DESIGN & CONSTRUCTION GUIDELINES
The University of North Texas

February 2009

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INTRODUCTION

This handbook, ***Design and Construction Guidelines***, is prepared to assist Architects and Engineers in the design and construction of physical facilities for The University of North Texas. The information collected in this manual is based upon past experience with design practices, construction methods, equipment and materials which have provided the quality of construction the University requires.

These guidelines are designed to supplement the policies and the procedures of the Texas State Building Commission, the latest edition of the Uniform General Conditions and the Supplementary Uniform General Conditions. It is assumed that all professionals providing design services for the University are familiar with these policies and procedures.

It is recognized that particular project situations shall, in the judgment of the Designer, warrant deviations from these standards. We welcome any such recommendations and shall consider each of them carefully. However, unless the University gives specific approval for alternatives prior to implementation, the Designer must comply with the guidelines in this publication.

We also welcome recommendations for additions or improvements of this document from users. .Please submit any comments or suggestions to the Senior Construction Manager.

The information in this manual is organized to follow the sequence of the design process. The first section outlines the **Planning Procedures** which are followed for every University capital project, and it is organized by the phases of the planning process: Schematic Design, Design Development, Construction Documents, Bidding, Construction, and Project Close-out.

The second section contains **Design Guidelines** that represent the University's expectations regarding the design of the specific elements and systems typically involved in University projects.

The third section, **The Construction Contract - Conduct of the Work**, outlines specific requirements pertaining to the nature of the construction contract and to the conduct of construction work at the University.

The fourth section, **Selection and Evaluation Policy,** contains **information about** the procurement of Architectural and Construction Services. The University of North Texas has established these policies in order to provide fair and equitable evaluation of the firms that are soliciting these opportunities.

The fifth section collects **Standard Details** that are referenced throughout the manual.

A. PLANNING PROCEDURES

1.0 Designer's Relationship to the University

The Designer should understand that the University is the owner and client for the project – even though project planning and design for the University is a cooperative procedure involving many persons within the UNT System, Campus, State Agencies and other reviewing authorities.

At any point in time there is a single representative assigned to each project. This is the person through whom the Designer is required to work and to whom the Designer should turn for authoritative information on all matters and questions involving the University. Many other individuals and groups within the University will participate in the capital improvement planning process, but the Designer should not act on any information other than that received from, or coordinated through, the designated project representative – herein referred to as the Project Manager.

The Project Manager is the contact for all information during the initial phases of a project--the programming phase, the designer selection, the design, and the bidding phases. This individual coordinates and monitors all project activities for the University. The Designer shall designate an individual within his or her firm who is directly responsible for the project, and who can be contacted on any matter pertaining to the project.

2.0 Initial Planning Conference

An initial planning conference will be scheduled to discuss general requirements of the program and procedures for facilitating the Designer's work. This conference is held as soon as possible after selection of a Designer for the project. The Designer's professional consultants for plumbing, HVAC, and electrical design should attend this conference as necessary.

3.0 Site & Existing Conditions Information

The University shall furnish topographic surveys and other existing information for new construction; including record drawings for remodeling projects. The University cannot warrant that this information is correct. The Designer shall supplement this information with his or her own field surveys and measurements. The Designer is responsible for reporting to the owner any inaccuracy in the information shown on the construction contract drawings.

3.1 Survey Criteria

Surveyors contracted by the University shall comply with the following guidelines:

A. Digital Data Requirements
   - Provide AutoCAD format electronic file with each feature, e.g., sidewalks, roads, buildings, fences, trees, etc, on separate layers.
   - Surveys must be referenced to one of the three UNT GIS benchmarks. UNT Campus Facilities will provide the metadata as needed.
   - Coordinate system must be State Plane 4202 TXNC Zone, with units of feet. Elevations must be based on GEOID03 NAVD88 as the datum. Latitude and Longitude should be based on NAD 83 (CORS96) (EPOCH:2002.0) as the datum.
   - Data attribute formats must be in Excel, DBF4, or tab/comma delimited text files.
   - Pertinent metadata must be provided.

B. Length of each property line
C. Measure angle at each property corner
D. Iron pin set at each corner
E. Indicate any corner radius
F. Location of any existing buildings, driveways, sidewalks, etc.
G. Location of any fences or structures within 50’ outside of property line
H. Indicate any easements, right of ways, and building set back lines
I. Establish permanent benchmark location and note on survey
J. Width of street
K. Type of pavement for each street

L. Height and type of curb and show existing curb cuts
M. Width and type of sidewalks
N. Location and size of gas, water, and other know underground utilities including storm and sanitary sewer lines with flow lines and top of manholes
O. Location of existing gas and water meters
P. Show catch basins with size and elevation of grating and flow line
Q. Location of fire hydrants, traffic signs, street light, power and telephone poles, guy wires, etc.
R. Location of trees and type and size
S. Show depth and size of basements
T. Give elevations in 1' intervals. Show any unusual grade changes
U. If a drainage ditch is along any side of the property line, give elevations of bottom and crest of ditch
V. Coordinate with Facilities Maintenance for locations and tie-ins of underground utilities

3.2 Geotechnical Engineer (if employed by Designer)

In addition to providing the normal sub-surface investigation written report, the Geotechnical Engineer is thoroughly involved in the design process and shall complete the following tasks prior to submittal of Construction Documents.

A. Review and edit the project's earthwork specifications, final site and structural foundation drawings for compliance with the soils report recommendations.
B. Estimate the quantities of weathered and bedrock excavation for bid purposes.
C. Any special analysis or report as required by special circumstances, situations or projects.

