GENERAL

All landscaping plantings shall be planned and designed to be compatible with the 2017 Campus Master Plan and any and all subsequent supporting documents.

The planting mix that we are using on campus with good results is 2 parts sandy loam, 2 parts washed yellow sand and one-part compost. This mix is used the entire depth of the root zone for new annual flower beds and landscape beds.

TREES

SUMMARY

Texas A&M University recognizes and values the importance of the campus trees as an essential and valuable resource and as a major component of the campus identity. These Tree Care Specifications and Guidelines have a companion document called the Campus Tree Care Plan. These two documents are to guide all construction and any work that impacts trees on the Texas A&M College Station campus. These standards provide direction to any and all outside designers and contractors. Likewise, they shall guide and direct university employed, or contracted, design professionals and contractors. This direction relates to proper procedures regarding tree design, selection, maintenance, preservation, protection, and replacement. Prior to any work that is done on campus, which has any tree impact, a tree training course will be provided and required.

DEFINITIONS

Branch Collar: Wood tissue that forms around the base of a branch between the main stem and the branch. Usually as a branch begins to die, the branch collar begins to increase in size.

Best Management Practices (BMP): Best available, industry recognized course of action, in consideration of the benefits and limitations, based on scientific research and current knowledge.

Caliper Inch: is the diameter of a young tree. It is measured 6" above ground for trees up to and including 4" caliper size. If caliper at 6" above ground exceeds 4" caliper, the tree will then be measured at 12" above the ground. Newly planted (nursery stock) trees on the Texas A&M College Station campus are measured in caliper inches.

Cambium Layer: Growing point between bark and sapwood.

Closure: Refers to the roll of the wound wood growth around the wounded area.

Critical Root Zone (CRZ): an area from the base of the tree that extends beyond the drip line. It is equal to 1-foot radius for every inch of stem diameter. This minimum area is needed for tree and root health and stability.

Cut: The exposed wood area that remains after the branch has been removed.

Cut Back: Specific reduction of the overall size of the tree or individual branches, but may include the overall reduction of the sides as well as the top of the tree.

Damage or damaged: A tree is considered "damaged" when a physical/mechanical action

damages parts of the stem, canopy or roots.

Diameter at Breast Height (DBH): a standard method of measuring stem diameter 4.5 feet above the ground. Established trees on Texas A&M College Station campus are measured in DBH inches.

Dormant: A condition of non-active growth. Deciduous trees are considered to be dormant from the time the leaves fall until new foliage begins to appear.

Drip Line: Considered the outer edge of the tree canopy. An imaginary vertical point that extends from the canopy edge to the ground.

Elevating: The removal of lower branches for under clearance.

Existing Soils: A naturally occurring soil that has not been relocated or was present before construction.

Girdling Roots: Circular root growth around the base of the truck. These roots can be below or above ground level. These roots choke the tree and restrict the flow of sap.

Heading Back: The cutting back of terminals of a temporary limb or branch to a lateral branch or bud to slow its growth, while allowing it to produce food resources for the tree. This is a common nursery practice.

Heritage Trees: Trees greater than 24" DBH. Trees greater than 30 years of age that are in good health. Does not include: Tree of Heaven, Mimosa, Mulberry species, Siberian Elm, Calleryana Pear.

Lifting: The removal of lower branches for under-clearance or sight line issues.

Owner: TBD by project scope

Owner's Representative: TBD by project scope but usually an FPC or SSC project manager.

Parent Stem: The trunk of the main tree.

Planting Medium/Mix, Acceptable: A soil mix developed by amending the existing soil or removing the existing soil and replacing with new soil mix (as defined in Section #_____ SOILS). Soil mix shall be of uniform composition throughout, with admixture of subsoil. It shall be free of stones, lumps, live plants and their roots, sticks, and other extraneous matter.

Precut or Pre-cutting: The removal of the branch at least 6" beyond the finished cut to prevent splitting into parent stem or branch.

Pruning: The removal of dead, dying, diseased, or live, interfering objectionable and weak branches in a scientific manner.

Replacement Tree: A self-supporting tree on the Texas A&M University College Station Desirable Tree Species list that meets caliper inch requirements.

Scars or Injuries: Natural or man-made lesions of the bark in which wood is exposed.

Suckers: Abnormal growth of small branches usually not following the general pattern of the tree.

TAMU representative: Campus Planning, Design & Construction, the University Architect,

or designated individual under the approval of TAMU.

Temporary Limb: A limb left on a small tree to provide for tree growth until permanent scaffold limbs and adequate top limbs are developed. If large, they are headed back to prevent their challenging the desired terminal for dominance.

Thinning Out: The removal of live branches to reduce wind resistance and create more space.

Top Soil: Native soil on site or natural soil harvested from another site than naturally has the texture and composition to meet the specification described under Soil section #_____, and is free of noxious weed seed, shall constitute an Acceptable Planting Media (APM).

Topping: Any pruning practice that results in more than one-third of the foliage and limbs being removed. This includes pruning that leads to the disfigurement of the normal shape of the tree.

Tracing: Careful cutting of the bark along the lines of sap flow to encourage wound closure.

Tree Training: Pruning young trees in a specified manner to shape their growth in keeping with their genetically determined natural form and the urban requirements immediately surrounding them.

Trimming: Same as pruning

Wounded Wood: New growth made by the cambium layer around all of a wound.

University Sponsored Arborist: Typ. Arborist appointed to represent TAMU under the direction of TAMU Campus Planning, Design & Construction, or the University Architect.

Tree Value: The estimated value of the tree as provided by a licensed arborist certified to do tree appraisals.

Tree Survey: Part of the construction plans; contains tree tag number, location of trees (GPS located if possible), DBH, species, and drip line (if possible).

Tree Protection Plan: A written part of the construction plans that describes measures to protect trees during all phases of the project; it should include details, notes, location of tree protection fence, and any other applicable items.

REFERENCE STANDARDS

National Arborist Association (NAA)

American Association of Nurserymen (AAN)

American National Standards Institute (ANSI)

Texas A&M University Campus Tree Care Plan

International Society of Arboriculture (ISA)

Tree Care Industry Association (TCIA)

US Forest Service Urban and Community Forest

Arbor Day Foundation

Texas A&M Forest Service

PRE-CONSTRUCTION

Preconstruction Meeting

At least 7 days prior to the start of work, a pre-construction meeting with the Owner's Representative shall be set to review any questions the contractor may have regarding the work, administrative procedures during construction, and project work schedule as the questions relate to trees. This meeting should be held on the construction site when applicable and possible. This meeting shall include:

A Texas A&M representative. TAMU Campus Planning, Design & Construction, the University Architect or designated individual.

General Contractor

University Sponsored Arborist

ISA Certified Arborist (If outside arborist is overseeing work)

Subcontractor assigned to install Tree and Plant Protection Measures

Earthwork Contractor

All Site Utility Contractors that may be required to dig or trench into the soil.

Landscape Subcontractor

Irrigation Subcontractor

Construction Site Tree Assessment

Prior to any construction, the University Sponsored Arborist shall provide a tree evaluation of trees on site. This is to be communicated to FPC, SSC and other applicable TAMU departments prior to any site work begins. The project may provide an assessment from an outside arborist (ISA Certified Arborist, or ASCA Registered Consulting Arborist (RCA). The Assessment shall include all potential root pruning, branch pruning, tree removals, transplanting, and/or the current health of the tree and an ongoing care plan. This assessment must be approved by the University Sponsored Arborist and a university owner representative. Cost appraisal of tree should be provided when applicable and requested by

the university.

Tree Survey

As the University Tree Survey becomes available, any design and construction should use this information as a basis of initial evaluation. If the information is invalid or missing, this shall be communicated to the university sponsored arborist and the project manager in order to get the information to the correct people. Contact the University Sponsored Arborist for this tree inventory data for project area.

All trees 6" DBH and greater on all development sites shall be surveyed and shown on the site plan. Survey information shall state location, species, canopy size and tree DBH. Any tree survey must be assessed by the University Sponsored Arborist prior to the issuance of construction documents.

CRITICAL ROOT ZONE (CRZ):

The University Sponsored Arborist shall coordinate specific requirements regarding tree protection fencing, construction storage, construction parking, construction traffic through site, scaffolding, forms, foundation or any other issues as they relate to CRZ. This shall be the minimum amount of preservation required with any additional requirements determined in coordination between the university sponsored arborist and the project manager:

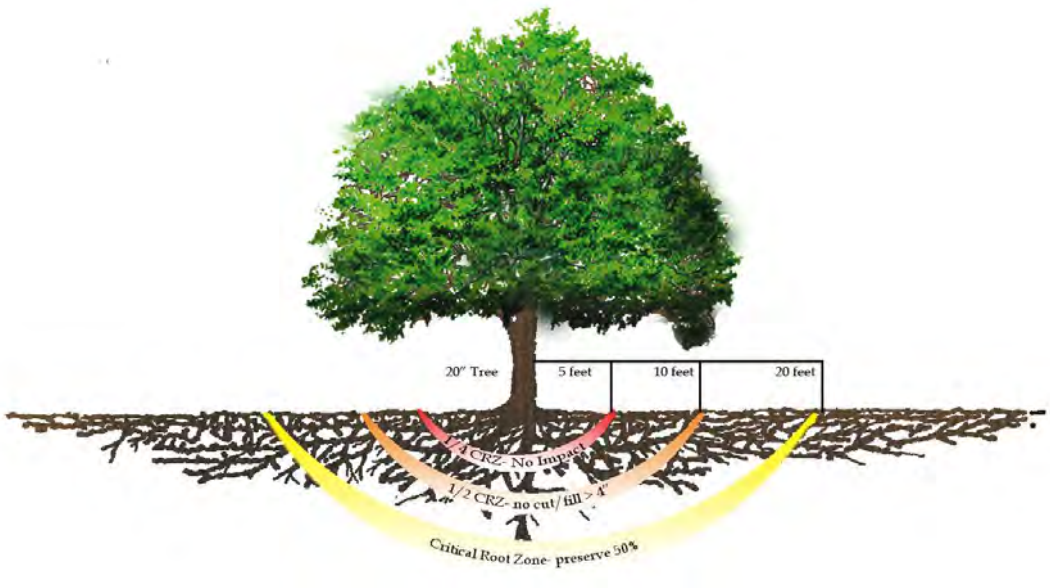
1 foot of radial protection per diameter inch of tree shall determine CRZ (i.e., a 25" tree would have a 50-foot diameter CRZ; see chart below)

Tree diameter, DBH (inches)	Critical Root Zone, CRZ (feet)
8 inches	16 feet
10 inches	20 feet
15 inches	30 feet
20 inches	40 feet
25 inches	50 feet
30 inches	60 feet

40 inches	80 feet

The Critical Root Zone- Development Impact

Example: 20 inch diameter tree



TREE PROTECTION FENCING

All trees shown on plan to be preserved shall be protected with temporary chain-link fencing. In areas where installation of chain-link fencing would be detrimental to a tree or a tree's root system, other methods of fencing may be acceptable per approval from Texas A&M designated Arborist (i.e., Chain-link panels, plastic fencing, etc.).

Protective fences shall be erected according to Texas A&M campus standards for tree protection. Protection fencing shall be installed prior to the start of any site preparation work (clearing or grading) and shall be maintained throughout all phases of the construction project until substantial completion and the approval to remove the fencing from the university sponsored arborist.

Tree protection fencing that is damaged or found to be non-compliant shall be repaired/replaced within 24 hours of notice or a stop work order shall be given. Tree protection found to be moved by anyone other than the project arborist or the university

sponsored arborist will require that all work stop until the issue is investigated, the fence returned and any needed care, as determined by the arborist. Depending Erosion and sedimentation control barriers shall be installed or maintained in a manner that does not result in damage to the tree or Critical Root Zone (CRZ) and in a manner that does not result in soil buildup.

Protective fences shall surround the trees or groups of trees, and will remain at the location specified in the approved site plan. For natural areas, protective areas shall follow the limit of construction line in order to prevent the following:

Soil compaction in the root zone area as a result from vehicular traffic, parking or storage of equipment and materials.

Root zone disturbances due to grade changes (greater than 4 inches of cut or fill). No removal of soil or piling of soil is permitted with the CRZ of protected trees.

Trenching not approved or authorized by the Texas A&M designated Arborist.

Compaction from construction activities, including eating or resting under protected trees.

Welding or any other heat sources under or near trees.

Other activities detrimental to trees such as chemical storage, concrete clean-outs and other construction spoils. Portable toilets should not be placed within any area of a CRZ of a protected tree.

Exceptions to installing fences at CRZ shall be permitted in the following cases:

Where there is to be an approved grade change, impermeable paving surface, tree well, or other such site development, erect the fence 2 to 4 feet beyond the area disturbed. Where permeable paving is to be installed within a tree's CRZ, erect the fence at the outer limits of the permeable paving area (prior to site grading so that the area is graded separately prior to paving installation to minimize root damage). Where construction activities come within 6 feet of any tree, permission must be obtained from the university prior to any work. If approved, protection of the trunk with strapped on planking to the height of 8 feet (or the limits of lower branching) may be required in addition to the reduced fencing provided. Where trees are close to proposed buildings, erect the fence so there is 6 to 10 feet of workspace between the fence and the building. Where there are severe space constraints due to limits of construction (LOC) or other special requirements contact the Texas A&M designated Arborist. on all circumstances, a fine might be imposed to the contractor who moved the fencing.

Special Note: For the protection of natural areas, fences are required. No exceptions.

TREE TRANSPLANT SPECIFICATIONS

Trees suitable for transplanting and their future locations shall be designated on site plan and marked on site at least six months prior to commencing site preparation activities. Tree transplant contractor should be allowed at least 90 days lead time for root pruning activities prior to moving trees. It is recommended that root pruning occur between the months of October and February, if possible. It is recommended that trees be moved between the months of October and February, if possible. A good example to pruning and moving a tree would be to prune in the fall and move during spring. Or vice versa. Final grading and elevation of transplant trees shall be confirmed by the university designated arborist and the appropriate university owner representative prior to final issuance of construction documents. Coordination of logistics for movement of transplant trees shall include TAMUS FP&C, TAMU Campus Planning, Design & Construction, the University Architect, general contractor, engineer, and Texas A&M designated Arborist. Transplanting of trees shall be done in a manner that is industry standard (e.g., time-tested practices etc.). Texas A&M designated Arborist shall approve these means and methods. The tree transplant contractor or landscape subcontractor shall maintain all transplanted trees during construction and for an additional twelve months following substantial completion and is responsible for the tree health. If the tree dies or declines to a state not suitable to the university, the contractor is responsible for replacement. If a tree fails to survive the above timeframe, a new tree(s) will be provided by the project (must meet the mitigation requirements in section 1.12). The project must either assign a certified arborist to care for trees within fenced areas, or designate the university sponsored arborist. Responsibilities of this area are to include irrigation, mulching, erosion control, weed control, insect and disease and any other necessary plant care activities. Construction activities shall not take place within five (5) feet of the edge of any transplant tree root ball

TREE REMOVAL AND REPURPOSING SPECIFICATIONS

Trees approved for removal shall be removed in a manner that does not impact trees to be preserved. Reference Technical Standards Subsection 3.00.0.

Contractor performing tree removal shall coordinate with Texas A&M designated Arborist and the appropriate university owner representative to remove selected trees in a manner that will enable them to be processed into usable materials.

Contractor will transport trees removed for repurposing to a local Texas A&M designated property (exact location TBD). This should be coordinated through TAMU Campus Planning,

Design & Construction, the University Architect, and SSC Grounds Operations.

TREE PROTECTION DURING CONSTRUCTION

Projects on the Texas A&M campus shall adhere to specifications based on the most current editions of the following:

American National Standards Institute (ANSI) A300– 05 Management of Trees and Shrubs during Site Planning, Site Development, and Construction (2012).

ANSI z133.1 Safety Standards

Related ISA Best Management Practices (BMP's)

Trees within LOC are ultimately the property of Texas A&M. All necessary efforts shall be made to ensure survivability of trees in regard to construction impacts. Including:

Continuous inspection of tree protection fencing installed per university specifications and approved site plan (by Texas A&M designated arborist and general contractor).

Any encroachments into tree protection fencing and CRZs shall be brought to the attention of the project manager and/or construction inspector, Texas A&M designated Arborist, or Landscape Services representative.

Deviations from approved tree preservation plans will occur only with written authority from Texas A&M designated Arborist or the proper university owner representative.

Critical Root Zone Management

Any roots two inches (2") or greater severed by construction activities shall be pruned flush with the soil. Roots severed shall be backfilled with quality soil or compost as soon as possible. Cuts to oak roots shall be made using disinfected. If exposed roots are not backfilled within 48 hours, cover them with organic material in a manner that reduces soil temperature and minimizes water loss due to evaporation. Excavations within CRZ shall be first assessed by means of air excavation. Utilizing a compressed air tool significantly decreases damage to roots. Locating roots using this method allows for proper root pruning and preservation techniques that will increase the chance of survival of the tree. A compressor-powered air excavation tool shall be used to "pot- hole" (probe soil to certain depth in search of root material) proposed excavation areas. Roots 2" inches and greater will be exposed and cut cleanly back to existing soil (wound paint and disinfected tools required for all oaks). A quality topsoil and/or compost shall be used as backfill in areas where roots are present.

Coordinate with the requirements of the proposed Planting Soil section for modifications to the soil within the root zone of existing trees. Any trenching required for the installation of landscape irrigation shall be installed as far from existing tree trunks as possible, and must be outside of quarter CRZ. No soil greater than 4 inches shall be permitted within the half CRZ of trees. No soil or mulch is permitted on the root flare of any tree. Compost may be used in this area if the mix and the use are approved by the university sponsored arborist and the proper university owner representative. Any Concrete Washout areas shall be outside of the CRZ.

Removal of Hardscape Areas from CRZ

Special care shall be taken when removing sidewalks, streets, pavers, etc., from within CRZ. This will include but not be limited to:

Saw cutting and hand removal of materials within CRZ

Reduced heavy equipment access within CRZ. Any vehicle activity within these areas shall only be done with the consent of the university sponsored arborist.

Installation of mulch (4-6 inches) within CRZ for root protection

Installation of Ground Protection Mats or Mulch

In areas where foot traffic or storage of lightweight materials is unavoidable, provide a layer of 4-5 inches of wood chips or mulch. Prior to any activity, near or under trees, communication and approval from the university sponsored arborist and the proper university owner representative is required.

Areas where heavy vehicle traffic is unavoidable provide a layer of 6 to 8 inches of wood chips or mulch and add ground protection mats on top.

Irrigation Standards for Trees Preserved on Site

In order to minimize impacts of construction, trees located within LOC and slated for preservation shall continue to receive the necessary levels of irrigation to ensure survival. Coordination must be made between Texas A&M designated Landscape Services Irrigation staff and the general contractor. Trees within preservation zones will continue to be irrigated through duration of project. Irrigation systems shall be continually monitored to ensure correct coverage. If irrigation service is interrupted, water shall be provided by the general

contractor. Water barrels, tree gators and water trailers/tankers are suitable substitutes. Maintenance of CRZ Areas within LOC. Contractors shall be responsible for grass and weed maintenance inside LOC and tree protection fence areas. Grass will remain trimmed inside all tree protection fencing, work shall be performed on the same frequency as surrounding area. Routine hand weeding is required for all mulch areas located within the tree protection zone. Trash inadvertently deposited within tree preservation zones shall be removed prior to trimming or mowing.

Tree Inspections

To ensure compliance of tree preservation, a Texas A&M designated Arborist, Texas A&M owner representative, and if necessary, a project appointed arborist, shall conduct regular inspections. Frequency based on project needs. If project has a consultant arborist, inspections shall be monthly at minimum. Reports shall be provided to the university project manager and sent to all parties. Inspections shall include:

Tree preservation zone encroachment

Structural integrity of tree protection fencing

Irrigation/soil moisture levels

Evidence of plant stress

Insects and disease activity

Dust levels on leave

TREE MITIGATION POLICY

Heritage Trees

Heritage Trees (24" DBH and above) shall not be removed without a review process. That review will consider the following:

Current health of the tree (tree is dead, tree is a risk, or tree is diseased)

The tree is a danger to the public.

Texas A&M designated Arborist shall determine current condition of tree. If tree is dead,

diseased, or poses a risk, Texas A&M designated arborist will evaluate and this will affect mitigation requirements.

Final approval will be determined by the proper university owner representative.

Trees shall be replaced on a 3" to 1" ratio (i.e., if you have removed a 24" DBH tree, 72 caliper inches must be replaced). See section 1.00 for difference between DBH and caliper.

8"- 23" DBH Trees

Trees shall be replaced on a 1" to 1" ratio. For example: a 20" diameter tree will be replaced by 20 caliper inches; this could mean five, 4" trees or ten, 2" caliper trees.

Trees less than 8" in diameter require a 1 to 1 replacement.

Memorial Trees/Historical Significance

Various memorial trees and trees with historical significance exist throughout Texas A&M campus. The project shall attempt to preserve in place or transplant any memorial trees or historically significance trees on the site. The university reserves the right to remove or relocate trees in an unforeseen circumstance. If a tree cannot be relocated due to restrictions of tree size and available planting locations, the tree will be removed and replaced with a new one at the discretion of the Texas A&M designated Arborist. The first option shall be to replace on site if space is available; costs to be covered by the project.

Tree Replacement Requirements

Tree mitigation shall be required when the above sizes of trees are removed. Examples shall include one or more of the following mitigation measures:

Planting replacement trees on the site in accordance with the latest edition of the American Standard for Nursery Stock (ANSI Z60.1).

Transplanting existing trees on site or nearby. Any transplant tree can count 50% toward total mitigation; for example: a 30" diameter oak would count toward 45 inches of required

mitigated inches (due to heritage trees being replaced 3:1).

All trees (from section 5.04.1) below 8" diameter that are preserved on site will count 50% toward total mitigation; for example: five 6" elm trees are preserved on the perimeter of the site – this would count toward 15 inches of required mitigated inches.

Quantities of Replacement Trees

Existing tree inches are calculated in DBH inch but replacement trees are calculated in caliper inch (i.e.: 20" DBH tree removed equals 20 caliper inches replaced).

Size of trees replaced on development sites should range between 1" and 4" in caliper. Trees greater than 4" may be planted if feasible and approved by Texas A&M designated Arborist and the appropriate university owner representative.

Replacement trees shall be planted to the extent on the site without jeopardizing spacing requirements for future growth of the trees, or impacting existing tree canopy.

Newly planted trees on development projects shall be spaced in the following manner:

Large trees shall be planted at least 30 feet off center

Medium sized trees shall be planted at least 20 feet off center

Small sized trees shall be planted with proper spacing per species

Types and sizing of replacement trees: refer to the Texas A&M Desirable Tree Species List:

In the 2017 Campus Master Plan on page 338.

*Disclaimer: Riparian restoration projects may have a different list of desirable species and should be coordinated with the appropriate university owner representative.

A minimum of 5 different species from the Texas A&M Desirable Tree Species List should be planted if more than 100 caliper inches is required. No more than 30% of one species should be planted.

Newly planted trees should have the following available soil volumes:

Large trees (from desirable species list) - 1,200 ft3 to 2,000 ft3

Medium trees – 1,000 ft3 to 1,500 ft3

Small trees (ornamental) – 500 ft3 to 1,000 ft3

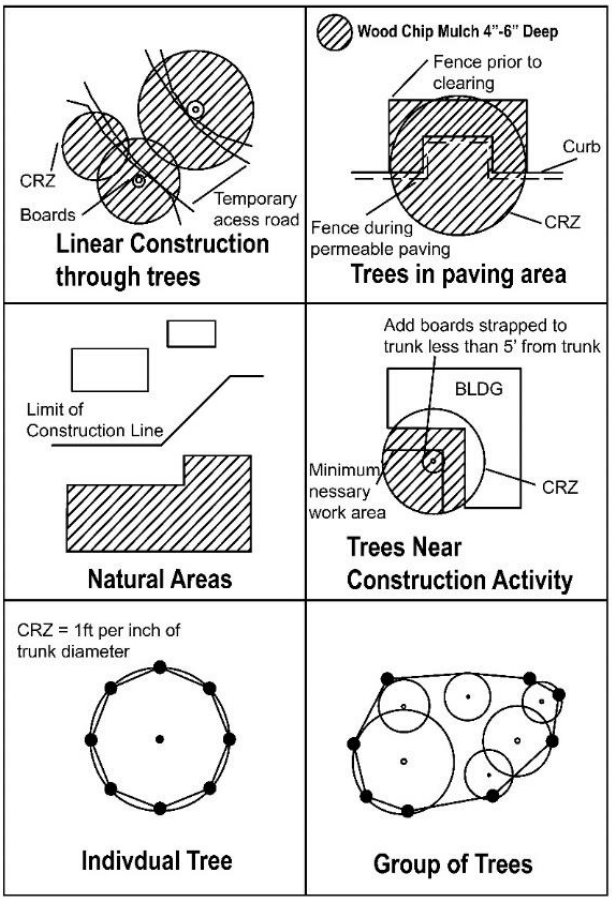
Planting Season Requirements

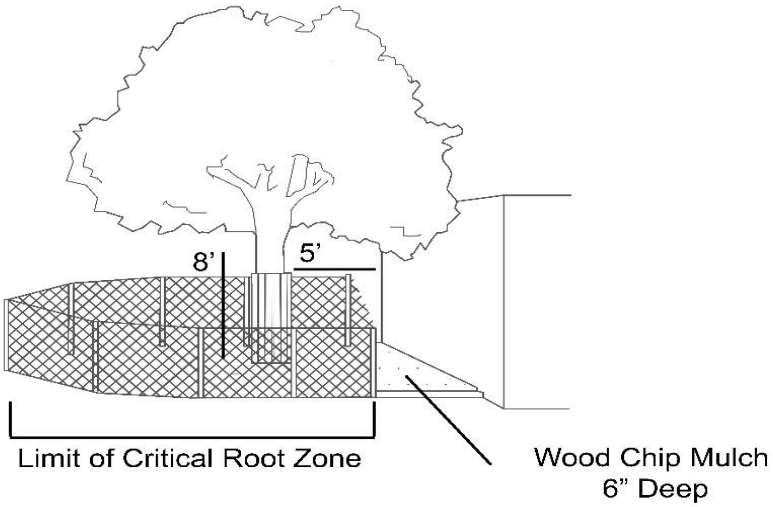
Optimal tree planting window in Central Texas is typically from October through March. Projects shall consider this during the site plan process. If possible, landscape installations should be held to that time frame. Signage and education materials can be used to assist in this area. Consider minimal plantings to suffice until planting season.

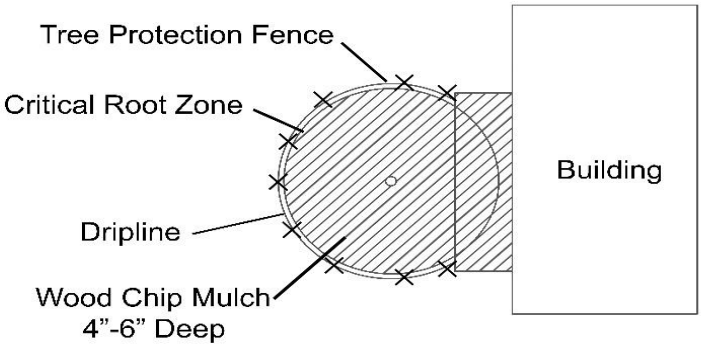
TREE CARE FOR EMERGENCY UTILITY WORK

It is recognized that emergency utility work is an ongoing necessity on a university campus. The following are guidelines to help best safeguard the university trees from this continual work.

Examples of tree protection details for construction documents:







TREE PLANTING SPECIFICATION AND DESIGN

Projects on Texas A&M campus shall adhere to specifications based on the most recent editions of the following for tree planting:

American National Standards Institute (ANSI) A300 – 06 Planting and Transplanting Standards (2012)

American National Standards Institute (ANSI) Z60.1-2013, standards for nursery stock ANSI Z133.1 Safety Standards

Related ISA Best Management Practices (BMP's)

Design Guidelines:

Texas A&M will not approve designs proposing additional tree plantings within existing tree canopies and CRZ.

There shall be no site improvements located within the CRZ. Site improvements include: light fixtures, signage, paving that require excavating, tables/benches/walls and footings.

There shall be no plant materials located within CRZ, including turf and groundcovers.

Planting Soil: refer to Texas A&M soil specifications and standards, native soils are recommended for tree planting.

Irrigation: Refer to Texas A&M landscape irrigation specifications. Note: Tree irrigation zones (valves) must be separate from other landscape irrigation zones. Every newly planted tree shall have a minimum of 1 irrigation bubbler installed (drip allowed), with the goal of watering as much of the root ball surface area as possible.

Staking: Tree stakes should have plastic caps on top for safety reasons and should be within the mulch ring of the tree, not in the adjacent turf. Place 3 t-posts (or similar) around each tree, and drive into existing soils. Wire, rope, or other methods of securing the tree shall not injure the bark. Stakes should be removed after the first growing season. Posts must be marked for safety (painting, caps, etc.). Six-foot t-posts are the typical means of staking.

Tree Grates: Only in instances of pier and beam (floating-deck) walk areas will tree grates be permitted. These are areas where a significant gap exists between top of root ball of newly planted trees and the finished elevation of the hardscape. No tree grates shall be installed on existing mature trees.

Types of Nursery Stock. Trees and shrubs can be purchased as bare root, in containers or pots, or with root balls wrapped in burlap (B&B). Bare root trees and shrubs are usually less expensive than containerized or B&B plants, but are available only during their dormant season, usually in early spring. Containerized and B&B trees and shrubs are available throughout the growing season. The preference is for all plant material to be from local seed source. Texas A&M shall receive at least 48-hour notice of delivery of plants to job site.

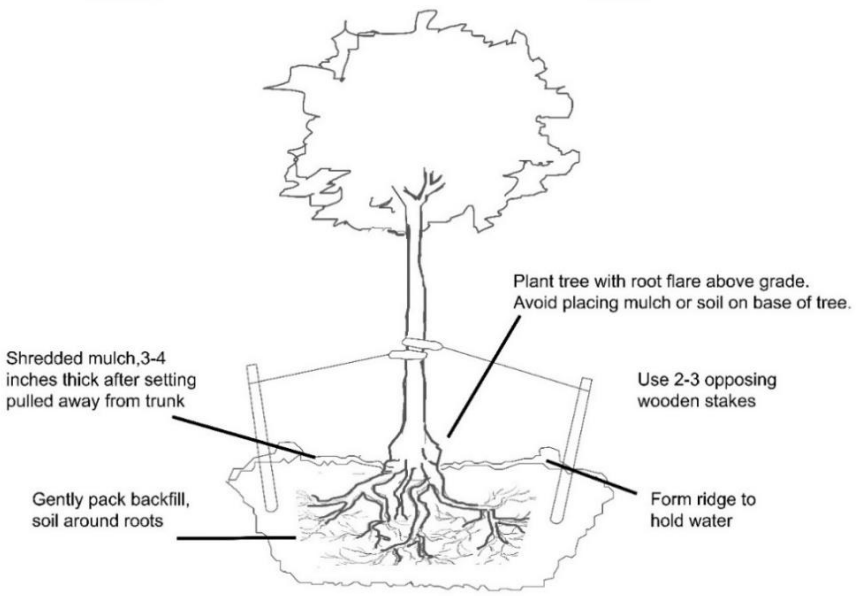
PLANTING BARE ROOT TREES

Roots of bare root trees should be moist and protected at all times prior to planting. Prepare planting hole for each plant before removing it from their protected area.

The hole prepared shall be large enough to spread the roots without crowding. The sides of the hole shall be roughed sure to ensure glazing of hole does not occur.

Inspect roots and prune any that appear broken or damaged.

Place the roots in the hole at a level so that the soil surface will be at the same level where the plant was previously growing, as indicated by the slightly darker area of the trunk.



Trees should be planted so that trunk flare is visible above the final soil surface.

Backfill with existing soil from excavated hole, and add the soil into the hole a few inches at a time, firming the soil after each addition. While backfilling, be sure the plant remains vertical and be careful not to damage roots. Use water to settle the soil around the roots while backfilling. Do not compact wet soil.

After backfilling is complete, form a ridge of soil (berm) around the edge of the hole to hold

water on the roots.

Thoroughly water the plant at installation. Mulching with a local hardwood mulch helps retain moisture and deter weeds. Mulch root ball with 3" of mulch and keep mulch 1-2 inches away from the plant's trunk to prevent damage from moisture.

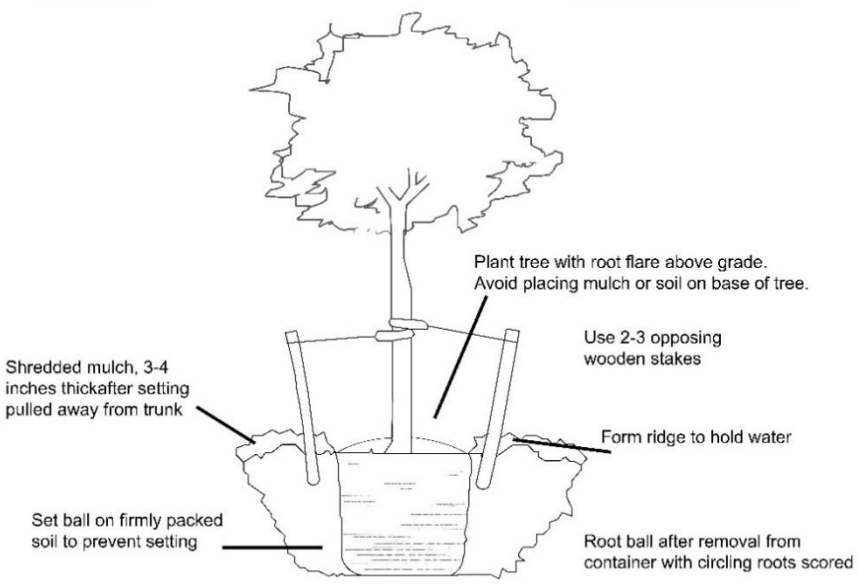
PLANTING CONTAINERIZED TREES

Prepare a planting hole as described in #2 above. The depth of the hole should be the same as the soil in the container, and the width of the hole should be at least twice the width of the container.

Once the planting hole is prepared, lay the containerized tree or shrub on its side and gently slide the plant out of the container. It may be necessary to push on the sides of the container to loosen the root ball. If the plant has become root-bound and roots have circled the container, slice the root ball in 4-5 places with a pruning saw or hand pruners that will cleanly cut roots. Loosen exterior of root ball to promote lateral root growth.

Place the intact ball in the hole. Trees should be planted so that trunk flare is visible above the final soil surface. Ideally, this is the same level at which the tree was growing in the container, but many trees are buried several inches deep.

Form a ridge to hold water and stake and protect trees as described above under "Planting Bare Root trees and Shrubs".



PLANTING BALLED AND BURLAPPED (B&B)

B&B trees are not allowed.

Container grown trees establish better here due to the complete root system and the issues with water in College Station.

Examples of tree planting details for construction documents

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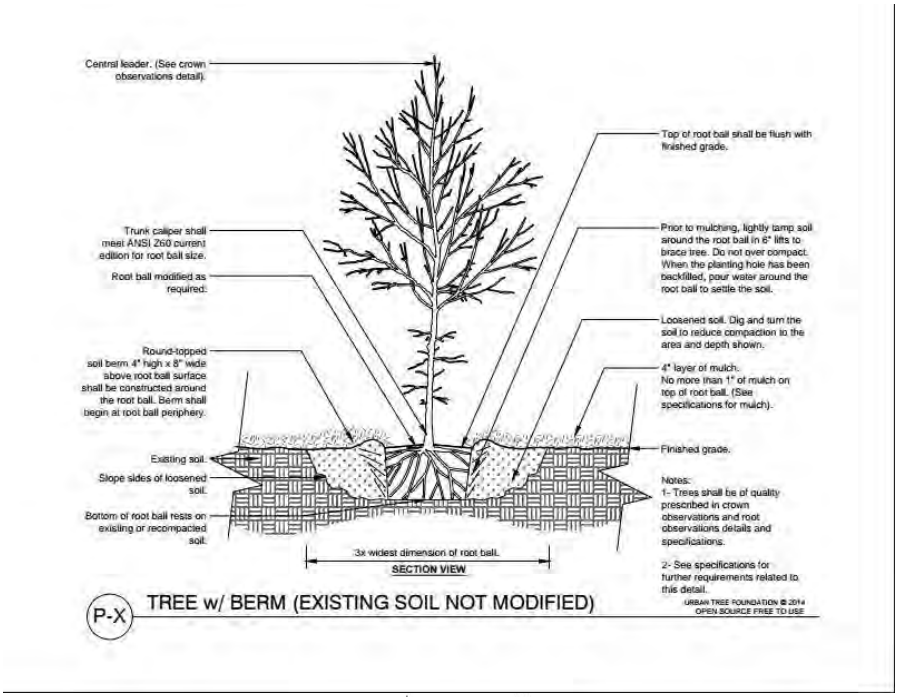
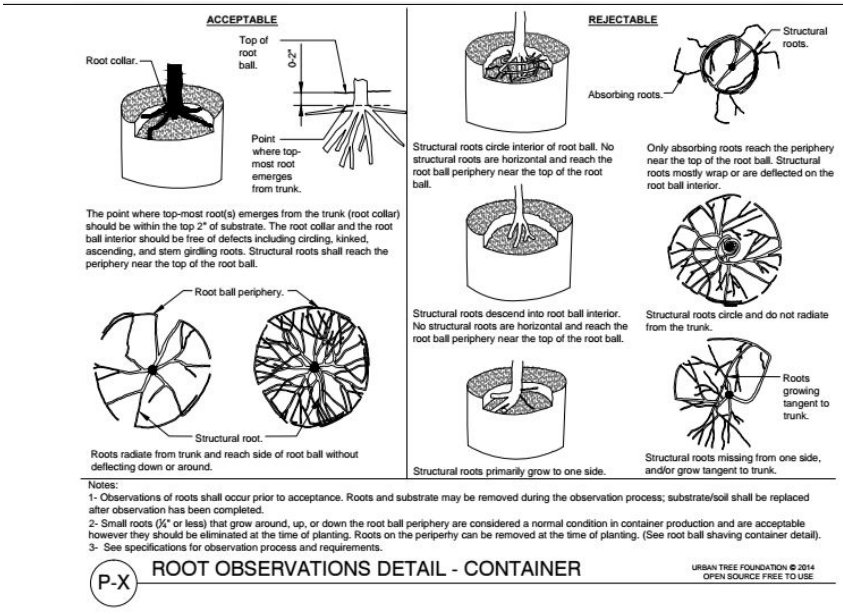
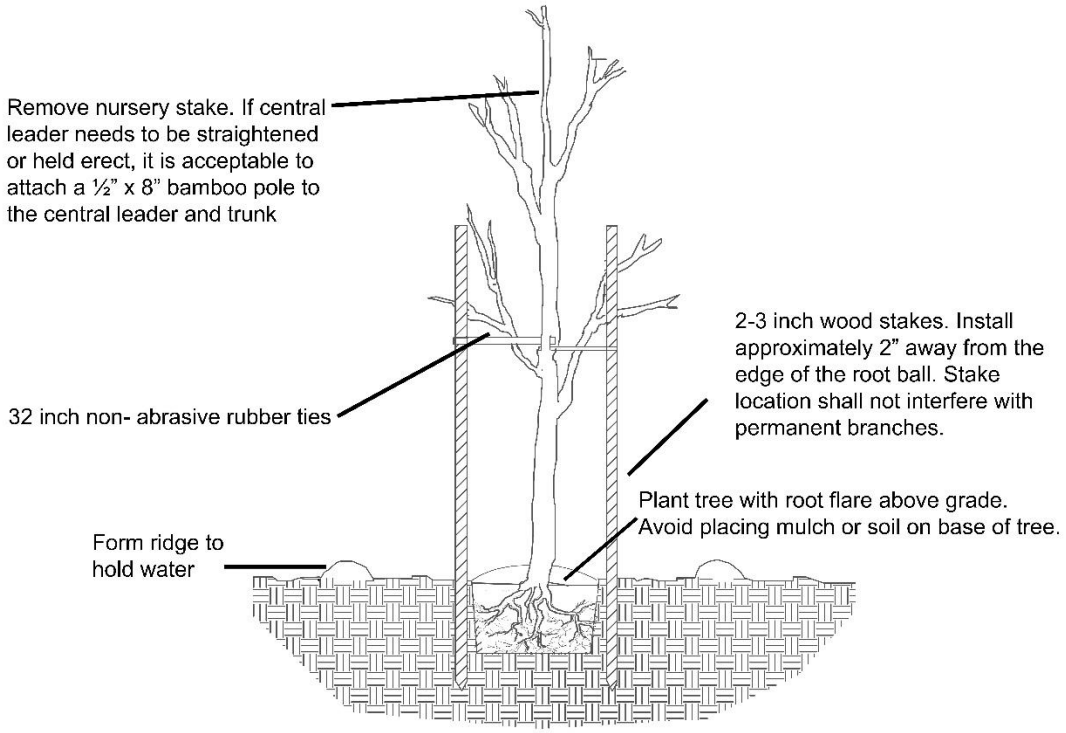






TREE PRUNING SPECIFICATION

Pruning on Texas A&M campus shall adhere to specifications based on the most current editions of the following for tree pruning:

American National Standards Institute (ANSI) A300 - 01 Pruning Standards 2008(R2015)
ANSI Z133.1 Safety Standards

Related ISA Best Management Practices (BMP's)

Contractors will apply the standards and guidelines when engaged in pruning operations on campus. To ensure that pruning is appropriate for the species and tree/site conditions, it is important to have a clear understanding of the specific needs of the tree and the objectives for pruning. Pruning objectives shall comply with section (2.14.D).

Requirements for Pruning Trees

No more than 25% of the tree may be pruned. Anything above 25% must be discussed and approved by Texas A&M designated Arborist. No tree shall be cut back in such a manner that its health will be impaired. An exception to this may occur in tree removal or emergency storm damage situations in which protecting people or property is urgent. Any emergency procedures shall be brought to the attention of the Texas A&M designated Arborist. When pruning cuts are made to a lateral branch, the remaining branch must possess a basal thickness of at least half the diameter of the wound affected. Such cuts shall be considered correctly done when the branch collar is left intact and the cut is not "flush" with the stem. Tree branches shall be removed and controlled in such a manner as not to cause damage to other parts of the tree or to other plants and property. All cutting tools and saws used in pruning shall be kept adequately sharpened so as to retain smooth surfaces and secure bark on all cuts.

Precautions for the inadvertent transmittal of oak wilt will be recognized. This includes the disinfecting of cutting tools between trees and cuts to be treated with tree wound dressing.

Pruning Objectives

Maintenance Pruning: Recommended when the primary objective is to maintain or improve tree health and structure, and includes risk reduction pruning.

Risk Reduction Pruning: Recommended when the primary objective is to reduce overall tree risk and chance of limb or tree failure.

Pruning Types

Crown Cleaning: The selective removal of one or more of the following items: dead, dying or diseased branches, weak branches and water sprouts.

Crown Thinning: The selective removal of branches to increase light penetration, air movement and to reduce weight.

Crown Raising: The removal of lower branches to provide clearance.

Crown Reduction or Shaping: Decrease the height and/or spread of a tree. Consideration should be given to the ability of the species to sustain this type of pruning.

Vista Pruning: The selective thinning of framework limbs or specific areas of the crown to allow a view of an object from a predetermined spot.

Crown Restoration: Should improve the structure, form and appearance of trees that have been severely headed, vandalized or storm damaged

Campus Clearance Recommendations

All trees and/or branches in or around infrastructure shall be shortened or removed when necessary to prevent damage to infrastructure or tree. Growth on the tree should be directed away from infrastructure such as buildings light poles power lines and signs by reducing and/or removing limbs on that area of the tree. Vertical clearance for roads shall be in accordance with Austin city code Section 6-3-25 and provide a minimum clearance of 14 above street level. An 8' vertical clearance shall be provided for pedestrian walkways.

Building Clearance: Clear all branches and foliage in contact with or within 2 foot of roofs, walls, stairways, decks or other building appendages to the extent feasible while maintaining aesthetics and canopy structure. Prune to direct growth parallel to or away from the building.

Exceptions will be made in instances that operations will eventually hinder the structural integrity of the tree or clearly cannot conform to ANSI A300 standards.

Prohibited Pruning Acts

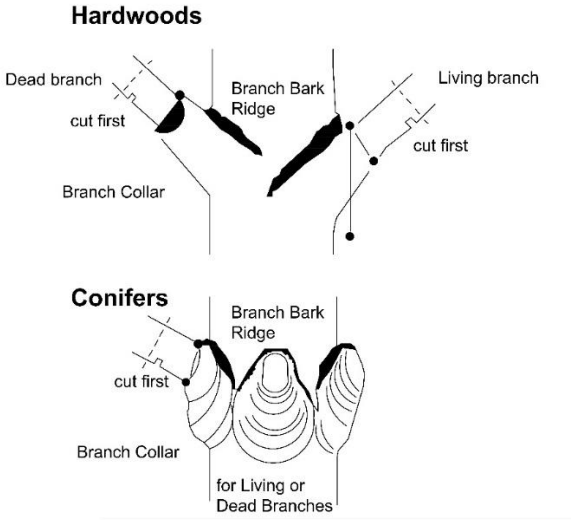
Excessive Pruning: Except for clearance of utility lines, traffic or abating a public nuisance, excessive pruning will not be tolerated.

Topping: Topping is the indiscriminate cutting of tree branches to stubs or lateral branches that are not large enough to assume the terminal role. Other names for topping include "heading," "tipping," "hat-racking," and "rounding over."

"Lion Tailing": Excessive removal of branches from the lower two-thirds of a stem or branch.

No pruning of a tree's canopy shall take place to compensate for removal or damage to its root system.

No cavities shall be filled with any substance (except in instances of bee hive relocations)



TREE REMOVAL SPECIFICATIONS

Projects on Texas A&M campus shall adhere to specifications based on the most recent editions of the following for tree removals:

American National Standards Institute (ANSI) A300 – 01 Pruning Standards 2008(R2015)

ANSI Z133.1 Safety Standards

Related ISA Best Management Practices (BMP's)

A campus tree shall not be removed without university review and approval. All removals as a result of a development project or campus operations shall follow the specifications in section 5.00 of the Texas A&M campus – Tree Preservation and Protection, Standards and Specifications.

Any tree removed for campus operations will likely be dead or a risk to the university. These tree locations will be made available for new trees planted by Landscape Services (Arbor Day, memorial trees, etc.).

Trees may be removed if:

A tree is infected with an insect or disease and its removal is recommended practice to prevent transmission.

The tree is creating an extreme nuisance because of it species, size, location, or condition. The nuisance could be caused by fruit or seed drop, harboring insects, root conflicts and excessive twig or limb breakage.

The tree is posing a severe safety risk that cannot be corrected by pruning, transplanting or other treatments. Tree risk assessments (per the ISA Tree Risk Assessment Qualification ANSI A300-09 Tree Risk Assessment (2011)) should be performed as needed for significant trees.

The tree severely interferes with growth and development of a more desirable tree.

The tree's aesthetic value is so low that the site would be enhanced visually by the removal of the tree.

Any construction, improvements or maintenance to be made around the tree would substantially interfere with the tree's natural growth and size or would damage or destroy it.

The tree has been topped or disfigured thus producing an unsound branching structure conducive to severe storm damage, wind throw and accelerated death.

PLANT HEALTH CARE (PHC) FOR TREES

A Soil Analysis shall be done when prescribing soil amendments and fertilizer for trees. The application of pesticides shall be done by a Texas Department of Agriculture (TDA) licensed applicator, and the products must be labeled to target the desired pest. All applications shall be logged and recorded per TDA rules. All pesticide recommendations must come from an ISA certified arborist.

Tree Growth Regulators (TGR) must be applied by a TDA licensed applicator, and be used only as the label states. Special considerations are for trees in overhead utility corridors or smaller grower spaces, and trees growing in reduced soil volumes.

Soil health is critical to the survival of trees at Texas A&M. Several tactics are used to improve the soils where trees grow. These include incorporating various types of compost and other forms of organic matter (via soil injection or air-tillage), such as bio-char, mycorrhiza fungi, and humate. Fertilizers and fungicides are used only as a last resort where timing and condition of the tree are of utmost important.

CAMPUS TREE COMMITTEE

The role of the Campus Tree Committee will meet on a regular basis to review the status of the Campus Tree Care Plan and update it as needed. Additional responsibilities will include analyzing data, addressing policy and guideline issues related to tree care, developing and implementing outreach and education strategies, and setting annual goals for campus tree care. The Campus Tree Committee will follow the standards established by the Arbor Day Foundation's Tree Campus U.S.A. program and apply for certification or submit recertification to stay actively certified. The scope of the Campus Tree Committee may expand by implementing practices and strategies for other areas including native grasses, forbs, gardens, rainwater management projects, etc. Whether or not these or similar responsibilities will be added to the Campus Tree Committees role depends on the time commitment required and the needs of the campus.

The committee will meet no fewer than four times a year and will be composed of a cross-section of campus representatives. Each member will serve a term of one year with the option to renew each consecutive year. Permanent sitting members will include:

TREE DIVERSITY

As part of the overall appearance and conservation practices for the University, a diverse mixture of tree types is desired. This helps ensure that no particular species is overused in the event that a disease or pest that affects a certain type of tree can significantly alter the current tree canopy. The full list of native and adapted species recommended for the University can be found in section VII of this campus tree care plan.

PRIHIBITED PRACTICES

Tree Topping – No tree should be topped or have its uppermost branches removed unless an emergency warrants top removal. Special circumstances (i.e. bird netting over courtyards) must be assessed by the University Grounds Department to ensure that the best possible pruning is attained.

Canopy Debris – Trees should be maintained to be free of debris. It is inappropriate and harmful to the health of a tree to place objects that might scar the tree, break limbs, or harbor pests. The items are unstable in the canopy and could fall, causing injury to pedestrians and property. Additionally, nothing should be attached or posted on the trunks of trees, which can cause damage to the bark.

Unscheduled Tree Work – Outside parties are not permitted to trim, prune, or remove trees unless first approved by the Grounds Department and Facilities Planning & Construction. Exceptions are trees pruned for utilities by the utility company. Any unauthorized work will result in a fine corresponding to the amount of damage done up to the cost of the value of the tree. This fine may be assessed to the unauthorized contractor, or the hiring party, depending on the circumstance.

Line trimmers and mowing – Line trimming and mowing around the trunk and base of trees is prohibited to prevent tree injury.

Materials within dripline – No material or equipment may be stored within the drip line of trees. This also includes vehicles parking for the contractor's staff or sub-contractor

LAWN AREAS

SOIL SPECIFICATION FOR HIGH USE LAWN AREAS (SPORTS FIELDS)

Coarse Concrete (C-33) Sand containing:

- ≤2% clay
- ≤3% silt
- 75-95% sand
- <20 gravel (2-4 mm)
- 10-20% very coarse sand (1-2 mm)
- 15-35% coarse sand (0.5-1 mm)
- 23-35% medium sand (0.25-0.5 mm)
- 2-12% fine sand (0.15-0.25 mm)
- <5% very fine sand (0.05-0.15 mm)
- pH = 5.5-7.5 or have a plan to amend it to reach this range EC = <2 mmhos/cm
- Sodium absorption ratio (SAR) = <3

Sand shall be free of sticks, stones and debris larger than ¾ inch Sand shall be free of weeds and other undesirable vegetation Sand shall be free of oil and other anthropogenic chemicals

Sand shall be free of herbicides and insecticides that may affect subsequent growth of turf or other plantings, or that may be toxic or injurious to humans and/or animals.

Sourcing

Sources of sand meeting these specifications will include sand plants that manufacture this grade of sand for ready mix type concrete plants and highway use.

Testing

A 1-2-gallon representative sand sample shall be tested by owner's representative noted below prior to purchase and delivery to the site.

After approval for use, a representative 1-2-gallon sand sample shall be submitted and tested from every 500 tons of delivered sand to insure consistent quality. Materials not passing the above specifications shall be removed and replaced by the contractor/subcontractor at no additional expense to the owner. One of these initial samples should be tested by the owner's representative for fertility to determine a suitable pre-plant fertility application.

Sand shall be placed at depths specified by owner or contract documents. Depths are to be measured after settling by irrigation and/or light compaction from no more than 2 passes with a smooth drum 1-ton roller.

Owners Representative:

Thomas Turf Services, Inc. 11183 State Highway 30 College Station, TX 77845

Rationale for the above specifications:

Given the high sodium content of the local irrigation water, it is important that the clay content be kept low and the sand content high. Furthermore, for very high use areas where there will be a significant amount of compaction in addition to the sodium, a coarse sand having a high saturated hydraulic conductivity is needed. We recommend placement at a minimum depth of 6 inches to provide adequate rooting and sufficient water retention. The high saturated hydraulic conductivity of a coarse sand of this nature will allow leaching of excess salts from the sand.

Since this coarse sand will be much more permeable than the underlying subsoil, it will be necessary to grade the subsoil so that it has a slope to allow drainage water to go through the sand and then flow downhill along the top of the subsoil. It will also be necessary to put some subsurface drainage in areas plated with this soil to prevent the formation of a belowground pool. This will be especially important at the bottom of the slope in areas where the soil may about a nearby non- permeable surface such as a concrete sidewalk or curb. It may also be necessary to place some surface drop box drains in these locations to help remove excess surface water as well.

If areas plated with this coarse sand are to be sodded, washed sod should be used. Under no circumstances should sod grown on a clay textured soil be placed above the specified coarse sand. If sprigs are used, they should be essentially free of soil. Turf species and cultivars should be selected carefully and favor warm season grasses that have high salinity tolerance, drought tolerance, traffic tolerance and high recovery potential.

Management of areas plated with this coarse sand may be slightly different from areas of native clay soil. The turf will require the same total amount of irrigation water (approximately 1 inch per week in heat of summer). However, it will have a smaller storage capacity and may require smaller, but more frequent applications that total the same 1 inch per week. Fertilization will have a similar management plan with sand capped areas requiring the same total amount applied in smaller, but more frequent applications. The use of slow release fertilizer products will help reduce nutrient losses due to leaching. The fairways of the campus golf course are plated with this type of sand and we encourage you to speak with the superintendent to get some firsthand information on management issues.

This soil should resist compaction; however, it should still be aerated particularly between events such as concerts or home football games. On large areas such as campus this can be done using tractor pulled equipment such as a drum or spoon type aerator or an Aerway type aerator that has a slicing type of action. Ideally, this should be done monthly during the growing season. Caution should be exercised to flag irrigation heads, valve boxes and shallow pipes prior to aeration.

SOIL SPECIFICATIONS FOR TURF AND GRASSES

Soil Specifications for General Lawn Areas

Sand or Loamy Sand texture containing:

≤10% clay

≤20% silt

≤20% total silt plus clay

≥80% sand

pH = 5.5-7.5 or have a plan to amend it to reach this range EC = <2 mmhos/cm

Sodium absorption ratio (SAR) = <3

Soil shall be free of sticks, stones and debris larger than ¾ inch Soil shall be free of weeds and other undesirable vegetation Soil shall be free of oil and other anthropogenic chemicals

Soil shall be free of herbicides and insecticides that may affect subsequent growth of turf

or other plantings, or that may be toxic or injurious to humans and/or animals.

Sourcing

Locally procured soil is preferred over imported soil. If a local source of native sand meeting these specifications cannot be located, a commercially available masonry sand should be sampled and tested to see if it meets the above specifications.

Testing

A 1-2-gallon representative soil sample shall be tested by owner's representative noted below prior to purchase and delivery to the site.

After approval for use, a representative 1-2-gallon soil sample shall be submitted and tested from every 500 tons of delivered soil to insure consistent quality. Materials not passing the above specifications shall be removed and replaced by the contractor/subcontractor at no additional expense to the owner. One of these initial samples should be tested by the owner's representative for fertility to determine a suitable pre-plant fertility application.

Soil Depth

Soil depth shall be 4" for all sod areas. Depths are to be measured after settling by irrigation and/or light compaction from no more than 2 passes with a smooth drum 1-ton roller.

TURF SPECIES SPECIFICATION

For sod areas with predominantly full sun conditions install only the Bermuda Grass variety "Tif-Tuf".

For turf areas that are shaded for a large majority of the day install the Zoysia Variaty "Cavalier".

TURF INSTALLATION

Sod shall be transplanted/installed as soon as possible following delivery, unless a suitable preservation method is approved prior to delivery. Sod not transplanted shortly after delivery shall be inspected and approved by the Landscape Architect prior to its installation. Transplant sod only when temperatures are above 45 degrees F and ensure that netting is removed from rolls prior to installation.

After all unevenness in the soil surface has been corrected, the soil shall be lightly moistened immediately prior to installation of sod.

The first row of sod shall be laid in a straight line, with subsequent rows placed parallel to and tightly against each other. Lateral joints shall be staggered to promote more uniform growth and strength. Care shall be exercised to ensure that the pieces are not stretched or overlapped and that all joints are butted tightly to prevent voids that would cause air drying of the roots.

Sod must be cut so that grade of sod matches the grade of any adjoining grass that is preexisting.

On 3:1 or greater slopes, traditional size (1 sq. yd / 1 sq. m) Sod shall be laid across the angle of the slope (perpendicular), with staggered joints and secured by tamping, pegging, stapling or other approved methods of temporarily securing each piece. Large-roll sod shall be laid in the direction of the slope, with temporary securing being at the discretion of the installation contractor.

Swales and Intermittent Waterways: The installation of turfgrass sod within drainageways or intermittent waterways shall be determined after considering maximum channel velocities for storms of a designated intensity. Traditional size sod shall be laid perpendicular to the direction of flow and pegged to resist washout during the establishment period, while large-roll pieces shall be laid in the direction of the flow, with temporary securing being at the discretion of the installation contractor.

The installation contractor shall water the sod immediately after transplanting to prevent excessive drying during progress of the work. As sodding is completed in any one section, the entire area shall be lightly rolled in (2) different directions to ensure good contact with subgrade. It shall then be thoroughly watered to a depth sufficient that the underside of the new sod pad and soil immediately below the pad are thoroughly wet.

RATIONAL FOR ABOVE SPECIFICATIONS

Given the high sodium content of the local irrigation water, it is important that the clay content be kept low and the sand content high. It is felt that a maximum of 10% clay and a minimum of 80% sand is a reasonable compromise that will allow the soil to be functional and stable yet still have a reasonable amount of permeability. We recommend placement at a minimum depth of 4 inches to provide adequate rooting and sufficient water retention.

Since this soil will be more permeable than the underlying subsoil, it will be necessary to grade the subsoil so that it has a slope to allow drainage water to go through the sand and then flow downhill along the top of the subsoil. It will also be necessary to put some subsurface drainage in areas plated with this soil to prevent the formation of a belowground pool. This will be especially important at the bottom of the slope in areas where the soil may abut a nearby non-permeable surface such as a concrete sidewalk or curb.

If areas plated with this soil are to be sodded, the sod needs to be grown on a soil that is compatible with the above specifications. If this is not available, then washed sod should be used. Under no circumstances should sod grown on a clay textured soil be placed above the specified sandy soil. If sprigs are used, they should be essentially free of high clay content soil. Turf species and cultivars should be selected carefully and favor warm season grasses that have high salinity tolerance, drought tolerance, traffic tolerance and high recovery potential.

Management of areas plated with the Lawn and Landscape Soil may be slightly different from areas of native clay soil. The turf will require the same total amount of irrigation water (approximately 1 inch per week in heat of summer). However, it will have a smaller storage capacity and may require smaller, but more frequent applications that total the same 1 inch per week. Fertilization will have a similar management plan with sand capped areas requiring the same total amount applied in smaller, but more frequent applications. The use of slow release fertilizer products will help reduce nutrient losses due to leaching.

Since this soil will have some clay and also a fairly large amount of fine sand particles, it will tend to compact. Therefore, routine aerification will be needed. On large areas such as campus, this can be done using tractor pulled equipment such as a drum or spoon type aerator or an Aerway type aerator that has a slicing mode of action. Ideally, this should be done monthly during the growing season. Caution should be exercised to flag irrigation

heads, valve boxes and shallow pipes prior to ground penetration.

All disturbed areas shall be graded to properly drain and seeded or sodded with a permanent grass. Any exceptions to the sodding requirement must be approved through TAMU Campus Planning, Design & Construction, the University Architect in conjunction with SSC Grounds Operations.

Sod variety shall be approved by TAMU Campus Planning, Design & Construction, the University Architect in conjunction with SSC Grounds Operations.

Area to designate for sod, shall be fine graded, smoothed, before final grading. If soil is dry, lightly moisten before placement of sod.

SOIL SPECIFICATIONS FOR LANDSCAPE BEDS.

The planting soil mixture for landscape areas shall be 2 parts sandy loam: 2 parts washed coarse yellow sand, and 1-part compost for all landscape beds. Landscape beds shall be excavated to 12" depth below existing grade and backfilled with the planting soil mixture. If the grade necessitates it, remove soil. Beds should be slightly crowned because the soil will lose volume over time due to decomposition of the organic matter. Soil can be delivered pre-mixed, or tilled/mixed in place.

The sandy loam shall be taken from a well-drained, arable site. It shall be free of subsoil, stones, clay, roots, weeds, grass or other objectionable debris, matter or toxic wastes.

Planting Soil Mixture shall not have a mixture of subsoil and shall contain no slag, cinders, stones, lumps of soil, sticks, roots, trash or other extraneous materials larger than 1.5 inches (40 mm) in diameter. Topsoil must also be free of viable plants or plant parts of common bermudagrass, quack grass, johnsongrass, nutsedge, poison ivy, thistles, or others as may be specified. All topsoil shall be tested by a reputable laboratory for pH and soluble salts. If needed, pH correction material shall be applied at a rate sufficient to correct the pH to a range of 6.5 to 7.5. Soluble salts shall not be higher than 700 parts per million.

Submit to Texas A&M University proposed source or sources of topsoil at least 15 working days prior to delivery. Obtain soil samples from his intended topsoil source and have soil analysis performed by soil testing laboratory to ensure conformity with specification. Do not deliver topsoil to site prior to approval by TAMU Campus Planning, Design & Construction, the University Architect in conjunction with SSC Grounds Operations.

Percolation rate: between 3 to 4 inches per hour.

Commercial Grade Fertilizer – AS REQUESTED BY TAMU REPRESENTATIVE BASED ON SOIL ANALYSIS

Fertilizer: Organic by Microlife (6-2-4) or approved equal

Soil sulfur: 'Agri-Sul', 'Dispersul' or approved equal.

Soil Amendments – AS REQUESTED BY Grounds BASED ON SOIL ANALYSIS

Nature's Way Leaf Mold compost (Nature's Way Resources, Conroe, TX (936-273-1200)

Pre-emergent herbicide – AS REQUESTED BY TAMU REPRESENTATIVE. Notify Texas A&M University of proposed pre-emergent herbicide prior to application.

EXECUTION

INSPECTION

Examine finish surfaces, grades, topsoil quality, and depth. Do not start planting until unsatisfactory conditions are corrected and inspected by Grounds.

PREPARATION

Preparation areas shall be then entire area to be planted, and not limited to areas immediately surrounding the plant material. Excavate to 12" below final grade and scarify existing soil surface and cultivate to minimum 6-inch depth to alleviate compaction from site excavation work. Remove debris, stones over ½-inch in diameter, sticks, roots, rubbish, and other extraneous materials and dispose of offsite. Ensure that excavated area drains freely, and no pooling is present within the excavated area.

Restore prepared area to specified condition if eroded, settled, or otherwise disturbed after fine grading and prior to installation of turf.

Weeds shall be removed by hand throughout the duration of warranty period or until

project is turned over to Texas A&M University.

MAINTENANCE AND PROTECTION

See Section "Operation and Maintenance of Planting."

ACCEPTANCE

See Section "Operation and Maintenance of Planting."

CLEANING

Perform cleaning during installation and upon completion of work. Remove excess materials, debris, and equipment. Repair damage resulting from turf installation.

PLANTING

SUMMARY

Work included: Provide all labor, materials and installation necessary to complete the fine grading, incidental grading, planting and related work as required.

This Section includes the following:

- Plant materials
- Planting accessories
- Planting mulch
- Soils & soil amendments
- Fertilizers, herbicides, and pesticides

Related work described elsewhere:

- Irrigation"
- Section 32 01 90 – "Operation and Maintenance of Planting"
- See Texas A&M Plant List

REFERENCED STANDARDS

ANSI Z260.1 – 2013 American Standards for Nursery Stock (ASNS).

Standard Methods of the Association of Official Agricultural Chemists.

ASTM D 698 – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort

ASTM D 2325 – Test Method for Capillary-Moisture Relationships for Coarse and Medium-Textured Soils for Porous-Plate Apparatus

United States Department of Agriculture (USDA) - Soils Classification Taxonomy.

ASTM C136, Standard Methods for Sieve Analysis of the Fine and Course Aggregate.

http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/urban/?cid=nrcs142p2_053993

LAWS, CODES AND REGULATIONS

Perform Work in accordance with all applicable laws, codes and regulations required by authorities having jurisdiction over such Work and provide for all inspections and permits required by federal, state and local authorities in furnishing, transporting and installing materials as shown or for completing the Work identified herein.

EXISTING UTILITIES

Existing utilities and improvements not designated for removal shall be protected in place. Any damage shall be repaired by the Contractor at no additional cost to Texas A&M University.

SUBMITTALS

Documentation for Sustainable Sites: For products that are extracted, harvested or recovered and manufactured from within 250 miles of College Station, Texas. Indicate location and distance from College Station of material manufacturer and point of extraction, harvest, or recovery for each raw or recycled material. Include statement indicating costs for each product that is regionally extracted, harvested or recovered and manufactured.

General: Comply with Section 01 61 00 – Common Product Requirements.

Test Reports:

The Contractor shall submit landscape material test reports for the following:

Existing topsoil source with nutrient analysis Texas A&M AgriLife Extension Service Soil, Water and Forage Testing Laboratory (979-845-4816)

Fertilizers/soil amendments/chemicals

A certified laboratory retained by the Contractor shall provide agronomy testing and verification of representative landscape material samples proposed for use on Texas A&M University projects. Testing includes, but is not limited to, the following:

Plasticity index (PI)

Soil pH

Particle size, percentage soil texture

Percentage organic material

Nutrient level analysis

-All macro, secondary and micronutrient

-Nitrate

-Potassium

-Phosphorous

-Calcium

-Magnesium

-Sodium

-Percolation rate

-Conductivity

Based on the above testing, the laboratory shall make recommendations on type and quantity of organic amendments required to bring these materials into acceptable ranges as specified in Part 2 – Products of this section. Contractor shall submit test results prior to, or at the same time as, the suggested amendments.

The Contractor shall submit separate agronomy tests with soil preparation recommendations for irrigated tree and shrub areas. A minimum of three (3) soil samples shall be tested. These samples are to be taken from various areas of the site with the objective of identifying differing soil conditions. Submit soil sample locations for approval prior to gathering sample. The location of each sample is to be identified on a map and a written summary. Each individual sample is to be prepared and presented to the Texas A&M University. In addition to the analysis of the soil conditions the testing lab is to identify specific recommendations for supplementing and improving the soil to provide an optimal germination and growing condition.

Soil tests have already been completed for existing on-site fill material. Test results for his material, attached to this specification section as Exhibit 1, can be used by Contractor to determine amendments required to bring soil into acceptable ranges specified in Part 2 – Products of this section. All other soil to be used on site for landscape shall be tested as indicated above. Grounds to inspect soils upon delivery to site.

PLANTING DESIGN

General

All planting design must comply with the 2017 Campus Master Plan (CMP) and requirements and standards derived from the CMP.

Plant Selection

Planting selection shall comply with the 2017 Campus Master Plan and adhere to the approved plant list (See Section 32.9). Plants on the approved plant list must still be reviewed for appropriate use, spacing, and microclimate.

Planting Spacing

Plant Spacing shall be determined by the plant species and shall be to accommodate height and spread at full maturity. All plant material shall be container nursery grown. Plants shall meet the American Standards for Nursery Stock. Spacing shall be either triangular or square as shown on the plan or approved by the Landscape Architect.

Spacing shall be at 100% of full maturity crown size for all plants. The only exception to this requirement is for planting used for screening purposes. For screening, plant spacing should be reduced to 60% of mature growth size, and the plant size, at the time of planting should be increased. Final planted size must be approved by the owner.

Planting plans shall be provided and reviewed by TAMU Campus Planning, Design & Construction, the University Architect in conjunction with SSC Grounds Operations at or before 100% Design Development to ensure compliance.

Planting Coverage

Plant coverage, at full plant maturity bust be 80%. This can be averaged over the entire site, includes all landscape beds on the site, and is limited to the project boundary. This allows space between plants, and plant groupings, reduces cost of landscape maintenance, and reduces water use.

Landscape Edging

Stainless steel edging: May be used with approval by the owner during the design process in places that concrete maintenance bands are no appropriate or detract from the aesthetic. Stainless steel edging may not be substituted for concrete maintenance bands in the field.

Concrete Maintenance Band: A 6”x6” or 12” x 12” concrete maintenance band edge with the turf planted at same grade as top of mow strip/bed edge shall be used. Finish grad of planting bed will be minimum of 2” below top of concrete mow strip/bed edge to prevent mulch and soil migration. When approved by TAMU a natural beveled shovel cut edge can be used.

PLANT MATERIAL

Plant Material Sourcing

All plants and raw materials shall be manufactured and/or extracted or harvested within 250 miles of Texas A&M University College Station site and all recycled or salvaged materials shall be manufactured and recovered within 250 miles.

General

Plants shall be high quality, exhibit a growth habit that is normal for the species, and be sound, vigorous, healthy, and free from insects, weeds, plant diseases and injury. Container, box, ball, height and spread dimensions shall be measured according to specified standards and good practice.

Container plants shall have been in containers for sufficient length of time for root system to hold earth when taken from container but not long enough to become root-bound or cause "hardening-off.” Heeled-in stock or stock from cold storage is not acceptable. Plants cut back from larger sizes to meet specifications will not be acceptable.

Plant names shall conform to those given in "Standardized Plant Names" latest edition,

prepared by the American Committee on Horticultural Nomenclature, or be names generally accepted by the trade.

Select, dig, transport, protect and plant in accordance with requirements of these specifications and "American Standards for Nursery Stock" and with accepted good practice.

Certificates shall accompany shipments as proof of inspection and quality as may be required by federal, state or other authorities. Each shipment shall be declared free of disease and insects of any kind. Label each plant or bundle and deliver bulk material in sealed, labeled bags, testifying as to percent of purity of contents.

Should any conflict arise as to the quality of any plant materials, the decision of Texas A&M University is final.

Balled and Bur lapped Stock: This stock will be defined as nursery plant stock which has been removed from the growing site with a ball of soil, containing the intact root system, and encased in burlap (or other approved similar material) to hold the soil in place. Ball sizes for balled and bur lapped stock shall be as shown on the Drawings. NOTE: Remove entire wire basket, and half –two-thirds of burlap from root ball following installation.

Collected Stock: This stock will be defined as nursery plant stock, which has been removed from its original native habitat. All collected stock shall receive specific approval of the TAMU or designated representative before it can be removed from its existing habitat. Ball sizes for collected stock shall be as shown on the Drawings and shall have sufficient diameter and depth to encompass enough fibrous and feeding root system consistent with approved salvage methods and as necessary for the full recovery of the plant. Collection may be by hand or mechanical method.

Bag Grown Stock: This stock will be defined as nursery plant stock which has been transplanted into a nonwoven fabric container which has been placed in the ground and the plant grown under nursery field conditions continuously long enough - normally one (1) month for each inch of bag diameter i.e., a plant with a 24 inch diameter bag, grown in its original planted location for 24 months] for the fibrous roots to have developed so that the root mass retains its shape and holds together after removal of the bag. The root ball shall be flat bottomed and straight sided. Ball sizes for bag grown stock shall be as shown on the Drawings. Bag grown stock shall not be pruned before delivery.

Plant Size:

Plants will be measured when branches are in their normal position. Height and spread dimensions shown on the Drawings refer to the main body of the plant and not branch tip to tip. Plants with a spreading or semi-spreading habit will be measured by the average diameter of the spread. Plant heights will be measured by the mean height from the ground line to the top of the canopy. Caliper measurements will be taken at a point on the trunk six (6) inches above natural ground for trees up to four (4) inches in caliper and at a point twelve (12) inches above natural ground for trees over four (4) inches in caliper. The caliper size for multi-trunked plants will be determined by adding the calipers of the largest cane and one-half (1/2) the caliper(s) of the second and third largest cane(s).

When a range of size is shown on the Drawings, no plant shall be less than the minimum size and at least 40% of the plants shall be as large as the maximum size shown on the Drawings. The required measurements are the minimum sizes acceptable and are the measurements after pruning, when pruning is required. Except in cases of specimen plants, collected stock, prostrate ground cover, or trees. Plant material size specification and spacing will be determined by the average planet crowding and pedestrian and vehicle traffic impediment.

Sizes of plants or plant types such as vines, groundcovers, seedlings, young plants, understock, etc., will be measured in accordance with the plant standards or as indicated on the Drawings.

Container-grown plants which are well established in adequate size containers and are of equal quality and size to the specified balled plants may be accepted in lieu of balled plants; likewise, balled plants of equal quality and size may be substituted for container-grown plants when permitted by TAMU Campus Planning, Design & Construction, the University Architect or designated Texas A&M University Landscape Grounds. Soil shall be approximately 3/4 depth of container and contain roots of the plant throughout the soil.

The ball size for a balled and bur lapped plant shall be firm natural balls equal to or in excess of the ball sizes indicated on the Drawings. Collected plant material substituted for a nursery-grown plant shall have a ball or root system 1/4 greater in both diameter and depth than the nursery-grown plant for which it is substituted. The ball size shall be the average of the diameters measured 90 degrees apart (refer to Technical Standards for Tree Planting, Pruning and Removal Sec. 1, Tree Specifications)

Inspection of plant materials as required by city, county, state or federal authorities shall be the responsibility of the Contractor, who shall have secured permits or certificates prior to delivery of plants to site.

Plants are subject to inspection and approval or rejection at nursery source or on project site at any time before or during progress of Work for size, variety, condition, latent defects and injuries. Remove rejected plants from project site immediately. Plants to be guaranteed to be true to form. Example - if the specification calls for creeping rosemary or dwarf esparanza, contractors will guarantee true to form materials for one year of completion of project unless approved by Grounds. Grounds to inspect all plant material upon delivery on site and can accept or reject according to conditions stated.

MULCH

The current grounds maintenance crew is using a ground pine bark mulch that helps to acidify the soil in tree rings and landscape beds as it breaks down. The mulch should be 3" thick and trees in turf areas should have a mulch ring cut in with a beveled edge 3-4" deep. Beveled toward the tree and flat against the turf edge – to discourage mulch from migrating onto the turf and to make edging maintenance easier.

Mulch material shall be free of excess amounts of large leaves and sticks that would prevent proper dressing of the mulched surface, free of harmful substances and free of detrimental amounts of soil or other foreign matter that would promote early compaction, matting or deterioration of the mulch.

PLANTING SOIL MIXTURE (BACKFILL)

See Soil Specifications for Landscape Areas.

WATER DURING INSTALLATION OR STAGED ONSITE

Provide hoses, connections, and other equipment necessary to distribute water from source to required locations. Do not waste water or let it run into Texas A&M University thoroughfares.

ADDITIONAL SOIL AMENDMENTS – AS RECOMMENDED BASED ON SOIL TEST ANALYSIS:

Organic fertilizer such as Microlife 6-2-4 by San Jacinto Environmental Supply (713-957-

0909), "Ladybug" 8-2-4 formula by The Natural Gardener (512-288-9740) or approved equal.

Root stimulator shall be Vitamin B-1 Medina, etc. and shall not contain synthetic fertilizer.

PLANTING ACCESSORIES (ONLY IF NECESSARY/REQUIRED)

Tree Stakes: Steel T-stakes, only stake trees if required or as specified by Texas A&M University if used, do not create trip hazards and have plastic caps. Stakes shall be painted silver or as directed in the drawings. Minimum height of stakes 48".

Tree Ties: Wire of pliable galvanized zinc-coated iron of #10 gauge; provide a minimum of two (2) per tree.

Hose covering: 2-ply, reinforced, rubber garden hose, minimum of 1" diameter.

Tree Guard: 'ArborGard+' by DeepRoot, 1-800-458-7668 (or equal).

Tree stakes are to be removed 1 year after planting.

Any product used shall not damage plant material in any way.

EXECUTION

COORDINATION

Coordinate as required with other trades to assure their proper and adequate interface with work of this section. Coordinate schedules for installation of work with schedules for other installations in order to assure orderly progress of the total construction sequence.

EXAMINATION

Examine areas to receive landscape installation for compliance with requirements and

conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected

PREPARATION

Protect structures, utilities, sidewalks, pavements, and other facilities, and existing vegetation from damage caused by landscape installation operations.

Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water/sedimentation runoff or airborne dust to adjacent properties and walkways.

Soil Preparation for Shrub and Ground Cover Beds

Pre-Plant Weed Control

If live perennial weeds exist on site at the beginning of work, spray with a non-selective systemic contact herbicide as recommended and applied by an approved licensed landscape pesticide applicator. Leave sprayed plants intact for at least fifteen (15) days to allow systemic kill. Apply herbicide in strict accordance with manufacturer's instructions.

Clear and remove these existing weeds by scraping or grubbing off all plant parts at least 1" below the surface of the soil over the entire area to be planted.

Backfill for Shrub and Ground Cover Beds

Remove existing soil to an overall depth equal to ten (12) inches below finish grade.

Till exposed soil to a minimum depth of six (6) inches.

Ensure that bed is adequately drained to prevent water retention in the landscape bed.

Add 12 inches of prepared Planting Soil Mixture accounting for settlement. Soil and compost can be pre-mixed, or tilled in place.

Mulch all planting areas when plant installation is complete with a minimum settled depth of three (3) inches of composted shredded hardwood mulch.

Notify Texas A&M University for soil inspection after initial excavation and prior to

loosening the exposed soil.

At time of planting, all areas to be planted shall be free of stones, stumps, or other deleterious matter 1" in diameter or larger and shall be free from all wire, plaster or similar objects including construction debris that would be a hindrance to planting or maintenance.

INSTALLATION

Planting shall occur only when weather and soil conditions permit, and in accordance with locally accepted practices, and as reviewed by Texas A&M University.

Soil Compatibility Tests: Perform topsoil compatibility tests for pH and chemical contamination prior to completion of rough grading.

Site Preparation: Prepare site by applying contact herbicide to weed growth on site as per manufacturer's label directions. Provide three (3) applications, each one week apart. Scarify planting areas to a minimum depth of six (6) inches. Float beds to grade and rake to remove weeds, clods, or rocks one (1) inch in diameter or greater. Thoroughly water-settle all soil.

Topsoil Installation:

Do not work soil when moisture content is so great that compaction will occur or when it is so dry that clods will not break readily. Apply water if necessary, to bring soil to an optimum moisture content for filling and planting. All compacted soils will be treated as necessary to provide adequate aeration. Subsurface drainage must be addressed so that water does not pool below the planting soil, and beds should be crowned to compensate for lost soil volume due to organic matter breakdown.

Fine grading

Fine grade all planting areas. Provide incidental grading of all areas adjacent to curbs and sidewalks. Grade planting areas to a smooth, uniform surface plane with loose, uniform fine texture. Remove ridges and fill depressions to meet finish grades. Soil grades adjacent to paving, curbs or headers shall be adjusted for surface materials.

Maintain or provide positive drainage away from all building structures. Drainage flows shall not be impaired with obstructions.

Unless otherwise specified, final grade (at top of any surface materials) shall be set at 1 inch below adjacent paving, curb and headers for turf and planting beds unless shown otherwise.

Existing soil shall be graded to curbing with a 4 to 1 maximum slope.

Excavation of Plant Pits:

The Contractor shall not excavate plant pits more than 24 hours in advance of planting operations. Any plant pits left unattended for any length of time which may present a hazard shall be covered and/or clearly flagged as approved by the Engineer or designated representative. The walls and bottoms of all plant pits shall be scarified immediately prior to the placement of plants.

Pit Sizes: Planting holes may be dug by hand or by mechanical means and shall be circular or square (according to the shape of the root ball) with vertical sides, unless otherwise indicated on the Drawings. Trimming of the sides or bottom of the hole to uniform shape will not be required. Planting pit sizes shall be as follows, unless indicated otherwise on the Drawings:

A minimum horizontal dimension of twelve (12) inches between the root ball and the sides of the planting pit for the following plant specifications:

Containers of fifteen (15) gallons or larger

Root ball diameter of Balled and bur lapped or bag grown plants larger than fourteen (14) inches.

A minimum horizontal dimension of two (2) times the diameter of the root ball for the following plant specifications:

Containers less than fifteen (15) gallons

Root ball diameter of Balled and bur lapped or bag grown plants fourteen (14) inches or less

A minimum diameter for bare-root plants to permit the roots to spread without crowding or curving around the walls of the pit.

Planting pits shall be excavated to a depth of 2 inches greater than the depth of the root ball of balled and bur lapped, containerized, container grown or bag grown plants; or the depth of the root system of bare-root plants. Pits dug to excess depths shall be backfilled and compacted to bring the pits to the specified depth. The depth of pits on slopes shall be measured at the lower side.

When performing mechanical transplanting, the receiving plant pit shall be backfilled as necessary with native or amended soil material as approved by TAMU.

Where holes are dug with an augur and the sides of the holes become plastered or glazed, this plastered or glazed surface shall be scarified.

Fill pits with water:

Contact Texas A&M University if water does not percolate within 24 hours. Do not plant until proper measures have been taken to ensure appropriate percolation.

Pruning Roots

Root pruning shall be limited to the amount necessary to prune away broken and badly damaged roots. Any girdling roots on edge of root-ball shall be cut with a handsaw or pruners. Severely girdled plants will be rejected on site.

Pruning

Pruning of plants shall be executed by certified arborist and shall conform to the best horticultural practice and shall be appropriate to the various types of plants and the special requirements of each. Plants otherwise acceptable, but with broken or badly bruised branches, shall have such branches removed with a clean cut.

Planting and Backfilling

Topsoil from the planting hole may be used for backfilling provided it is kept separate from subsoil and rendered loose and friable. Additional topsoil required to backfill the holes shall be furnished. (See products section).

Shrubs shall be planted with the root ball flush with the level of settled backfill unless specifically noted otherwise specified. Unless indicated otherwise or approved otherwise by the Grounds or designated Representative, planting and backfilling shall be as follows:

Depth of Transplanting

In general, plants shall be installed and covered with top soil approximately one (1) inch (25 mm) above the top of the root ball or container soil surface.

Balled and Bur lapped Plants

Plants of this type shall not be handled by the stems nor in such manner that the soil of the ball may be loosened. A saddle around the ball should be used for lifting. No plastic burlap material will be allowed. The burlap shall not be removed from the ball unit it is in the hole the then top 1/3 shall be. After the plant has been placed in the proper position, as shown on the Drawings, loose friable backfill shall be worked about the ball in 12-inch lifts until the pit is two-thirds (2/3 full). The burlap shall then be opened on top of the root ball to expose the top one-third (1/3) of the root ball. The pit shall then be filled with water (being aware of clay soil to prevent the tree from being drowned) and the backfilling completed, working the backfill and water well to prevent any air pockets.

For ball supporting devices such as wire baskets, the basket shall not be removed at first. The plant shall be placed in the prepared planting pit in the proper position and backfill shall be placed around the ball until the pit is about one-third (1/3) full. The basket shall be carefully removed to just above the backfill, leaving the bottom portion intact. Remove all other non-biodegradable materials such as twine, nylon bagging, and the like. Backfilling shall be completed as described above.

Containerized or Container Grown Plants

At the time of planting the root ball and plant shall be carefully removed from the container to prevent damage to the plant and root ball. If in the opinion of TAMU Campus

Planning, Design & Construction, the University Architect, or designated Texas A&M University representative a sufficient amount of soil has fallen off or the ball has been broken to such an extent as to reduce the chances of the plant to grow, the plant will be rejected. Container plants shall be acclimated to outside growing conditions. Container plants shall be placed and backfilled in the same manner as balled and bur lapped plants. Any girdling roots on edge of root ball shall be cut with a handsaw or pruners.

Vegetative Watering

During the planting operations, the Contractor shall keep the ground and backfill material moist to at least 12 inches around the root ball. The Contractor shall be required to meet the minimum watering requirements shown on the Drawings for all circumstances by a method approved by the Landscape Architect. When an irrigation system is shown on the Drawings, the Contractor shall coordinate his work to ensure that the irrigation system is operational as the plants are installed.

Pruning

Plants shall not be pruned immediately before delivery to the work site, unless approved by Grounds. Common nursery pruning practices are acceptable. Any necessary pruning shall be done at the time of planting as approved by the TAMU and shall be appropriate to the various types of plants and the special requirements of each.

Clean-Up

Remove all waste and debris; clean all pavement of soil and mulch created by this work from site.

Disposal

Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, debris, and legally dispose of them off Owner's property at Contractor's expense.

MAINTENANCE AND PROTECTION

Comply with Section 32 0190 – Operation and Maintenance of Planting. Campus Specific Information

Project A/E shall refer to Campus Site Furnishings and Hardscape Standards which can be found at http://www.cbe.tamu.edu/drsc-documents.aspx

Fertilization

Balanced Fertilizer as needed. Based on Soil test of area recommended 13-13-13 use in majority of application.

If fertilizer is needed in summer use Ammonia Sulfate, 21-0-0, applied in rates as recommended by manufacturer.

Apply fertilizer twice a year, Spring - March- April, Fall- September- October

Rate of application as recommended by manufacturer.

Planting Mixture:

The planting mix that we are using on campus with good results is 2 parts sandy loam, 2 parts washed yellow sand and one-part compost. This mix is used the entire depth of the root zone for new annual flower beds and landscape beds.

Plant List

The below plant list is intended to be a guide. Plants included in this list should be used with care to ensure the appropriate microclimate. Additions to this list must be approved by the owner. Any additions or substitutions must be requested AND approved in writing by the owner. Failure to gain approval will result in replacement of unapproved plant material at no cost to the owner.

Type	Common Name	*Scientific Name*	Spread	Size (Ht. unless specified)
Shade Trees	Bur Oak	*Quercus macrocarpa*	80'	60' - 100'
	Cedar Elm	*Ulmus crassifolia*	40'-60'	50' -90'
	Chinkapin Oak	*Quercus muehlenbergii*	50'-60'	50' -90'
	Common Bald Cypress	*Taxodium distichum*	25'	50' - 75'
	Live Oak	*Quercus virginiana*	60'-100'	40' - 50'
	Mexican Sycamore	*Platanus mexicana*	30'-40'	40'
	Monterrey Oak	*Quercus polymorpha*	60'	40' - 80'
	Montezuma Cypress	*Taxodium distichum var. mexicanum*	60'	30' - 80'
	Pond Cypress	*Taxodium distichum var. imbricarium*	30'	30' -70'
	Shumard Oak	*Quercus shumardii*	50'-60'	50' - 90'
	Southern Magnolia	*Magnolia grandiflora*	40'	50' - 75'
	Texas Red Oak	*Quercus buckleyi*	50'-60'	75'
	Water Oak	*Quercus nigra*	50'-80'	50' -100'
	Willow Oak	*Quercus phellos*	30'-40'	70' -100'
Medium Trees	American Holly	*Ilex opaca*	18'-40'	25' - 60'
	Arizona Cypress	*Cupressus arizonica*	25'-30'	30' - 40'
	Cherry Laurel	*Prunus caroliniana*	20'-25'	15' -36'
	Chinese Pistache	*Pistacia chinensis*	25'-35'	30'-35'

	Eastern Red Cedar	*Juniperus virginiana*	8'-20'	30' - 90'
	Japanese Blueberry Tree	*Elaeocarpus decipiens*	20'-30'	40'-60'
	Lacebark Elm	*Ulmus parvifolia*	35'-40'	40'-50'
	Mesquite	*Prosopis glandulosa*	25'-35'	25' -30'
	River Birch	*Betula nigra*	40'-60'	30' - 50'
	Texas Ash	*Fraxinus texensis*	25'-35'	30' -45'
Ornamental Trees	Pineapple Guava	*Feijoa sellowiana*	10'-15'	10'-15'
	Staghorn Sumac	*Rhus typhina*	15'-25'	15' -30'
	Sweet Bay Magnolia	*Magnolia virginiana*	10'-20'	12' - 50'
	Common Crapemyrtle	*Lagerstroemia indica*	6'-15'	
	Desert Willow	*Chilopsis linearis*	10'	15' -40'
	Evergreen Sumac	*Rhus virens*	8'	8' -12'
	Forest Pansy Redbud	*Cercis canadensis*	15'-25'	15' - 30'
	Mexican Buckeye	*Ungnadia speciosa*	15'-20'	8' -30'
	Mexican Plum	*Prunus mexicana*	20'-25'	15' -35'
	Mexican Redbud	*Cercis canadensis var. mexicana*	18'-25'	10' -25'
	Possomhaw Holly	*Ilex decidua*	15'	15' -30'
	Prairie Flameleaf Sumac	*Rhus lanceolata*	20'	12' - 30'
	Purple Leaf Plum	*Prunus cerasifera*	25'	

	Southern Waxmyrtle	*Myrica cerifera*	20'-25'	
	Texas Mountain Laurel	*Sophora secundiflora*	6'-10'	10' -20'
	Texas Redbud	*Cercis canadensis var. texensis*	15'-20'	10' -20'
	Tree Yaupon	*Ilex vomitoria*	15'-20'	
	Fringe Tree	*Chionanthus sp. (virginicus and retusus)*	25'-30'	
	Eve's Necklace	*Styphnolobium affine*	15'	
	Chaste Tree	*Vitex agnus-castus*	15'	
	Palo Verde Tree	*Parkinsonia x* 'Desert Museum'	25'	
Evergreen Shrubs	Mary Nell Holly	*Ilex x* 'Mary Nell'	8'	
	Saw Palmetto	*Serenoa repens*	7'	
	Dwarf Fan Palm	*Chamaerops humilis*	5'	
	Desert Barberry	*Mahonia trifoliate*	2-6'	
	Boxwood	*Buxus microphylla*	10-15'	
	Burford Holly	*Ilex cornuta* 'Burfordii'	8-10'	
	Blue Nolina	*Nolina nelsonii*	5-10'	
	Common Bottlebrush	*Callistemon citrinus*	2-3'	
	Dwarf Chinese Holly	*Ilex cornuta* 'Dwarf Burford'	8-10'	
	Dwarf Palmetto Palm	*Sabal minor*	3'-5'	
	Dwarf Waxmyrtle	*Myrica cerifera*	6'	
	Dwarf Yaupon	*Ilex vomitoria*	6'	
	Flowery Senna	*Senna corymbosa*	6'-10'	

	Glossy Abelia	*Abelia x grandiflora*	3'-6'	
	Gray Cotoneaster	*Cotoneaster glaucophyllus*	3'-6'	
	Giant Hesperaloe	*Hesperaloe funifera*	5'-10'	
	Indian Hawthorn	*Raphiolepis spp.*	3'	
	Japanese Aucuba	*Aucuba japonica*	5'-9'	
	Japanese Pittosporum	*Pittosporum tobira*	12'-18'	
	Japanese Yew	*Podocarpus macrophyllus*	4'	
	Mahonia	*Mahonia bealei*	4'	
	Nandina	*Nandina domestica*	5'	
	Nellie R. Stevens Holly	*Ilex cornuta*	8'-15'	
	Primrose Jasmine	*Jasminum mesnyi*	5'-'10	
	Rosemary	*Rosmarinus officinalis*	4'	
	Red Yucca	*Hesperaloe parviflora*	4'	
	Sago Palm	*Cycas revoluta*	5'	
	Sandankwa Viburnum	*Viburnum suspensum*	5'	
	Flax Lily	*Dianella tasmanica*	5'	
	Walter's Dwarf Viburnum	*Viburnum obovatum 'Densa'*	5'	
	Oleander	*Nerium oleander*	10'	
	Giant Lilyturf	*Liriope gigantean*	3'	
	Japanese Plum Yew	*Cephalotaxus harringtonia*	4'-6'	

	Cleyera	*Ternstroemia gymnanthera (Cleyera japonica)*	10'	
	Gray Leaf Cotoneaster	*Cotoneaster glaucophyllus*	5'	
	Juniper	*Juniperus virginiana*	6'-8'	
	Loquat	*Eriobotrya japonica*	15'-20'	
	Adam's Needle Yucca	*Yucca filamentosa*	2'-3'	
	Texas Sotol	*Dasylirion texanum*	5'	
Perennials & other Shrubs	Mexican Beautyberry	*Callicarpa*	3'-6'	
	Cuphea	*Cuphea micropetala*	2'	
	Dwarf Katie Ruellia	*Ruellia brittoniana*	2'	
	Blue Mistflower	*conoclinium*	3'	
	Gregg's Mistflower	*conoclinium greggii*	2'-3'	
	Joe Pye Weed	*Eutrochium purpureum*	2'-4'	
	Autumn Sage	*Salvia greggii*	3'	
	Mealy Cup Sage	*Salvia farinacea*	2'	
	Texas Sage	*Salvia texana*	2'	
	Meadow Sage	*Salvia sylvestris*	2'	
	Scarlet Sage	*Salvia coccinea*	3'	
	Javelin Juncus	*Juncus pallidus*	2'	
	Purple Heart	*Tradescantia pallida*	2'	
	Yarrow	*Achillea millefolium*	3'	
	Purple Verbena	*Verbena canadensis*	2'	
	Artemisia	*Artemisia x 'Powis Castle'*	2'	
	American Beautyberry	*Callicarpa americana*	6'-8'	
	Blue Plumbago	*Plumbago auriculata*	8'-10'	
	Bulbine	*Bulbine frutescens*	2'	
	Daylily	*Hemerocallis spp.*	2'	

	Dwarf Pomegranate	*Punica granatum*	4'-15'	
	Firebush	*Hamelia patens*	6'	
	Firecracker Fern	*Russelia equisetiformis*	5'	
	Flame Acanthus	*Anisacanthus quadrifidus*	4'	
	Fragrant Sumac	*Rhus aromatica*	5'-10'	
	Gaura	*Gaura lindheimeri*	2'	
	Turk's cap	*Malvaviscus arboreus var. mexicanus*	3'	
	Jerusalem Sage	*Phlomis fruticose*	5'	
	Lily-Of-The-Nile	*Agapanthus africanus*	2'	
	Louisiana Hydrid Iris	*Iris x* 'Louisiana Hybrids'	3'-4'	
	Mexican Heather	*Cuphea hyssopifolia*	3'	
	Mexican Mint Marigold	*Tagetes lucida*	3'-4'	
	Farfugium	*Farfugium japonicum var. giganteum*	2'	
	Dwarf Katie Ruellia	*Ruellia brittoniana* 'Katie'	1'	
	Pride-Of-Barbados	*Caesalpinia pulcherrima*	12'	
	Russian Sage	*Perovskia atriplicifolia*	4'	
	Rusty Blackhaw Viburnum	*Viburnum rufidulum*	10'-20'	

	Texas Lantana	*Lantana urticoides*	6'	
	Texas Sage	*Leucophyllum frutescens* 'varieties'	5'	
	Trailing Lantana	*Lantana montevidensis*	5'	
	Varigated Ginger	*Alpinia zerumbet*	4'	
	White Butterfly Iris	*Dietes iridioides*	3'	
	Yellow Bells	*Tecoma stans var. angustata*	5'-8'	
	Yellow Bicolor Iris	*Dietes bicolor*	1'	
	Zexmenia	*Wedelia hispida*	3'	
Ornamental Grasses	Inland Sea Oats	*Chasmanthium latifolium*	3'	2'-4'
	Bamboo Muhly	*Muhlenbergia dumosa*	3'-5'	4'-6'
	Deergrass	*Muhlenbergia rigens*	3'-4'	3'-6'
	Gulf Muhly	*Muhlenbergia capillaris*	2'-3'	2'-3'
	Lindheimer Muhly	*Muhlenbergia lindheimeri*	3'-4'	2'-5'
	Maidengrass	*Miscanthus sinensis*	3'-6'	4' -7'
	Purple Fountain Grass	*Pennisetum alopercuroides*	3'-6'	2.5' -5'
	Feather Reed Grass	*Calamagrostis × acutiflora*	3'	3' -5'

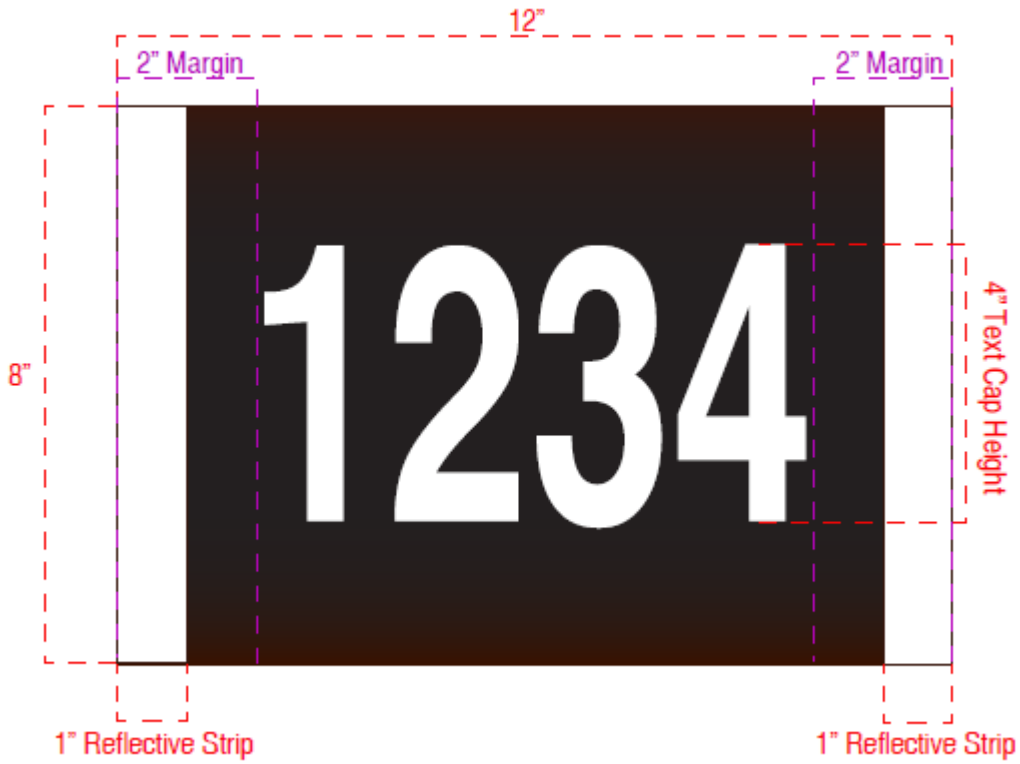
	Alkali Sacaton	*Sporobolus airoides*	3'	1'-3'
	Blue Lyme Grass	*Elymus arenarius*	2'	2'-3'
	Little Bluestem	*Schizachyrium scoparium*	2'	2'-4'
	Grama	*Bouteloua gracilis*	2'	0.75' - 2.5'
	Berkeley Sedge	*Carex divulsa*	2'	1'-2'
	Bushy Bluestem	*Andropogon glomeratus*	3'	3'-6'
	Switchgrass	*Panicum virgatum*	3'	3'-6'
	Indiangrass	*Sorghastrum nutans*	2'	3'-6'
Groundcovers	Asian Jasmine	*Trachelospermum asiaticum*	1'	1' -2' ht., 10' - 12' spread
	Asparagus Fern	*Asparagus densiflorus*	3'-4'	2'-3'
	Cast Iron Plant	*Aspidistra elatior*	2'	2'-3'
	Trailing Juniper	*Juniperus horizontalis*	5'-8'	1'-3'
	Frogfruit	*Phyla nodiflora*	1'	3" - 6"
	Holly Fern	*Cyrtomium falcatum*	3'	1'-2'
	Liriope	*Liriope muscari*	1'	1'-2'
	Silver Pony Foot	*Dichondra argentea*	4'	3" - 4"
	Wood Fern	*Thelypteris kunthii*	3'	2.5' - 5'
	Sundrops	*Calylophus berlandieri*	2'	4" - 20"
	Rain Lily	*Zephyranthes sp.*	2'	1'-1.5'

	Dianthus	*Dianthus sp.* 'Bath's Pink' & 'Firewitch'	2'	0.75' - 1'
	Wooly Stemodia	*Stemodia lanata*	3'	4"-10"
Climbing Vines	Butterfly Pea	*Clitoria ternatea*	6'	10'-15' Height, 3'-6' spread
	Carolina Jessamine	*Gelsemium sempervirens*	6'	10'-20' long
	Fig Ivy	*Ficus pumila*	6'	25'-30' tall, 3ft spread
	Confederate Jasmine	*Trachelospermum jasminoides*	6'	3'-6' spread and height
	Coral Honeysuckle	*Lonicera sempervirens*	6'	3'-20' long
	Evergreen Wisteria	*Millettia reticulata*	6'	12'-15' long, 4'-6' spread
	Virginia Creeper	*Parthenocissus quinquefolia*	10'	3'-40' long
	Butterfly Vine	*Mascagnia macroptera*	10'	10'-12' long
	Wisteria	*Wisteria floribunda*	8'	10'-25' long, 4'-8' spread
	Candy Corn Vine	*Manettia luteorubra*	3'	6'-12' long
	Crossvine	*Bignonia capreolata*	9'	Can climb to 36'-50'

Building Number Signage

Building number signage for new and existing buildings should be fabricated and installed per the specifications listed below.

Specifications:
Base sabstrate: .063" thick Black Anodized aluminum
Vinyl: Orafol Oralite 5600-010 Reflective White
Font: Helvetica Narrow Bold
Text Cap Height Average: 4"
Text Horizontal Scaling: ~80%
Text Vertical Scaling: 100%
Text centered vertically and horizontally.
Text fits within 2" left margin and 2" right margin
Mounting Location: Installed on the building side closest to the main road
Mounting Height: 10' to the bottom of sign typically. May vary due to building size/shape, but should be visible from the main road.
Mounting Type: Mechanically fastened with screws and anchors suitable with building material type



Wayfinding Signage

The purpose of the Texas A&M Wayfinding and Signage Package is to provide a consistent methodology for implementing signage at Texas A&M's main campus. The package includes detailed fabrication and installation specifications for vehicular, pedestrian and directional signage as well as architectural lettering and can be found at: https://universityarchitect.tamu.edu/media/1602765/tamu-wayfinding-signage-pkgs.pdf

The Wayfinding and Signage Package is not limited to a single manufacturer. Fabrication and installation should adhere to the package requirements, resulting in products of equal quality.

Approvals

All signs must be submitted to TAMU's Campus Planning, Design & Construction and Texas A&M Division of Marketing & Communications for approval. A survey and field study of conditions are necessary to determine messaging and sign placement. Texas A&M's University Architect is available to discuss signage or graphic design projects prior to implementation and must be included in the review and sign-off process for every signage project.

TEXAS A&M
UNIVERSITY

CAMPUS SITE FURNISHINGS AND HARDSCAPE STANDARDS DOCUMENT

Published by Campus Planning, Design & Construction

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EXECUTIVE SUMMARY

The Campus Site Furnishings and Hardscape Standards is one instrument to implement the Texas A&M University Campus Master Plan and associated policies. The Plan provides a road map and a planning ethic for the future.

> *"Standard site furnishings, which include benches, tables, shade structures, lighting, etc. are an integral part of the development of campus streets, open spaces, and pedestrian zones for a consistent campus character. These items should be consistently applied throughout the campus with the exception of areas of historical significance or a unique program may have unique site furnishings specific to the character of those spaces" (p.289).*

The Plan is flexible in order to adapt to future changes: it provides policies, principles, and guidelines to shape the future growth and development of the campus. The Campus Site Furnishings and Hardscape Standards aims to ensure that the development of the quality and character of the campus outdoor environment is consistent with the policies and principles in the Campus Master Plan.

The Campus Site Furnishings and Hardscape Standards are comprised of 18 elements, each with a set of standards. For each element, the technical specifications, the approved locations, the CMP guidance, and a reference for sources of additional information are presented where applicable.

GENERAL DESIGN STANDARDS AND PRINCIPLES

Five overriding principles guide the implementation of Campus Site Furnishing and Hardscape Standards:

1. Fitness with Site and Context: Site furnishings and hardscapes should fit harmoniously with the structures and outdoor spaces at the Texas A&M campus and strengthen the sense of place for students, faculty, staff, and visitors. Fitness implies sensitivity to scale, materials, pattern, texture, and form to achieve a balance between variety and unity.

> *"Material continuity plays a major role in the structure of the broader campus environment. As such, product and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure. A palette that upholds the designated campus standards for items such as paving, site or garden walls, site furnishings, and lighting helps strengthen visual order on the campus, allowing students, faculty, staff, and campus visitors to easily recognize boundaries, transitions, and programs for any campus space, small or large" (p.288).*

2. Functionality: Site furnishings and hardscapes must effectively meet the pragmatic needs of their users. They need to be designed for serviceability over time. In addition, site furnishings should be designed for flexibility and adaptability since user needs may vary and evolve over time.

3. Economy: It is important that site furnishings are constructed and maintained over their life-cycle in a cost-effective manner. Careful analysis and decision-making to select qualified manufacturers and tested products are required to ensure that the University will be able to expend finite funds wisely.

> *"As site furnishings need to be replaced in areas with existing styles, new site furnishing must match what is already present. As older site furnishings fail or need to be replaced in areas that do not have existing styles, they should be upgraded with the brands and styles called out in the Campus Site Furnishings and Hardscape Standards document" (p.300).*

4. Quality: Strong design control is required to achieve a high-quality environment and implement the intent of the Campus Master Plan.

"This will avoid having to make impromptu field decisions that may compromise the quality and intent of the design, the health of planting material, or the structural integrity of hardscaping material" (p. 289).

5. Sustainability: The spirit of sustainability is embedded in the effective implementation of the proposed standards. Encouraging eco-friendly materials and technologies and reducing the consumption of energy and non-renewable resources will provide benefits for the natural environment, the quality of the campus-built environment, and the University's long-term financial stability.

".....hardscape materials must be functional, economical, of quality, and dove tail with the spirit of sustainability that the campus strives to achieve as stewards of its built and natural environments" (p.288).

1.1. Scarborough Bench

Product Description

Classically styled metal strap bench is available in backed or backless versions, and various lengths. The timeless design has elegant, and controlled curves and a clean, familiar, and classical appearance.

Product Dimensions

Backed 24”/48”/72”/96”
Depth: 26”/28”
Width: 22”/49”/73”/97”
Height: 28”/34”
Weight- 89-234 lb

Product Material

Material: Steel
Finish: Polyester Powder-coat
Color: Silver Ivy Green

Where to be placed?

Common outdoor gathering spaces, along walkways, large and small courtyard edges, and along “people movers” (p.308), “Connectors” (p.314), “multi-Use Paths and Trails” (p.316), and “Urban Edges” (p.318). The Ivy Green bench is/will be the predominant bench throughout campus common areas.

Campus Master Plan - Review

“Repetition in softscape and hardscape materials and their application can provide a sense of orderliness.” (p.288)
“Landscape treatment of the main entry should have a balance of hardscape and softscape areas, shade structures, ... seating to accommodate small gatherings, such as site walls, super stairs, benches, etc.” (p. 256).

Source: Scarborough bench

1.2. Sit Bench

Product Description

Modern, backless bench with a contemporary and modern aesthetic, perforated steel seating, and a clean, rectilinear cast aluminum frame.

Product Dimensions

Depth: 20”
Width: 69”
Height: 28”
Weight: 190 lbs

Product Material

Bench top: Perforated steel
Frame: Cast aluminum
Finish: Polyester Powder-coat
Color: Silver

Where to be placed?

Modern and Park-like natural seating areas such as rain gardens that embrace a more contemporary aesthetic.

Additional Notes

Specify without dividers.

Campus Master Plan - Review

“Small gathering areas should integrate ....movable tables and chairs,...., and benches. A range of seating variety fosters social interaction and provides opportunities for rest and meditation.... Custom furnishings”.... (p.326).
“Purposefully placed benches and small seating areas adjacent to malls are appropriate ....” (p. 310).

Source: Sit bench

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

1.3. Austin Bench

Product Description

Modernist inspired interpretation of the classic wooden bench with durable Ipe wood seat and back.

Product Dimensions

Depth: 22”/24”

Length: 72”

Height: 18”/33”

Weight: 90-130 lb

Product Material

Bench top: Ipe wood extruded boards

Frame: Cast aluminum

Finish: Polyester Powder-coat

Color: Silver Natural

Where to be placed?

Small and large courtyard edges, and other small seating areas along or associated with the building edges. Utilize in areas where shade is not available as the wood material would prevent the seat from becoming too hot.

Additional Notes

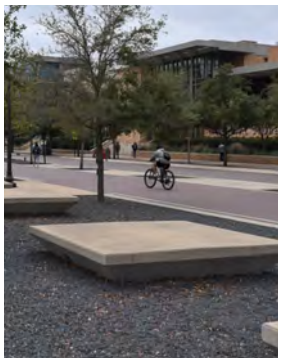
Specify without or without arms and backed or backless.

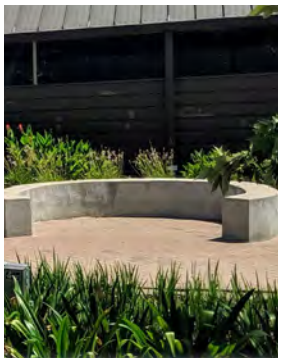
Campus Master Plan - Review

“Small gathering areas should integrate ....movable tables and chairs,...., and benches. A range of seating variety fosters social interaction and provides opportunities for rest and meditation”.... (p.326).

“Standard site furnishings, which include benches, tables, chairs, and bicycle racks, should be an integral part of the development of campus streets, open spaces, and pedestrian zones for a consistent campus character” (p. 300).

Source: Austin bench Campus Master Plan





1.4. Concrete Bench

Product Description

Custom designed cast-in-place benches designed to capture the uniqueness of the surroundings and reflect architectural styling.

Product Dimensions

Depth: Variable

Length: Variable

Product Material

Bench top: Concrete

Material: Concrete

Finish: Raw

Where to be placed?

Common outdoor small and large gathering spaces that lend themselves to a more unique or custom style of furnishing.

Additional Notes

Custom-designed as part of the landscape package.

Campus Master Plan - Review

“Site or garden walls can be used for grade accommodation, screening purposes, or seating areas.” (p.300).

“A concrete finish may be utilized where appropriate and must be approved by the Council for the Built Environment and/or the Office of the University Architect” (p.300).

“A range of seating variety fosters social interaction and provides opportunities for rest and meditation.... Custom furnishings, custom pavers or pavement types, artificial turf, decking, shade sails, shade structures, water features, and planters are all features that could be incorporated, enhancing the unique, or “special,” nature of these spaces” (p.326).

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

1.5. Concrete + Ipe Bench

Product Description

Custom designed cast-in-place frame with wood seat and back.

Product Dimensions

Depth: Variable

Length: Variable

Product Material

Bench top: Ipe

Frame: Concrete

Material: Concrete

Finish: Smooth

Color: Natural

Where to be placed?

Outdoor courtyards with small and large gathering spaces that lend themselves to a more unique or custom style of furnishing.

Additional Notes

Custom designed as part of landscape package

Campus Master Plan - Review

"Site or garden walls can be used for grade accommodation, screening purposes, or seating areas" (p.300).

A concrete finish may be utilized where appropriate and must be approved by the Council for the Built Environment and/or the Office of the University Architect" (p.300).

"A range of seating variety fosters social interaction and provides opportunities for rest and meditation.... Custom furnishings, custom pavers or pavement types,.. and planters are all features that could be incorporated, enhancing the unique, or "special," nature of these spaces" (p.326).

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

2.1. Americana

Product Description

The casual lounge chair is available in vibrant colors constructed of primarily sustainable products.

Product Dimensions

Depth: 37.5”

Width: 33.5”

Height: 39.25”

Product Material

Seat top and back: 100% Recycled HDPE

Frame: Extruded Aluminum

Finish: Polyester Powder-coat

Color: Green Sky Blue

Driftwood (light gray)

Where to be placed?

Small gathering spaces adjacent to, or near people movers and other pedestrian walkways as well as courtyards, forums, pocket parks, and lawns that lend themselves to relaxation and rest.

Additional Notes

Products are made with 100% recycled high-density polyethylene (HDPE)

Campus Master Plan - Review

“A range of seating variety fosters social interaction and provides opportunities for rest and meditation” (p. 326).

Source: Americana lounge chair

2.2. The 405 Chaise Chair

Product Description

The casual chaise lounge chair is available in vibrant colors constructed of primarily sustainable products.

Product Dimensions

Width: 24.75”

Length: 80”

Height: 34.25”

Product Material

Bench top: #2 plastics

Frame: #2 plastics

Material: Plastic

Finish: HDPE

Color: Leaf Green Sky Blue

Charcoal Grey

Where to be placed?

Small gathering spaces adjacent to, or near people movers and other pedestrian walkways as well as courtyards, forums, pocket parks, and lawns that lend themselves to relaxation and rest.

Additional Notes

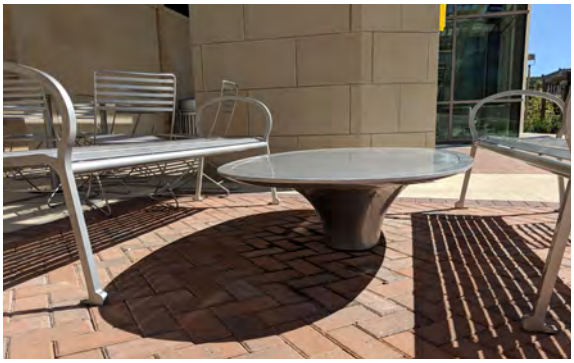
Products are made with 100% recycled high-density polyethylene (HDPE)

Campus Master Plan - Review

“A range of seating variety fosters social interaction and provides opportunities for rest and meditation” (p. 326).

Source: The 405 Chaise

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.



3.1. Stella Table

Product Description

Elegant oval shaped low table in combination with a classic bench is a versatile accessory to seating in small gathering spaces.

Product Dimensions

Depth: 39”

Length: 72”

Height: 15”

Weight: 214 lb

Product Material

Table top: Perforated steel

Table base: Cast aluminum

Finish: Polyester Powder-coat

Color: Silver

Where to be placed?

Small outdoor gathering spaces or grouped with other seating in larger spaces.

Additional Notes

Table must be surface mounted

Campus Master Plan - Review

“Standard site furnishings, which include benches, tables, shade structures, lighting, etc. are an integral part of the development of campus streets, open spaces, and pedestrian zones for a consistent campus character” (p.289).

Source: Stella table

3.2. Mingle Table

Product Description

An open and inviting seating system with a distinctive asymmetric structure lends it an energetic air and makes the seating accessible for small groups to sit together.

Product Dimensions

Style: Two, three, four five or six seats

Diameter: 73”, 87”

Height: 33”

Weight: 124-223 lb

Product Material

Table top: Catena stainless steel

Seat panels: Perforated metal

Finish: Polyester Powder-coat

Color: Silver

Where to be placed?

Shaded common outdoor gathering spaces, around small and large courtyards, near dining services, open plazas, and outdoor study areas. The table style is/will be one of the predominant table styles throughout campus.

Additional Notes

See shade mounting option for surface mount rules

Three-seat and five-seat styles are wheelchair accessible

Campus Master Plan - Review

“ Furniture items should be consistently applied throughout the campus” (p. 289).

Source: Mingle table

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

3.3. Chipman Table

Product Description

A table with a smooth aluminum finish and looks delicate in scale and proportion, easily movable but heavy enough to be placed on rooftop terraces.

Product Dimensions

Diameter: 45”
Height: 29.25”
Weight: 85 lb
Chair Style: W/O arms
Depth: 22”
Width: 20”, 24”
Height: 33”
Weight: 17-20 lb

Product Material

Table top: Aluminum table casting
Seat panels: Aluminum castings welded together
Finish: Polyester Powder-coat
Color: Silver

Where to be placed?

Outdoor gathering spaces, courtyards of dormitories, near dining services, pocket parks, and other small seating areas that allow for a more intimate and “custom” feel. It should be predominantly used in areas with concrete or smooth surfaces.

Additional Notes

Movable table adds to the special ambiance of a social space.

Campus Master Plan - Review

“Large gathering areas should integrate various forms of seating, including movable tables and chairs, site or garden walls, and benches” (p.322).

Source: Chipman table

3.4.Parc Center Table

Product Description

Economic, steel constructed, and easily movable table which is heavy enough to remain in place and opening options for versatile social settings.

Product Dimensions

Diameter: 30”
Height: 30”
Weight: 94 lb
Chair Style: W/O arms
Depth: 19”
Width: 19”, 21”
Height: 33”
Weight: 22-25 lb

Product Material

Table top: Solid 5/16” steel plate
Seat panels: Heavy steel straps
Finish: Polyester Powder-coat
Color: Silver

Where to be placed?

Common outdoor gathering spaces along walkways, small and large courtyard edges, pocket parks, and other seating areas in open plazas where movable furniture is desired. It can be used on decomposed granite/dirt areas as leveled glides on the steel plate base makes it stable on varied surfaces.

Additional Notes

Panels are constructed of welded steel straps.

Campus Master Plan - Review

“Since courtyards are typically accommodating small gatherings, they should include benches and movable tables and chairs” (p.328).

Source: Parc center table

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

3.3. Multiplicity Table

Product Description

multi-use wood top table designed for eating, working and social gathering. The frame of the table is dimensioned to allow a backless bench to slide efficiently underneath.

Product Dimensions

Height: 29’

Depth: 35’

Width: 95’

Weight: 119lb

Product Material

Table top: Ipe wood

Frame: Steel

Finish: Polyester Powder-coat

Color: Natural Silver

Where to be placed?

Outdoor gathering spaces, around small and large courtyards, near dining services, open plazas, and outdoor study areas. Adjacent to, or near people movers and other pedestrian walkways as well as courtyards, forums, and pocket parks

Additional Notes

It must be place on a hard surfaces in the landscape, and spaces that offer some protection from the elements.

Campus Master Plan - Review

“Large gathering areas should integrate various forms of seating, including movable tables and chairs, site or garden walls, and benches” (p.322).

Source: MultipliCITY Table

3.4. Morrison table

Product Description

A modernist inspired lounge height coffee table provides a large surface area at a height that is compatible with lounge style furniture around campus.

Product Dimensions

Depth: 40”

Width: 40”

Height:15”

Weight: 72-88 lbs

Product Material

Table top: Ipe wood

Frame: Steel

Finish: Polyester Powder-coat

Color: Natural Silver

Where to be placed?

In combination with lounge furniture in small gathering spaces adjacent to, or near people movers and other pedestrian connectors as well as courtyards, forums, and pocket parks.

Additional Notes

Require a smooth surface and limited protection from the elements.

Campus Master Plan - Review

A range of seating variety fosters social interaction and provides opportunities for rest and meditation.... Custom furnishings, custom pavers or pavement types,.. and planters are all features that could be incorporated, enhancing the unique, or “special,” nature of these spaces” (p.326).

Source: Morrison Table

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

3.5. Carousel Casual Height Table

Product Description

The table has fixed, casual height seating element with a casual appearance, and a wide range of available configurations.

Product Dimensions

Diameter: 90”-98”

Height: 22”-33”

Weight: 103-187 lb

Product Material

Table top: Silver solid, or Ipe wood

Seat panels: Perforated or gridded

Seat option: Backed, backless, and hoops

Finish: Polyester Powder-coat

Color: Silver

Table top: Ipe wood

Where to be placed?

Outdoor gathering spaces, around small and large courtyards, near dining services, and open plazas. This table style is/will be one of the predominant table styles throughout campus.

Additional Notes

Umbrella hole must be specified when ordered.

Casual height units come standard with 3 or 4 seats.

Campus Master Plan - Review

“Standard site furnishings, which include benches, tables, shade structures, lighting, etc. are an integral part of the development of campus streets, open spaces, and pedestrian zones for a consistent campus character (p.289)”.

Source: Carousel table

3.6. Carousel Dining Height Table

Product Description

The table has fixed, dining height seating element with a casual appearance, and a wide range of available configurations.

Product Dimensions

Diameter: 81”-90”

Height: 29”-33”

Weight: 127-290 lb

Product Material

Table top: Silver solid, or Ipe wood

Seat panels: Perforated or gridded

Seat option: Backed, backless, and hoops

Finish: Polyester Powder-coat

Color: Silver

Table top: Ipe wood

Where to be placed?

Outdoor gathering spaces, small and large courtyards, near dining services, and open plazas. This table style is/will be one of the predominant table styles throughout campus.

Additional Notes

Umbrella hole must be specified when ordered.

Three-seat is ADA compliant and five-seat styles are wheelchair accessible.

Campus Master Plan - Review

“Standard site furnishings, which include benches, tables, shade structures, lighting, etc. are an integral part of the development of campus streets, open spaces, and pedestrian zones for a consistent campus character (p.289)”.

Source: Carousel table

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

3.7. Carousel Standing Height Table

Product Description

The table has fixed, standing height seating element with a casual appearance, and a wide range of available configurations.

Product Dimensions

Diameter: 72”-80”

Height: 42”-44”

Weight: 154-214 lb

Product Material

Table top: Stainless steel solid, silver solid, or Ipe wood

Seat panels: Perforated or gridded

Seat option: Backed, backless, and hoops

Finish: Polyester Powder-coat

Color: Silver

Table top: Ipe wood

Where to be placed?

Outdoor gathering spaces, around small and large courtyards, near dining services, and open plazas. This table style is/will be one of the predominant table styles throughout campus.

Additional Notes

Umbrella hole must be specified when ordered.

Standing height units come standard with 4 seats.

Campus Master Plan - Review

“Standard site furnishings, which include benches, tables, shade structures, lighting, etc. are an integral part of the development of campus streets, open spaces, and pedestrian zones for a consistent campus character (p.289)”.

Source: Carousel table

4.1. Solstice Cygnus Umbrella

Product Description

Shade umbrella has a graceful winged aluminum canopy that protects from the sun and imparts a sense of place.

Product Dimensions

Diameter: 91”

Height: 91”

Weight: 85 lb

Product Material

Solid aluminum, mounted in an extruded aluminum frame

Finish: Polyester Powder-coat

Color: Ivy Silver

Where to be placed?

Outdoor gathering spaces, around small and large courtyards, near dining services, and open plazas.

Additional Notes

Shade umbrella must be mounted to the table, which in turn must be mounted to, or embedded in, a hard surface.

Campus Master Plan - Review

“ Furniture items should be consistently applied throughout the campus” (p. 289).

Source: Solstice Cygnus

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

5.1. Bike Rack

Product Description

Bike Racks are fabricated using US sourced steels with a high recycled content.

Product Dimensions

Standard racks width: 78”

Gap between top tubes: 15’

Between racks: 2’

Product Material

Racks: Steel tubing

Finish: Metallic flex

Color: statuary bronze

Where to be placed?

It shall be placed in all enclosed and designated outdoor bike parking spaces under all/semi or no covered sun shades or no shades.

Additional Notes

Provided by TAMU Transportation Services.

Campus Master Plan - Review

“Locating transit stops near parking garages with integrated bicycle parking facilities is one way to support this type of connectivity” (p.164).

Source: Cora Bike Racks and/or equal

5.2. Brick Wall with Stone Cap

Product Description

Custom masonry wall with stone cap with color selected to blend with the adjacent buildings.

Product Dimensions

Length: Variable

Width: 18”

Height: Min. 3’

Product Material

Wall top: Stone Cap

Material: Brick, concrete & Stone cap

Veneer: Masonry

Where to be placed?

Placed near outdoor gathering spaces or plazas that require immediate buffer and 100% screening and/or where the space for natural vegetation is limited.

Additional Notes

Custom designed as part of the building design package and in accordance with the Campus Master Plan. See section 12.1 for more information.

Campus Master Plan - Review

“Purposefully incorporating bike parking into the campus design, improving usability, proximity, and safety, and making sure that bike parking is either sheltered or screened depending on its location is necessary” (p. 304).

Source: Figure A-1.

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

5.3. Low Brick Wall with Stone Cap & Planting

Product Description

A low seat wall forms a planter to proved a blended screening element. The seat wall must be masonry to match the contextual brick colors with stone cap.

Product Dimensions

Length: Variable

Width of wall: 18”

Height of the wall: 18”-24”

Height of plants: 2-3’

Product Material

Wall top: Stone Cap

Material: Brick, concrete & Stone cap

Veneer: Masonry and planting on top

Where to be placed?

Outdoor spaces where privacy is required with a softer appearance, or additional outdoor seating is desired.

Additional Notes

Recommended shrubs: Burford holly, Podocarpus maki, Gulf muhly, or other evergreen to semi-evergreen approved plant. Provide at least 3’ minimum plant height at time of installation to provide immediate buffer. Must provide 100% screening at full maturity.

Campus Master Plan - Review

“Brick or stone enclosures should be contextually appropriate to the adjacent building” (p. 304).

“In lieu of providing one large bicycle storage area at each building, consider multiple smaller capacity storage areas which tend to result in fewer bicycle tangles” (p.162).

Source: Figure A-2.

5.4. Stone Wall with Sections of Steel Screen

Product Description

Masonry column with a stone cap and stainless steel screen panels to provide limited visibility and supported by evergreen plant material.

Product Dimensions

Length: Variable

Width of wall: 18”

Height of the wall: Min 3’

Height of plants: 3’ evergreen shrubs

Product Material

Panel: Steel (stainless)

Finish: Pickle and passivated

Where to be placed?

Outdoor gathering spaces or plazas that requires limited visibility and/or areas that would be adversely affected by full screening of the bike racks.

Additional Notes

Metal screening preferred with the brick wall so as to have bike parking visibility.

Campus Master Plan - Review

“Metal screening shall comply with campus standards in relation to material, type and color if it is not designed as a unique application” (p. 305).

Source: Figure A-3.

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

5.5. Softscape Hedge

Product Description

Full vegetative screen provided by a double row of plant material. The combination of dense evergreen shrubs with semi-evergreen grasses provide for seasonal interest and blend contextually with natural surroundings and providing full screening.

Product Dimensions

Counts: Group of 2 (repeat)

Buffer: 3' evergreen shrubs

Evergreen min.: 10 gallons

Product Material

Panel: Plants

Finish: Double planting layers with 1 row evergreen and 1 row semi-evergreen shrubs

Where to be placed?

Outdoor bike parking spaces where softscape screening is preferred.

Additional Notes

Recommended shrubs: Burford holly and Gulf muhly

Provide at least 3' height at the time of planting in order to provide immediate buffer.

Must provide 100% screening at full maturity.

Campus Master Plan - Review

"Planting bed must be a minimum of 8' deep to accommodate edge (concrete mow strip) and plantings" (p. 304).

Source: Figure A-4.

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

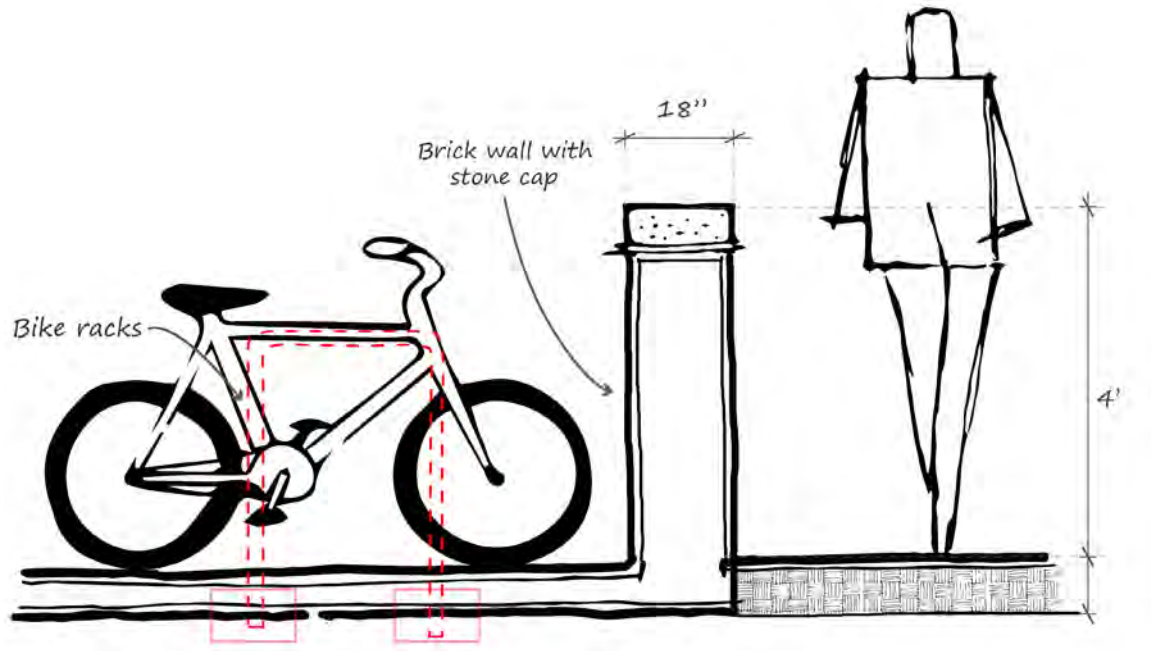


Figure A-1. Conceptual design for brick wall with stone cap

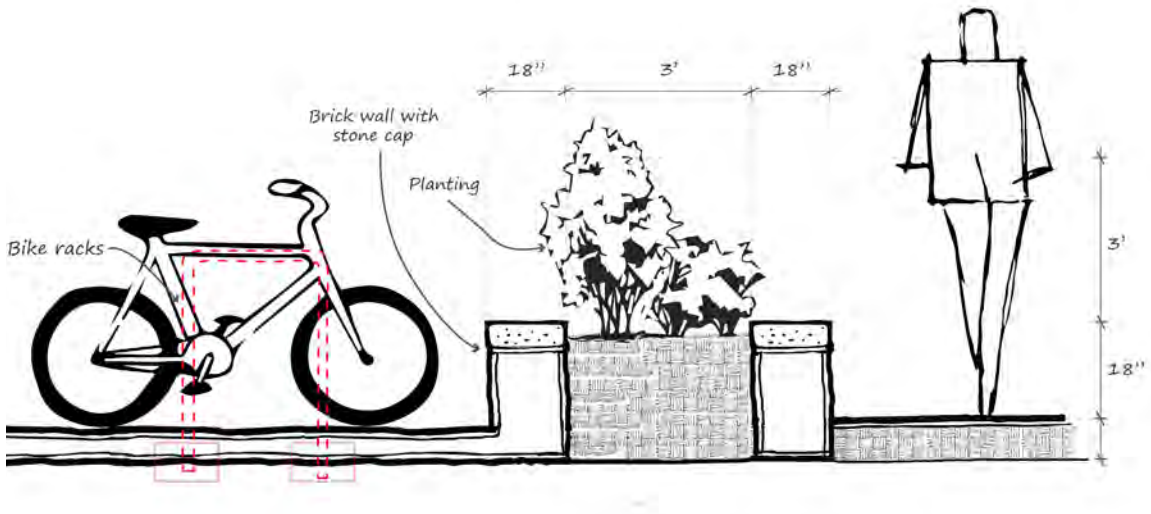


Figure A-2. Conceptual design for low brick wall with stone cap & planting

Note: All chosen products, their materials, and colors should get approved by the UA Office before purchasing.

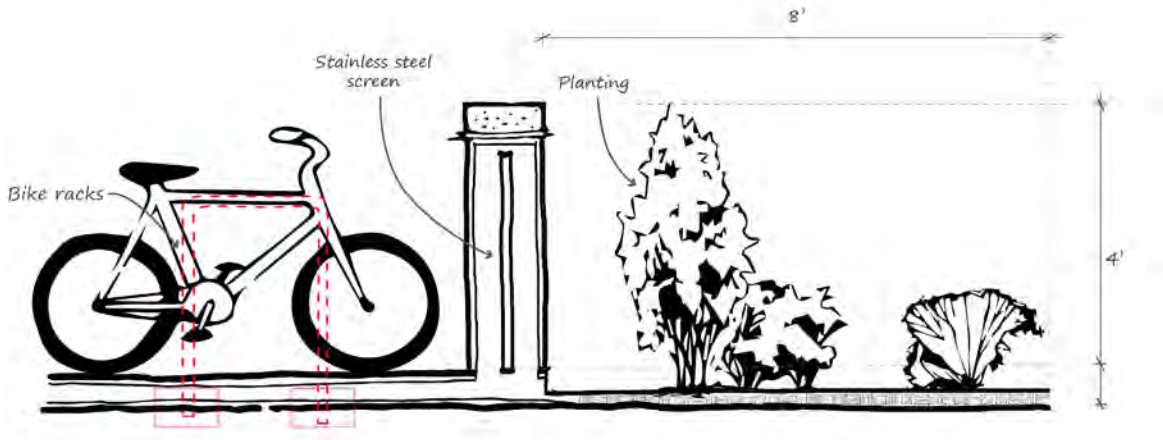


Figure A-3. Conceptual design for brick wall with sections of metal screen

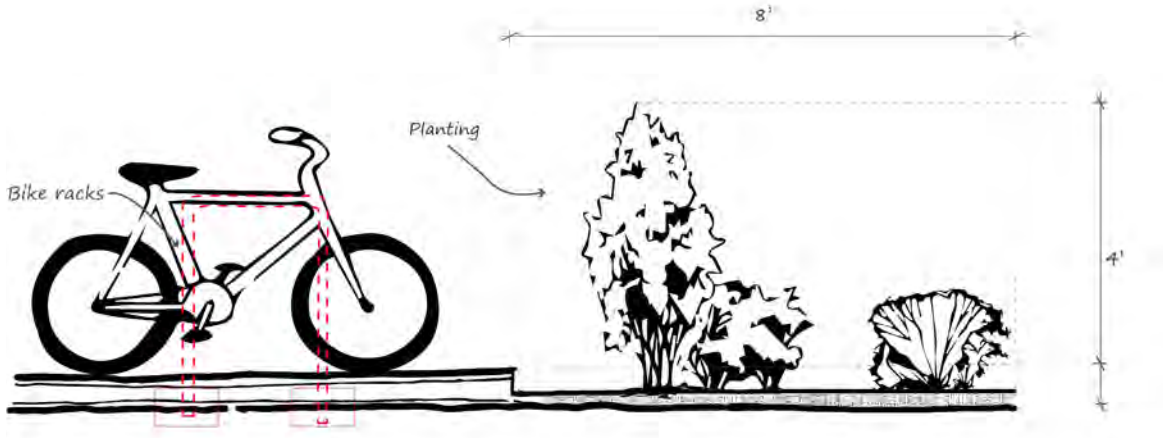


Figure A-4. Conceptual design for softscape hedge

Note: All chosen products, their materials, and colors should get approved by the UA Office before purchasing.

6.1. Green Screen (Utilities)

Product Description

Steel trellis screening with evergreen vining plants trained to provide low profile, vertical screening. Used in conjunction with single row of evergreen screening to provide a vegetative screen in a limited space.

Product Dimensions

Length: Custom
Height: must be tall enough to screen from all predominant view angles

Product Material

Buffer plants: Star jasmine
Trellis: Stainless steel
Frame: Powedercoat Steel

Where to be placed?

To preserve aesthetics and to blend with the open space. Green screens shall be placed to block the view of ground transformers, generators, and other types of equipment or where the soft screen is preferred but planting space is limited.

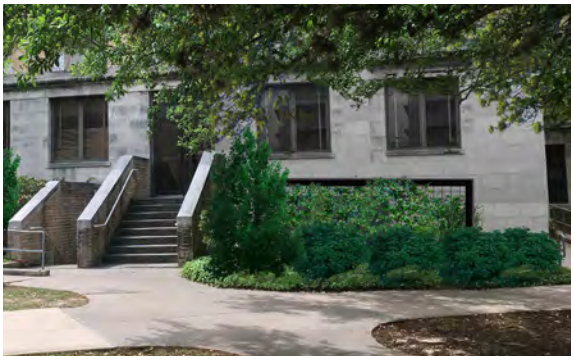
Additional Notes

Substitute planting where appropriate
Must provide 100% screening at full maturity from all predominant view angles.

Campus Master Plan - Review

" Softscape screening can include landscape buffers, such as green walls or planted berms, but must provide full screening upon completion of project" (p. 305).... "Softscape screening can include landscape buffers, such as green walls or planted berms. Screening should keep service areas out of sight, while providing proper ventilation for the equipment" (p. 258).

Source: Figure A-5.*and* Figure A-7.



6.2. Vegetative Screen (Utilities)

Product Description

Softscape hedge achieved by a double planting row consisting of vertical plantings combined with evergreen and semi-evergreen shrubs and grasses.

Product Dimensions

Length: Custom
Height: 6' or greater
Min.: 10 gallon
Buffer height at planting: 3'

Product Material

Vertical trees: Nellie Stevens holly and Mary Nell holly
Buffer plants: Burford holly, Podocarpus maki, Dwarf Pittosporum, and Gulf muhly

Where to be placed?

Around building utilities and service functions.

Additional Notes

To block the view of utilities, utility entrances, as well as service-related functions. Must provide 100% screening at full maturity from all predominant angles.

Campus Master Plan - Review

"Wherever possible, service and mechanical screening should be integrated into the building design. If it is not possible to incorporate the screening into the building, service and mechanical spaces shall be screened with brick enclosures, softscape, or metal fencing/screening, such as a louvered metal fence system." (p. 305) "Planting bed must be a minimum of 8' deep to accommodate edge (concrete mow strip) and plantings" (p. 304).

Source: Figure A-6. *and* Figure A-7.

Note: All chosen products, their materials, and colors should get approved by the UA Office before purchasing.

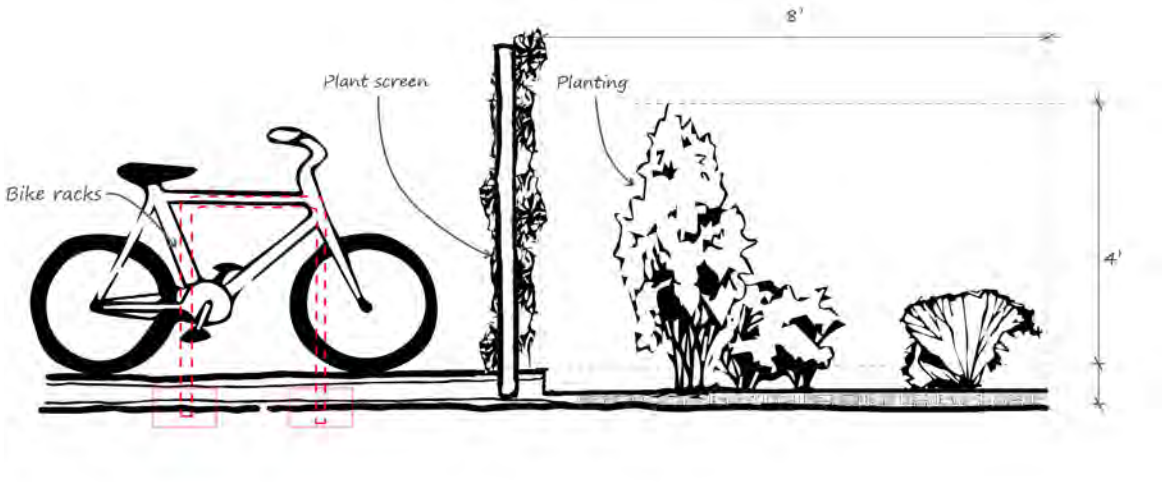


Figure A-5. Conceptual design for green screen

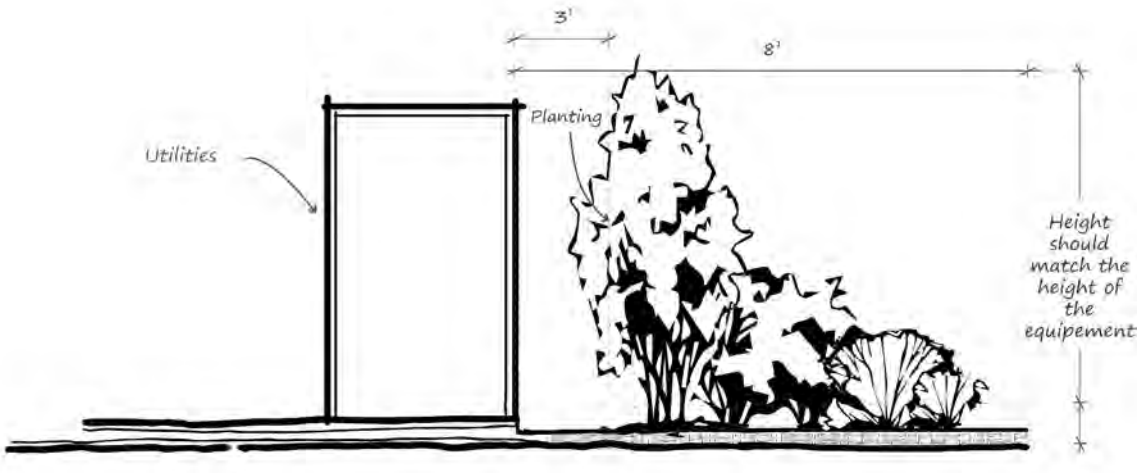


Figure A-6. Conceptual design for vegetative screen(Scenario 1 type of utility screening)

Note: All chosen products, their materials, and colors should get approved by the UA Office before purchasing.

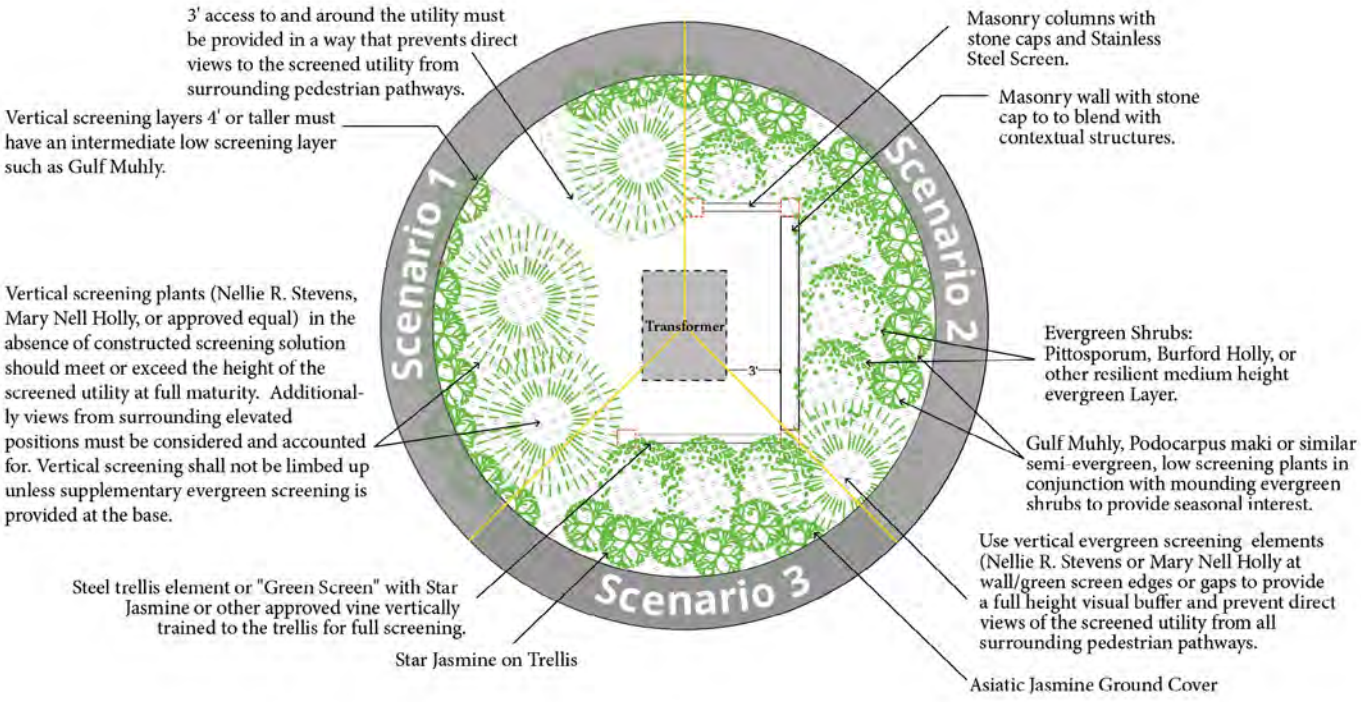


Figure A-7. Three different scenarios' conceptual design for utility screening

Note: All chosen products, their materials, and colors should get approved by the UA Office before purchasing.

7.1. Top Opening Receptacles

Product Description

Top-Opening trash receptacle

Product Dimensions

Diameter: 25”

Height: 33”

Weight: 149 lb

Product Material

Material: metal side panels

Top: Spun metal

Choose: Vertical straps

Finish: Polyester Powder-coat

Color: Silver

Where to be placed?

Parks & open spaces

Recreation facilities

Building entranceway

Food service/restaurants

Stadiums & arenas

Open plazas

Institutional buildings

Additional Notes

Receptacles are standard with a freestanding/surface mount option.

Campus Master Plan - Review

“So that all open spaces remain clean and free of debris, trash/recycling receptacles should be placed accordingly and should comply with Texas A&M Campus standards” (p.306).

Source: Scarborough Receptacles and/or equal

7.2. Side Opening Receptacles

Product Description

Side-Opening trash receptacle

Product Dimensions

Diameter: 25”

Height: 41”

Weight: 156 lb

Product Material

Material: metal side panels

Top: Spun metal

Choose: Vertical straps

Finish: Polyester Powder-coat

Color: Silver

Where to be placed?

Parks & open spaces

Recreation facilities

Building entranceway

Food service/restaurants

Stadiums & arenas

Open plazas

Institutional buildings

Additional Notes

Receptacles are standard with a freestanding/surface mount option.

Campus Master Plan - Review

“All containers shall be located on an accessible path of travel per the ADA and State Building Code” (p.306).

Source: Scarborough Receptacles and/or equal

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

8.1. XD35-3 Outdoor Recycling Container

Product Description

Attractive, durable and versatile recycling container's designed with a deep understanding of climate, behavior and even wildlife considerations. The outdoor recycling containers ensure seamless recycling from the outside in.

Product Dimensions

Length: 62”
Width: 19”
Height: 47.25”
Weight: 209 lbs
Capacity: Three (3) 35 Gallon Streams

Product Material

Construction Material: HDPE Plastic Lumber
Recycled Content: 97%

Where to be placed?

To be used outdoors as the standard recycling container.

Additional Notes

Drainage holes inside prevent buildup of liquid from spills, leaks or weather.

Campus Master Plan - Review

“Locations and placement of Trash/Recycling Receptacles must first be approved by the Department of Physical Plant and the Texas A&M Recycling Center” (p.306).

Source: Product catalogue CleanRiver and/or equal

8.2. XFF25-3 Indoor Recycling Container

Product Description

The indoor recycling containers can accommodate multiple recycling needs for high public traffic areas and crowded spaces.

Product Dimensions

Length: 44”
Width: 24”
Height: 50.50”
Weight: 200 lbs
Capacity: Three (3) 25 Gallon Streams

Product Material

Construction Material: HDPE Plastic Lumber
Recycled Content: 97%

Where to be placed?

To be used in all indoor campus common areas.

Additional Notes

Drainage holes inside prevent buildup of liquid from spills, or leaks.

Campus Master Plan - Review

“Additionally, they should have drainage openings at their base, be free of water running into them, be fire-proof, vermin-proof (crows and other animals), and vandal-proof, and hold a 40-50 gallon container” (p.306).

Source: Product catalogue CleanRiver and/or equal

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

9.1. Crosswalks

Product Description

Crosswalks utilize Maroon and Cast Stone banding in a herringbone pattern to create visual dark and light alternating bands that identifies crosswalks on campus.

Product Dimensions

Length: Varies
Width: 2' bands

Product Material

Concrete
Color: Maroon (platinum finish) and Cast Stone

Where to be placed?

All new crosswalks on campus must adhere to this color and pattern.

Additional Notes

This pattern is the only acceptable use of this color and pattern combination.

Campus Master Plan - Review

"Material continuity plays a major role in the structure of the broader campus environment. As such, products and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure" (p.288).

9.2. Building entrances

Product Description

A paver doormat uses banding colors as a field brick that highlights the intersections connecting building entrances to major pedestrian connectors. This helps facilitate wayfinding and strengthen visual order on campus.

Product Dimensions

Length: Varies
Width: Varies

Product Material

Clay Pavers: Areas in the campus core visually connected to Kyle field and Memorial Student Center
Concrete: All other areas

Where to be placed?

In conjunction with new or existing banded pedestrian connectors at intersections that connect building entrances

Additional Notes

Placement will depend on the intersecting pedestrian pathways and roads. Use of a paving doormat must be reviewed and approved, prior to implementation.

Campus Master Plan - Review

"Material continuity plays a major role in the structure of the broader campus environment. As such, products and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure" (p.288).

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

9.3. Pedestrian Pathway - Connectors

Product Description

Paver banding and paver buttons are applied along major pedestrian connectors that link buildings, quads,courtyards and along existing roadways in accordance with the 2017 Campus Master Plan to reinforce the sense of place.

Product Dimensions

Length: Varies
Width: Maroon banding along the street edge can be 2-4' for connectors less than 20', and up to 8' on connectors greater than 20'. In all other locations banding should be 2'

Product Material

Clay: Areas on campus core visually connected to Kyle field and Memorial Student Center
Concrete: All other areas.

Where to be placed?

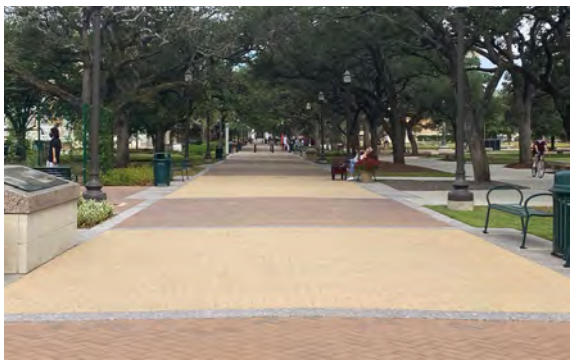
Banding and paver buttons are appropriate along all connectors and pattern should take direction from nearby banding patterns.

Additional Notes

Placement will depend on the intersecting pedestrian pathways and roads. Use of a banding and paver buttons must be reviewed and approved, prior to implementation.

Campus Master Plan - Review

"Connectors are the interstitial linkages between buildings, quads, courtyards, malls, and along roadways." (p.314)



9.4. Pedestrian Pathway - Malls

Product Description

Large promenades serve as important pedestrian thoroughfares that link key open spaces and are designed to accommodate large numbers of pedestrians. Malls are wide, prominent features on campus serving as both a connectors and destinations that should be predominantly pavers.

Product Dimensions

Length: Varies
Width: Varies
Banding: Bands should be 12" or 24" consistently spaced.

Product Material

Concrete
Granite: Used at the Military Walk area only.

Where to be placed?

New and existing campus malls. The 2017 Campus Master Plan identifies planed future malls. (p.169)

Additional Notes

Campus malls are major civic structures, and projects impacting them, or renovation/changes to them must be approved prior to implementation.

Campus Master Plan - Review

"Malls are used as a public walk or promenade through campus and are predominantly populated by groups of pedestrians, bicyclists, and skateboarders." (p.310)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

10.1. Maroon

Product Description

Maroon pavers are the most common pavers consistently applied throughout campus, appearing in banding, paver buttons, and as a field brick for paver doormats and plazas.

Product Dimensions

Size: 3 7/8" x 7 3/16"
Pattern: Stretcher bond, single/double soldier course, and 45 degree herringbone (crosswalks only)

Product Material

Clay: Areas in the campus core visually connected to Kyle field and Memorial Student Center
Concrete: All other areas
Color: Maroon
Plant : Grapevine. Texas (concrete paver only)

Where to be placed?

Banding, single/double soldier courses around other paver colors, 45 degree herringbone at crosswalks, and as a field brick near building entrances and where approved.

Additional Notes

All paving must contextually relate to its character zone and cannot be specific to adjacent buildings. Pavers must be supported by reinforced concrete, and contained by a minimum 12" concrete band or structural edging.

Campus Master Plan - Review

Material continuity plays a major role in the structure of the broader campus environment. As such, products and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure (p.288)

Source: Keystone Hardscape-Holland Stone

10.2. Cast Stone

Product Description

Cast stone colored concrete pavers are used widely on campus in crosswalks, plazas, in conjunction with banding, paver buttons, and as a field brick.

Product Dimensions

Size: 3 7/8" x 7 3/16"
Pattern: Stretcher bond, 45 degree herringbone (crosswalk only)

Product Material

Concrete
Color: Cast Stone
Plant : Katy, Texas

Where to be placed?

Can be used as banding in conjunction with maroon pavers on some connectors, as well as a field brick, or banding in plazas and pedestrian malls. In crosswalks as the light colored band.

Additional Notes

All paving patterns must contextually relate to its character zone and cannot be specific to adjacent buildings. Pavers must be supported by reinforced concrete, and contained by a minimum 12" concrete band or structural edging.

Campus Master Plan - Review

Material continuity plays a major role in the structure of the broader campus environment. As such, products and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure (p.288)

Source: Keystone Hardscape-Holland Stone

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

10.3. Antique Terracotta

Product Description

Antique terracotta pavers are a color blend of lights and darks that are used commonly throughout campus in malls, promenades, banding, and seating areas.

Product Dimensions

Size: 3 7/8" x 7 3/16"
Pattern: Herringbone, 45 degree Herringbone, or Basket weave enclosed by single or double maroon soldier course.

Product Material

Concrete
Color: Antique Terracotta
Plant: Katy, Texas

Where to be placed?

Major pedestrian malls like Military Walk and Ross Street as well as seating areas and paver details closely associated with buildings.

Additional Notes

All paving patterns must contextually relate to the character zone and cannot be specific to adjacent buildings. Pavers must be supported by reinforced concrete, and contained by a minimum 12" concrete band or structural edging.

Campus Master Plan - Review

Material continuity plays a major role in the structure of the broader campus environment. As such, products and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure (p.288)

Source: Keystone Hardscape-Holland Stone

10.4 Truncated Dome Paver

Product Description

Truncated dome pavers are required at all crosswalks to provide a tactile guide at each intersection meeting ADA compliance requirements.

Product Dimensions

Size: 3 7/8" x 7 3/16"
Pattern: Herring bone or Basket weave

Product Material

Concrete
Color: Red

Where to be placed?

Must be utilized at all pedestrian ramps

Additional Notes

Truncated domes must align the ramp on the opposite side of the crosswalk and be parallel to the path of travel. The visually impaired utilize the orientation to safely direct crossings.

Campus Master Plan - Review

"Material continuity plays a major role in the structure of the broader campus environment. As such, products and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure (p.288)

Source: Keystone Hardscape-Holland Stone

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

11.1 Black Star Gravel

Product Description

Gravel paving can be installed in seating areas where storm-water management is a concern and around trees

Product Dimensions

Length: N/A
Width: N/A
Height: N/A

Product Material

Crushed basalt
Color: Grey/black

Where to be placed?

Small Seating/Gathering Spaces, around trees in lieu of mulch and in areas where pervious paving is necessary to meet runoff requirements

Additional Notes

Gravel does have low-maintenance properties, but it is not completely maintenance free and must be secured in place with a border or edge. Because gravel can migrate it will need to be replenished periodically as well. Note that Klingstone can be utilized only with Design Review sub-council approval in high traffic areas.

Campus Master Plan - Review

"To help mitigate storm water runoff, permeable paving and retention areas, such as bioswales and raingardens, are encouraged.." (p.334)

11.2. Decomposed Granite

Product Description

Decomposed granite is a permeable, compacted, fine granite surface used to soften the appearance and give an organic feel while allowing water to move through it.

Product Dimensions

Length: N/A
Width: N/A
Height: N/A
Depth: 6" (compacted in 2" lifts)

Product Material

Weathered Granite- Red/Brown

Where to be placed?

Seating/Gathering Spaces, high traffic areas where concrete is not appropriate.

Additional Notes

Decomposed granite does have low-maintenance properties, but it is not completely maintenance free and must be secured in place with a border or edge. Because decomposed granite can migrate it will need to be replenished periodically as well. Natural stabilizers may be used as long as they do not change the appearance, and allow water filtration.

Campus Master Plan - Review

"To help mitigate storm water runoff, permeable paving and retention areas, such as bioswales and raingardens, are encouraged.." (p.334)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

12.1. Stone Cap Brick Wall

Product Description

Brick walls are constructed to screen bike parking from pedestrian pathways. These walls have brick cladding and a cast-stone coping. This can also include down-lights for night-time visibility.

Product Dimensions

Length: Varies
Width: Varies
Height: 16-48" (higher with approval)

Product Material

Brick and Cast stone (3/4" chamfer)
Color: To match the context.

Where to be placed?

Around bike parking, utilities, and service related items that detract from the campus aesthetic, and to retain soil for slopes and raised landscaped areas. This can applied campus-wide where screening is needed

Additional Notes

The cladding material on the wall should be modified depending on the character zone. All applications of brick site walls must be approved prior to installation.

Campus Master Plan - Review

"As Texas A&M works towards a stronger pedestrian-centric campus that encourages alternative modes of transportation, accommodating bicyclists and bicycles becomes a bigger priority. Purposefully incorporating bike parking into the campus design, improving usability, proximity, and safety, and making sure that bike parking is either sheltered or screened depending on its location is necessary. To ensure safety and visibility after dark, all bike parking areas must be well lit."(p.304)

12.2. Gabion Wall

Product Description

Gabions are steel enclosures filled with stone. They can utilize a variety of stone colors to acheive the desired aesthetic.

Product Dimensions

Length: Varies
Width: Varies
Height: Varies

Product Material

Stainless or Galvanized steel.

Where to be placed?

Gabions should be placed in naturalistic areas where a formalized concrete structure is undesirable or aesthetically inappropriate. Gabions can be used as retaining structures, seating, space separation among other uses.

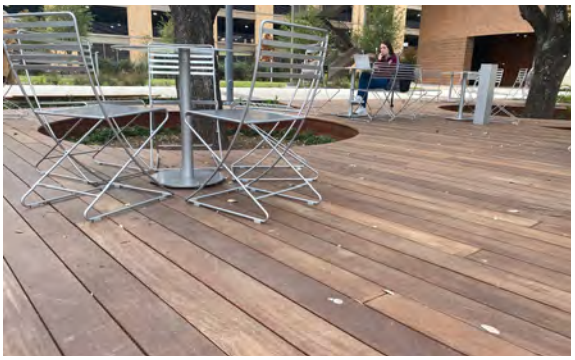
Additional Notes

Gabion walls have a wide range of appearances that must be taken into account when considering their use. All applications of gabions must be approved through the Council for the Built Environment (CBE) process.

Campus Master Plan - Review

"Site or garden walls can be used for grade accommodation, screening purposes, or seating areas. These walls encourage informal meeting and gathering places in locations that naturally attract people, such as building entries or transit hubs. These walls should be permanent structures that match the campus standard. Site or garden walls should be brick or stone with a pre-cast stone cap or concrete where appropriate. The brick and stone should match the brick types in the building materials per character zone." (p.300)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.



13.1. Wooden Decking

Product Description

Wood decks are utilized throughout campus in areas where the programmed spaces call for a softer feel than concrete, with a lower maintenance requirement than surfaces like decomposed granite. Wood decks must be of a sustainable, long-lasting material like Ipe wood.

Product Dimensions

Length: Varies
Width: Varies
Height: Varies
Weight: Varies
Capacity: Varies

Product Material

Wood: Ipe

Where to be placed?

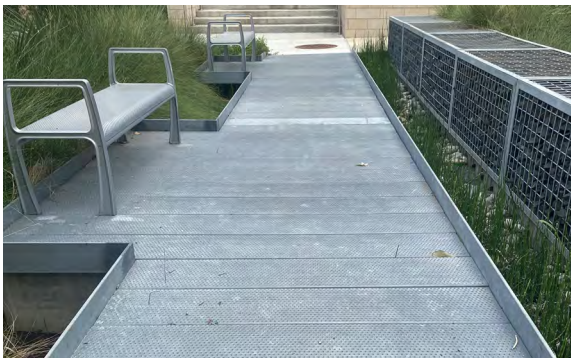
In programed small gathering spaces that call for a softer feel, around trees where gathering is to be encouraged, but the long term impact of compaction may compromise the trees health, and along pedestrian intersections where small to medium sized gatherings is appropriate.

Additional Notes

Decks must be custom designed and engineered for safety, and approved through the CBE process prior to installation. Ipe wood should be oiled to extend outdoor life expectancy

Campus Master Plan - Review

"Custom furnishings, custom pavers or pavement types, artificial turf, decking, shade sails, shade structures, water features, and planters are all features that could be incorporated, enhancing the unique, or "special," nature of these spaces." (p.326)



13.2. Steel Decking

Product Description

Steel decking may be used as a low maintenance alternative to wood decking. Decking should be perforated to prevent corrosion from standing water, the surface must be slip resistant.

Product Dimensions

Length: Varies
Width: Varies
Height: Varies
Weight: Varies
Capacity: Varies

Product Material

Steel, Galvanized

Where to be placed?

Around and over rain gardens, as bridges to carry pedestrians over areas that pedestrian traffic would compromise the landscape, and for seating of very small groups.

Additional Notes

Steel decks must be designed and engineered for safety, and approved through the CBE process prior to installation.

Campus Master Plan - Review

"Custom furnishings, custom pavers or pavement types, artificial turf, decking, shade sails, shade structures, water features, and planters are all features that could be incorporated, enhancing the unique, or "special," nature of these spaces." (p.326)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

14.1. The Weaver

Product Description

Accommodates eight hammocks or comfortably seats 16 people in a tight-knit community hang to lay down, relax, take a nap, soak up the sun and gear down with a good book, socialize and/or just enjoy the silence of the green space.

Product Dimensions

Length: 13’
Width: 15’
Height: 6’ 5”

Product Material

Frame: Steel
Finish: Powder-coat
Color: Silver

Where to be placed?

Outdoor courtyards adjacent to student housing, gathering spaces, study areas, shade structures, outdoor seating, pocket parks, and open green space that allows small recreation activities.

Additional Notes

Custom designed as part of landscape package.
Trees that are being used for hammock should bes substituted with dedicated hammock stands.

Campus Master Plan - Review

“The sight of students lounging in hammocks around campus is become more popular.... As Texas A&M’s student population grows and hammocks gain in popularity, campus should consider dedicated zones, infrastructure, and even shade sails for hammocks. ” (p.307).

Source: Kammok

14.2. Hammock Stands

Product Description

Custom designed welcoming hammock stands which give ample opportunity to lay down, relax, take a nap, soak up the sun and gear down with a good book, socialize and/or just enjoy the silence of the green space.

Product Dimensions

Spacing: Variable
Length: Variable

Product Material

Steel
Finish: Powder-coat
Color: Silver

Where to be placed?

Outdoor courtyards adjacent to student housing, gathering spaces, study areas, shade structures, outdoor seating, pocket parks, and open green space that allows small recreation activities.

Additional Notes

Custom designed as part of landscape package.
Trees that are being used for hammock should bes substituted with dedicated hammock stands.

Campus Master Plan - Review

“The sight of students lounging in hammocks around campus is become more popular.... As Texas A&M’s student population grows and hammocks gain in popularity, campus should consider dedicated zones, infrastructure, and even shade sails for hammocks. ” (p.307).

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

15.1. Concrete Maintenance Band

Product Description

Concrete maintenance bands separate landscape and turf areas and restrain soft paving applications like decomposed granite, and gravel. Maintenance bands allow for more efficient and effective maintenance at landscape transitions. They should be used to separate different landscape types whenever possible.

Product Dimensions

Length: Varies
Width: 6” or 12”
Depth: 4”

Product Material

Concrete: medium broom finish

Where to be placed?

Campus-wide as a barrier at landscape transitions between turf and mulch, as well as to restrain pavers and soft paving like decomposed granite, and gravel. including hard pavers, mulch, planters and turfs.

Additional Notes

Campus Master Plan - Review

“The continuity of ground level materials plays a major role in the structure of the broader campus environment. When differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure. “ (p.296)

15.2. Steel Edging

Product Description

Stainless steel edging supports the edge of pavers and is a barrier between different landscape types (turf, mulch, rock).

Product Dimensions

Length: Depends on the area
Width: 7/64 inch thick
Height: 6 inch
Weight: Varies

Product Material

Material : Steel
Finish: Stainless

Where to be placed?

Campus-wide as a barrier between different landscape types including hard pavers, mulch, gravel, decomposed granite, planters and turfs in areas where maintenance bands are not practical, or aesthetically undesirable.

Additional Notes

Use with caution in areas with high traffic. Edging can be damaged by pedestrians, as well as golf carts and other wheeled Areas where there is heavy footfall on pathway, care needs to be taken.

Campus Master Plan - Review

“The continuity of ground level materials plays a major role in the structure of the broader campus environment. When differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure. “ (p.296)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

16.1. Tensile Shade Canopy

Product Description

Tensile shade canopies are used throughout campus to provide both permanent shade as well as temporary shade in areas to increase comfort as we wait for tree canopy to fill in effectively.

Product Dimensions

Length: Varies
Width: Varies
Height: 12 ft - 15 ft

Product Material

Tensile fabric or membrane: Poly based material, engineered to be UV stabilized, and long lasting.
Connectors: Stainless Steel
Posts: Steel powdercoat/anodized

Color: contextually base, with approval

Where to be placed?

Canopies should be placed in small, medium, and large gathering areas that are adjacent to pedestrian pathways to enhance the environmental comfort for programmed spaces.

Additional Notes

All components and elements of the shelter should read as part of a consistent design language. It must be designed and engineered, and approved through Council for the Built Environment (CBE) process.

Campus Master Plan - Review

"Canvas shade structures are located on campus within the green spaces adjacent to the Engineering Activities Buildings (EAB) and within residence life areas. These contemporary forms of shading are not appropriate for the historic core but may be appropriate elsewhere across campus, such as for hammock areas, around student housing, or in parks.....intent is to ultimately eliminate the canvas shade structures once the surrounding trees have reached maturity and are providing ample natural shade."(p.302)

16.2. Steel Structure Canopy

Product Description

Steel Structure Canopies are used throughout campus to enhance a variety of programmed outdoor space and provide protection from the elements.

Product Dimensions

Length: Varies
Width: Varies
Height: 12 ft - 15 ft

Product Material

Steel or aluminum
Finish: Powdercoat/Anodized/Brushed

Color: Approval required

Where to be placed?

Canopies should be placed in areas that are adjacent to pedestrian pathways to provide an enhanced environment for a variety of programmed spaces. These should be primarily solid canopies with fans, lights, and power for user devices to improve comfort.

Additional Notes

All components and elements of the shelter should read as part of a consistent design language and items such as seating, lighting, and trash receptacles should constitute an integrated, cohesive, and consistent design. It must be designed and engineered, and go through Council for the Built Environment (CBE) approval process.

Campus Master Plan - Review

"In addition to planting new shade trees, which can take years of growth before they provide adequate shade, the campus can install built-in shading structures to provide immediate shade in both large and small gathering areas."(p.302)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

16.3. Golf Cart Shelter

Product Description

Hip roof shelters to provide shading for golf cart parking. These shades are consistently constructed throughout the campus in locations that do not compete visually with the surrounding architecture.

Product Dimensions

Length: Varies
Width: Varies
Height: 12 ft - 15 ft

Product Material

Metal roof with fascia and metal posts
Finish: Anodized

Where to be placed?

Areas where Golf cart parking is needed and cover is required.

Additional Notes

All components and elements of the shelter should read as part of a consistent design language . Structures must be designed and engineered prior to submission to the CBE approval process. It should not be a foreground element.

Campus Master Plan - Review

"All campus shelter designs, which includes bikes and golf cart shelters, such as the ones at J.K. Williams Administrative Building, must be well proportioned to give them a sleep and elegant appearance, similar to the campus standards for bus shelters."(p.302)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

17.1. Unlighted Bollards

Product Description

Unlighted bollards are used in any area that has a need to restrict vehicular traffic but maintain a pedestrian connection. Removable Unlighted bollards must be locked in place.

Product Dimensions

Length: N/A
Width: 4 3/8”
Height: 36”
Weight: 33 lbs
Capacity: N/A

Product Material

Steel Powder Coat, Silver

Where to be placed?

Pedestrian pathways that need to restrict vehicle traffic either permanently, or allow intermittent access for service and emergency services vehicles.

Additional Notes

Bollards can be either permanently installed, or removable with a lock. See Transportation Services for further information on lock control for removable bollards.

Campus Master Plan - Review

“Bollards are necessary to control entrance to pedestrian-only areas and to protect equipment and buildings when in close proximity to vehicular traffic.” (p.300)

Source: Reliance Foundry

17.2. Monument Pedestals

Product Description

Monument Pedestals are raised platforms used for displaying the historical plaques. This platform serves as an open educational exhibit along pedestrian pathways.

Product Dimensions

Length: 8' (may vary depending on display)
Width: 3'
Height (Back): 3'-9"
Height (Front): 2'-5"

Product Material

Base: Concrete core with cast-stone veneer
Top: Polished Sunset Red Granite

Where to be placed?

Along Military walk and near major heritage buildings and sites, and other areas on campus to provide historical education information.

Additional Notes

Placement requires review and approval through the CBE process for the pedestal, and the text/images involved in the display.

Campus Master Plan - Review

Material continuity plays a major role in the structure of the broader campus environment. As such, products and material choices that differ in color, style, and construction highlight a lack of cohesion. When these differing elements are adjacent, it can be particularly confusing and undermines the desire for order and ground plane structure (p.288)

Note: All chosen products, materials and colors require approval by the UA Office before purchasing.

TEXAS A&M
UNIVERSITY®

OPERATIONAL OVERVIEW
TREE PROTECTION PROCEDURES

(EMERGENCY AND NON-EMERGENCY REQUIREMENTS)

CAMPUS PLANNING, DESIGN & CONSTRUCTION

February 2023

CONTENTS

1 PURPOSE

This reference is designed to provide an abbreviated operational overview on tree protection actions pertaining to emergency and non-emergency situations. **It is the responsibility of the organization excavating to be knowledgeable of the full tree protection requirements outlined in the Facility Design Guidelines (FDG) Section 32.** This reference is not intended to be all inclusive, but to outline the required procedural actions. These requirements are based on the recommendations of the 2017 Campus Master Plan for construction operations within 30' of a tree canopy on the Texas A&M University, College Station Campus. This includes the placement and/or storage of materials, supplies, and equipment around trees. These requirements provide specific guidance on mobilization, excavation, and coordination/notification requirements. If, after reviewing this document and the FDG, clarification or guidance is needed please contact Campus Planning, Design & Construction, the University Architect.

2 TREE ROOT ZONES

Tree roots are categorized into three zones (see diagram below):

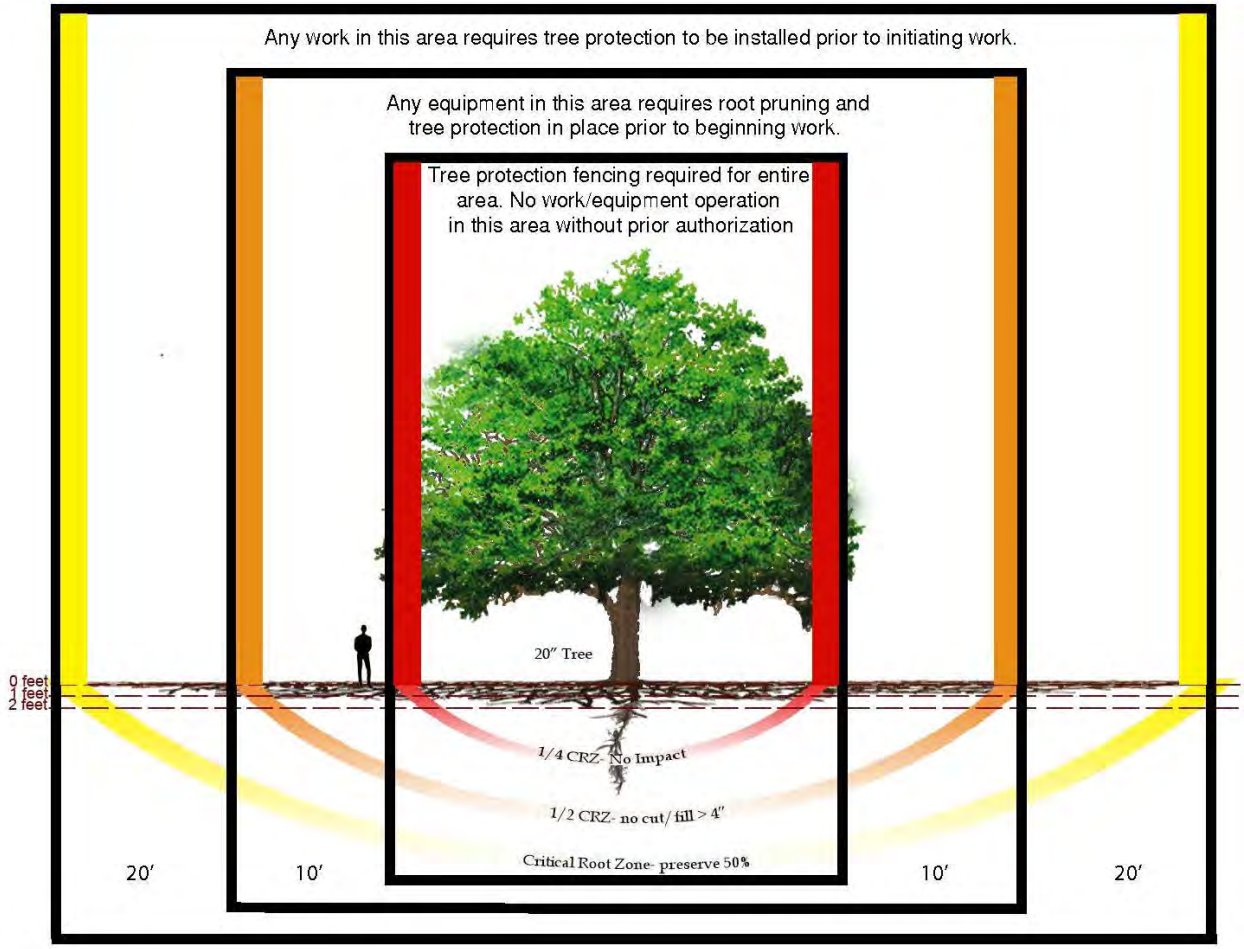
- Yellow – Within 30' of the trunk of the existing tree canopy. Any work in this area requires tree protection fencing must be installed prior to initiating work.
- Orange – Within 10' of the existing tree canopy. Any equipment in this area requires root pruning and tree protection to be in place prior to beginning any work (excluding emergency excavation).
- Red – Within the extent of the tree canopy in ANY direction **no work/equipment operation is to be done without prior authorization**. Tree protection fencing is required for this entire area at all times if equipment will be operated within 30' of the canopy. Entering this zone without authorization AND without properly installed mulch and matting in place is strictly prohibited.

KEY REQUIREMENTS:

If you look up and there are leaves/branches overhead, you are in the Red Zone. Stop work immediately, put tree protection in place and notify a supervisor.

Do not store ANYTHING under a tree canopy, this includes equipment, materials, or supplies.

Do not drive under a tree canopy for any reason.



3 PROCEDURES

3.1 Emergency Excavation Projects

For the purposes of these requirements, an emergency excavation refers to the previously unknown requirement to make a repair that requires excavation within 24 hours of notification of the needed repair.

3.1.1 Initial Notification

SSC Arborist must be consulted immediately upon receipt of notification in order to provide guidance on the most appropriate way to excavate without damaging the tree. If excavation occurs after hours, the below tree protection measure must still be followed, and notification must occur immediately the following workday. In other words, the requirements for Yellow zone are a minimum standard and will also apply to the Orange and Red zones, in addition to Orange and Red zone-specific requirements.

3.1.2 Tree Protection Requirements

Tree Protection Requirements in **Orange or Yellow** Zone / Within 30 Feet of Existing Tree Canopy

- *Fencing (See Appendix A)*
  T-posts with safety cap and snow fence must be installed at the drip line of any tree within 30' of the maximum extent of equipment operation prior to progressing with excavation. The intent of the fencing is to prevent accidental damage to the root zone caused by equipment, materials, and storage of supplies, as well as operation of equipment and foot traffic within the dripline of the tree. The tree drip line is off limits to pedestrian and vehicle traffic associated with the emergency response.

- *Protection Duration (See Appendix A)*
  T-posts with safety caps, and snow fence must remain in place until excavation is backfilled, and equipment removed from the site. If the excavation will remain open for longer than two weeks, the snow fence must be replaced with chain link.

- *Root Pruning (See Appendix A)*
  Prior to backfill, consult with the SSC arborist, and prune the exposed roots.

Additional Tree Protection Requirements in **Red Zone** / Within Dripline of Existing Tree

- *Trunk Protection*
  2x4's must be banded to the trunk AND any low hanging branches that are at risk of being impacted by equipment.

- *Fencing (See Appendix A)*
  Snow fencing must be installed PRIOR to excavation and exclude only the area immediately adjacent to the excavation site. Fencing must also be installed around any other trees within 30 feet of the work area (Area equipment will be operating from).

- *Mulch and Matting (See Appendix A)*
  If equipment is required to move under the drip line, install 5 inches of mulch and construction matting to prevent compaction. If mulch cannot be acquired in the necessary timeframe, a single layer of construction matting will suffice in emergency situations only. Mulch must be removed upon completion.

- *Tree Care Requirements*
  Contact SSC Grounds to arrange for remedial actions. Air evacuation decompaction, radial trenching, and fertilizing where recommended by the SSC Arborist.

3.1.3 Equipment Locations

Equipment must excavate from pavement or on soil outside of the trees dripline and excavate radially away from the tree. Excavation strokes must start nearer the tree and pull away from the tree to minimize root damage associated with trenching tangentially to the tree.

3.1.4 Close Out Notification

Prior to backfill, notify the SSC Arborist, and document remedial actions required to maintain tree health. This shall include root pruning (prior to backfill), radial trenching, and air-spade de-compaction of the soil within 90 days of emergency excavation.

3.2 Non-Emergency Excavation Project

A non-emergency project is one that is planned for some future date beyond the 24- hour period defined as an emergency excavation above.

3.2.1 Initial Notification

SSC Arborist and Campus Planning, Design & Construction, University Architect must be notified PRIOR to and during design to ensure tree protection requirements for each specific project are incorporated into the design and ultimately the construction portion of the project. If no design process occurs (example: water line replacement), consultations are still required prior to progressing with work. Tree protection direction provided is intended only to supplement the information provided in the Facility Design Guidelines Section 32 AND this document. This meeting must be documented in writing. **Any exemptions/changes to established tree protection requirements must be provided in writing and approved by Campus Planning, Design & Construction, University Architect**.

Every effort must be made to avoid excavation inside the drip line. If it must occur, any trees that will require work within the drip line must be identified prior to beginning work on the project and coordinated with Campus Planning, Design & Construction, University Architect and SSC Arborist to establish an approach to solving the project requirements while minimizing harm to the tree.

3.2.2 Documentation

A tree assessment needs to be conducted before mobilization to the project site by a board-certified arborist to document prior condition of trees in the construction zone.

3.2.3 Abbreviated Tree Protection Requirements

Tree protection fencing and signage above must be installed PRIOR to site mobilization and prior to any excavation around the tree AND any other trees whose canopy is within 30 feet of the work area (area equipment will be operating from).

No equipment, supplies, or materials may be stored under the canopy of any tree, for any time period. This includes construction restrooms and any other vehicles of any size.

Tree protection must be inspected by the SSC Arborist PRIOR to mobilization and consult the Office of the University Architect if there are unresolved conflicts or further guidance is needed.

3.2.3.1 Fencing (See Appendix A)

Chain link fence must be installed prior to site mobilization around all trees whose canopy is within 30 feet of the work area (extents of equipment use, not project boundary). Chain link fence must be installed in the ground (not on moveable bases) and be at least 6' tall. See above diagrams for tree protection fencing layout. Fencing MUST be installed outside the drip line, and not under any portion of the canopy of the tree. In addition to fencing, "Tree Protection Zone" signs should be posted clearly visible throughout the site.

3.2.3.2 Mulch and Matting (See Appendix A)

Any time equipment must enter the drip line (with prior coordination with the UA Office and SSC Arborist) 5" of mulch and a layer of construction matting must be installed to prevent compaction. Coordinate with SSC Arborist for appropriate matting.

3.2.4 Equipment

3.2.4.1 Location

Equipment must be located outside of the dripline of any trees. ANY time a piece of equipment is required to operate within, or pass through the dripline of a tree, please refer to section 3.2.3.2 to meet the requirement. Use of mulch and matting outlined in section 3.2.3.2 shall only be utilized when all efforts have been exhausted to operate, equipment from surrounding pavement or soil outside of any dripline.

3.2.4.2 Equipment Allowed for Excavation Within a Dripline

Excavation within the dripline in a non-emergency situation will only be allowed by the following means:

- Air Excavation to evacuate soil from around the tree roots and allow piping to be installed under the root system without damaging the existing roots.
- Directional boring at least 24" below the surface
- Pipe bursting to replace the pipe in place.

3.2.5 Close Out Notification

Prior to backfill, notify the SSC Arborist and document remedial actions required to maintain tree health. This includes root pruning (prior to backfill), radial trenching, and air spade to de-compact the soil within 90 days of backfill.

3.3 Tree Incident Reporting

A tree incident is any time a project violates any aspect of the above requirements. All incidents must be reported, and the following steps must occur:

- NOTIFICATION: Notify the SSC Arborist and Campus Planning, Design & Construction, University Architect in writing within 24 hours of the incident occurred, or discovery of the incident.

- DOCUMENT: Document the trees impacted (include photos) as well as the type of work that was done. This includes date, time, equipment used, duration of work, and Diameter at Breast Height (DBH = Diameter at 4.5' above the ground) of the tree.
- MITIGATE: Follow SSC Arborist guidance on remedial actions to improve tree health, to include root pruning, air spade to de-compact, and radial trenching to maximize moisture and nutrients to the root zone.
- MONITOR: Monitor the impacted tree for a period of 24 months.
- REPLACE: Replace any trees lost due to an incident in accordance with TAMU tree mitigation policy.

3.4 Tree Mitigation

TAMU's policy on tree mitigation is as follows:

- Heritage Trees - Heritage Trees, which are trees 24" Diameter at Breast Height (DBH) and greater, shall not be removed without a review process. If removal is necessary, trees shall be replaced on a 3" to 1" ratio (i.e., if you have removed a 24" DBH tree, 72 caliper inches must be replaced).
- 8"- 23" DBH Trees - Trees shall be replaced on a 1" to 1" ratio. For example: a 20" diameter tree will be replaced by 20 caliper inches; this could mean five, 4" trees or ten, 2" caliper trees. Trees less than 8" in diameter require a 1 to 1 replacement.
- Memorial Trees/Historical Significance - Various memorial trees and trees with historical significance exist throughout Texas A&M campus. The project shall preserve in place or transplant any memorial trees or historically significance trees on the site. The university reserves the right to remove or relocate trees in an unforeseen circumstance. If a tree cannot be relocated due to restrictions of tree size and available planting locations, the tree will be removed and replaced with a new one at the discretion of the Texas A&M designated Arborist. The first option shall be to replace on site if space is available; costs to be covered by the project.

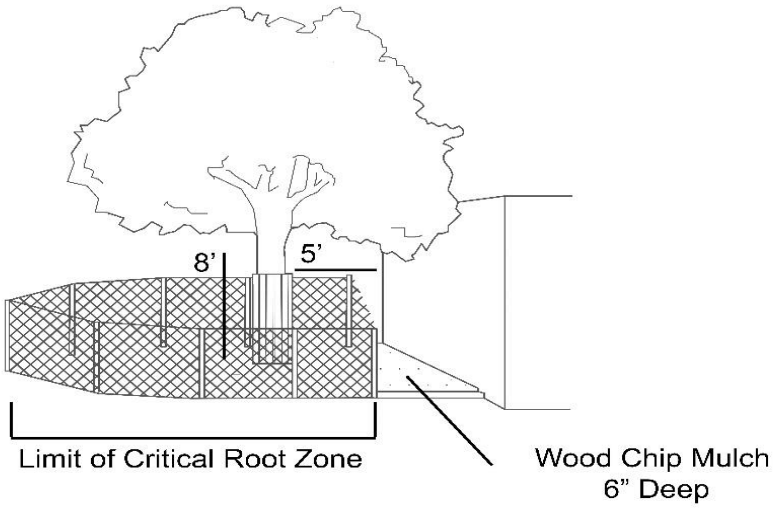
Tree mitigation shall be required when the above sizes of trees are removed. Examples shall include one or more of the following mitigation measures:

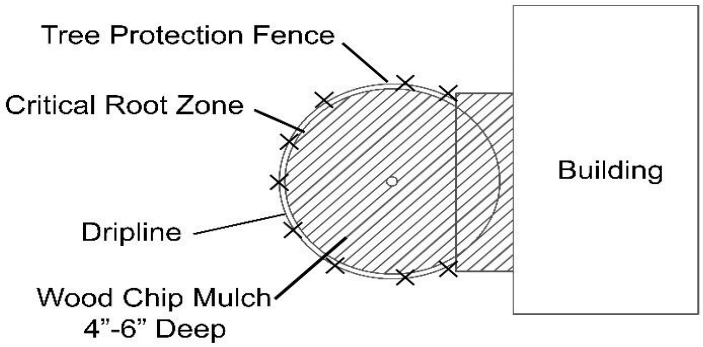
- Planting replacement trees on the site in accordance with the latest edition of the American Standard for Nursery Stock (ANSI Z60.1).
- Transplanting existing trees on site or nearby. Any transplant tree can count 50% toward total mitigation; for example: a 30" diameter oak would count toward 45 inches of required mitigated inches (due to heritage trees being replaced 3:1).
- All trees (from section 5.04.1) below 8" diameter that are preserved on site will count 50% toward total mitigation; for example: five 6" elm trees are preserved on the perimeter of the site – this would count toward 15 inches of required mitigated inches.

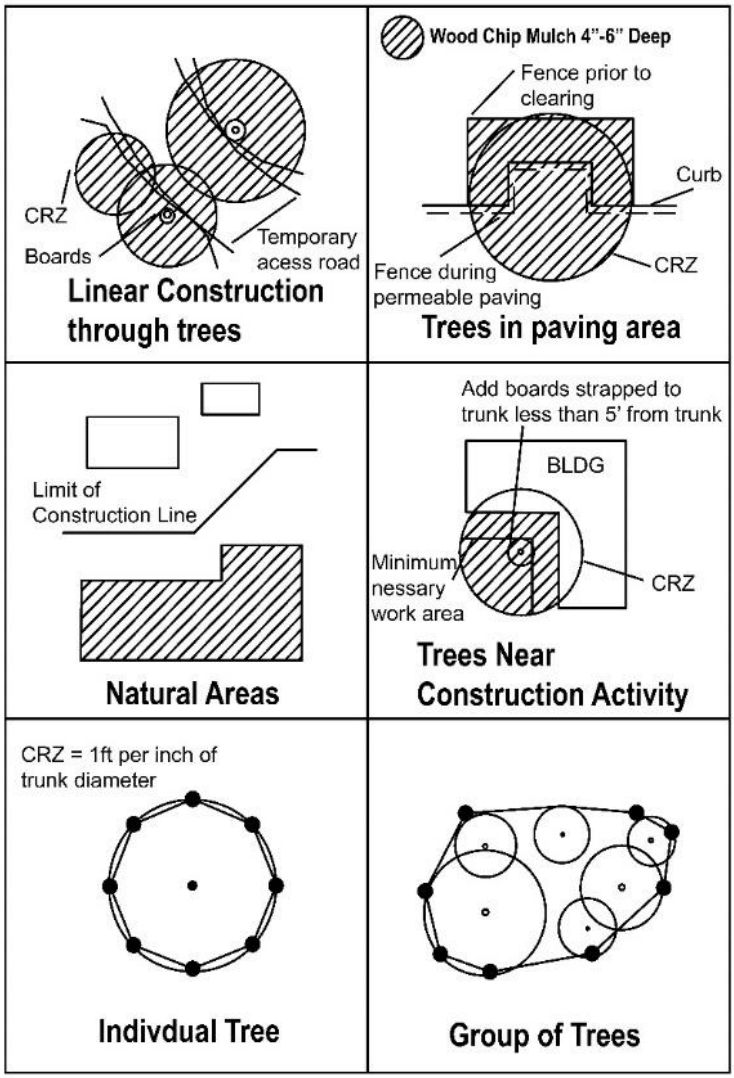
4 APPENDIX

These diagrams demonstrate the tree protection fencing requirements for all trees whose canopy is within 30 feet of the work area defined as the extents of equipment and supply use for an individual project.

Appendix A






CRZ
Boards
Temporary
acess road
Linear Construction
through trees
Wood Chip Mulch 4"-6" Deep
Fence prior to
clearing
Curb
CRZ
Fence during
permeable paving
Trees in paving area
Limit of
Construction Line
Natural Areas
Add boards strapped to
trunk less than 5' from trunk
BLDG
Minimum
nessary
work area
CRZ
Trees Near
Construction Activity
CRZ = 1ft per inch of
trunk diameter
Indivdual Tree
Group of Trees

TEXAS A&M UNIVERSITY®

TAMU Campus Banners

Procedures for Building & Light Pole Banners

February 2023

Campus Banners

Building Banners

Typical Request Process for Installation of Building Banners

Banners displayed on building exteriors are used to celebrate special events or acknowledge significant dates for programs, buildings, and/or achievements. All exterior banners require approval. Allowable types of banners typically fall into one of two categories:

- **Event Banners:** May be installed for up to three weeks; one week before the event, one week during the event, and one week after the event.
- **Anniversary Banners:** May be installed for up to one year (the year being celebrated), but must be removed one year to date from the date of installation.

Banners utilized as a wayfinding tool are not in alignment with the allowable categories and will not be approved.

Banner requests must be submitted in writing to the Vice President for Facilities and Energy Services and routed through the appropriate dean or vice president. Requests should be sent to facilitiesrequests@exchange.tamu.edu with a subject line to state "Banner Installation Request."

Approval will be required from the Office of Campus Planning, Design & Construction and the Division of Marketing and Communications.

Requests should include the following:

- Memorandum requesting approval for the use of either an Event Banner or an Anniversary Banner, and justification for the display of the banner
- Timeline of banner display, in compliance with the above outlined timelines for installation and removal
- Detailed location of banner and methods of attachment, as well as any repair or restoration required upon removal
- Dimensional size of banner
- Banner content / graphic layout (should be concise and to the point)
- Logistical support needed from university entities for installation and removal

Banner Installation

- Upon receipt of approval, the requesting entity must coordinate with the appropriate university organizations/entities required to support the installation.

- Banner installation must be of a high-quality nature and installed by a bonded and insured installer.
- Drilling and/or damaging brick or stone is prohibited. Mounts may be placed into the mortar between brick or stone. Mounting to other surfaces requires prior approval and should be done in a manner which minimizes damage.

Banner Removal

- Prior to expiration of the display period, the requesting entity must coordinate with the appropriate university organizations/entities required to support the removal. This includes providing the specific date for removal.
- Any cleaning or maintenance associated with repairing holes, or damage to the building must be addressed at the *time* of removal at the expense of the requesting entity.
- Any damage to the grounds (turf grass, irrigation, etc.) must be addressed at the time of removal at the expense of the requesting entity.

Banner Costs

- All costs associated with banner development, production, installation, and removal are the responsibility of the requesting entity.

Light Pole Banners

Typical Request Process for Installation of Light Pole Banners

Banners displayed on exterior light poles (street or parking lot light poles) are used to celebrate special events or acknowledge significant dates for programs, buildings, and/or achievements. All exterior banners require approval. Allowable types of banners typically fall into one of two categories:

- **Event Banners:** May be installed for up to three weeks; one week before the event, one week during the event, and one week after the event.
- **Anniversary Banners:** May be installed for up to one year (the year being celebrated), but must be removed one year to date from the date of installation.

Banners utilized as a wayfinding tool are not in alignment with the Campus Master Plan and will not be approved.

Light pole banners must adhere to the following requirements:

- Banner size for safety reasons should not exceed the recommended size per engineering evaluations for that specific install location with a size limit of 32” x 96” not to be exceeded.
- Banners are limited to one per light pole
- Banners are not allowed on sidewalk light poles, only the larger street and parking lot light
- Banners shall be adhered with proper and approved mounting hardware
- Banner height should not be lower than twenty feet (20’-0”).
- Banners should have graphics on both sides
- Graphic design should be approved by Marketing and Communications. Contact Laura Root at laroot@tamu.edu

Banner requests must be submitted in writing to the Vice President for Facilities and Energy Services and routed through the appropriate dean or vice president. Requests should be sent to facilitiesrequests@exchange.tamu.edu with a subject line to state “Banner Installation Request.”

Approval will be required from the Office of Campus Planning, Design & Construction, the Division of Marketing & Communications, and Utilities & Energy Services.

Requests should include the following:

- Memorandum requesting approval for the use of either an Event Banner or an Anniversary Banner, and justification for the display of the banner
- Timeline of banner display, in compliance with the above outlined timelines for installation and removal
- Detailed location of banner and methods of attachment, as well as any repair or restoration required upon removal
- Dimensional size of banner
- Banner content / graphic layout (should be concise and to the point)
- Logistical support needed from university entities for installation and removal

Banner Installation

- Upon receipt of approval, the requesting entity must coordinate with the appropriate university organizations/entities required to support the installation.
- Banner installation must be of a high-quality nature and installed by a bonded and insured installer.
- Banner mounting hardware must be of a type manufactured by BannerSaver or equivalent. Equivalence will be based on the ability of the mounting hardware to spill the air around the pole. Utilities & Energy Services will be the approvers regarding alternate options for equivalence.

Banner Removal

- Prior to expiration of the display period, the requesting entity must coordinate with the appropriate university organizations/entities required to support the removal. This includes providing the specific date for removal.
- Removal of banners, includes removal of the associated mounting hardware.
- Any cleaning or maintenance associated with damage to the light poles must be addressed at the time of removal at the expense of the requesting entity.
- Any damage to the grounds (turf grass, irrigation, etc.) must be addressed at the time of removal at the expense of the requesting entity.

Banner Costs

- All costs associated with banner development, production, installation, and removal are the responsibility of the requesting entity.