4.0 Project Development Schedule

The Designer shall prepare and submit a proposed Project Development Schedule to the Project Manager for approval. This schedule is submitted within twenty-one (21) calendar days of the date of the Design Contract, and it shall incorporate the end-of-phase milestone dates stipulated in the Design Contract. In addition, this schedule shall show:

A. The start dates and duration of each major phase of design.
B. The duration and completion dates of each design review period, which are required to maintain the project schedule. For most projects, the normal design review periods are: Schematic Design Review (ten calendar days), Design Development Review (two weeks), Construction Documents Review (thirty calendar days) and Final Review and Approval (two weeks).
C. The projected duration and completion dates of other project-related activities, such as funding decisions, surveys, sub-surface investigations and zoning approvals.
D. The estimated duration of the construction contract award process and the construction period.

The Project Development Schedule is up-dated and re-submitted with each end-of-phase submittal described below.

5.0 Review of Design

The Designer is required to make submittals and presentations, and to participate in review conferences at various stages of the project planning process.

A. Presentations and Review Conferences
During the design process, the Designer is expected to make presentations to various groups who must review and approve the proposed project designs. These groups include the user group, various groups of UNT System and Campus Facilities, other officials of the University, and the Board of Regents of the University. The Project Manager schedules all conferences and presentations.
B. Schematic Design Conferences
Normally several conferences precede the approval of Schematic Design documents. Conferences are required to clarify the program of requirements, to review and discuss the Designer's design proposals, to discuss the Designer's evaluation as to whether the program requirements are achievable within the project budget and to assist in the definition of alternates which shall become an important component of the Construction Documents.
C. Presentation to Board of Regents
The Designer may be asked to make a presentation of the project design to the Facilities Committee of the Board of Regents for their comments and approval. The following exhibits are typically required for these presentations: A simple scale model showing the siting and vicinity of the project (except for renovation projects), the building floor plans, the exterior elevations and possibly a sketch or rendering.

These presentations are scheduled to occur as early as possible in the Design Development Phase of project.

D. End-of-Phase Reviews

At least one conference is devoted to the end-of-phase reviews of the Design Development submittal and Construction Documents submittal for the purpose of discussing any areas of concern that arise during the review process. The Designer and the Designer's primary consultants are expected to attend these review conferences.

5.1 Conference Memoranda

The Designer is expected to record the content of all conferences and, within seven (7) days, provide a memorandum containing a complete summary of the decisions and actions that will affect the project. This memorandum is distributed to all conferees.

5.2 Submittals for Outside Review

Local building permits are not required. The designer shall submit plans to all appropriate agencies for review and approval, except as noted below. The owner shall submit plans and documentation to the Texas Higher Education Coordinating Board for review and approval. The Designer is required to provide the background and technical materials necessary to support these submittals; including a storm water management plan, erosion control plan, and/or traffic control plan. The Designer shall attend public hearing(s) related to these submittals, as required.

5.3 Submittals for University Review

In addition to the various State and Local agencies that may exercise plan review authority over the project, various departments within the University also participate in plan reviews at stages specified in the Designer's contract. The University's Project Manager shall coordinate these reviews. The review team consists of the following UNT departments. Though individual titles may change, the current review team is as follows:

System Facilities

Associate Vice Chancellor	Project Manager/Architect
Director of System Planning and Development	Construction Manager

Campus Facilities

Executive Director of Facilities	Grounds Maintenance Manager
Senior Construction Manager	Door Systems
Associate Director of Facilities Maintenance	Project Coordinator (for furniture and finishes)
Structural Maintenance Manager	Custodial Service Manager

Facilities Services

Custodial & Recycling Service Mgr.

Police, Parking & Transportation

Dir/Chief, Police & Traffic

Communications & Information Technology

Communications Mgrs (Telecom & Datacom)	
Dir Communications Services	Computer Systems Mgr

Risk Management & Environmental Services

Dir Risk Mgmt/Environmental Services
Asst Dir Risk Mgmt & Envmtl Services Fire Safety

Classroom Support Services

Dir. Micro Computer Maintenance/ Classroom Support

Office of Disability Accommodation

Disabilities Accommodations Dir.

Departmental Dean (if it is an academic project)

Primary Departmental Contact

The University review team will submit comments as necessary. Upon receipt of the review comments, the Designer shall revise the Design Documents in accordance with the review comments. The Designer shall prepare a written summary of his or her response to the University's review, and the Designer shall provide a copy of this to the Project Manager within two weeks of the Designer's receipt of the review comments.

The Designer shall not proceed to the next phase before receiving written approval of the previous phase from the University's Project Manager.

5.4 Payments to Designer

The Designer shall submit invoices to the Project Manager for approval. Invoice formats shall comply with the following format. The Designer may submit invoices on a monthly basis for up to 90% completion of design phase. The remaining 10% is invoiced upon written approval of design submission.

6.0 Project Development Phases

6.1 Schematic Design Phase

At the beginning of the Schematic Design Phase, the Designer shall confer with the Project Manager and the users to review the program and establish the project requirements. Based on an approved summary of the project requirements, the Designer shall prepare a Schematic Design illustrating the recommended implementation of the program and project requirements.

The Designer is expected to involve the University's Project Manager – and through that individual, the user group and other appropriate members of the University's Facilities – during the development of the schematic design. The Designer is expected to explore a range of alternatives that best implement the program and project requirements.

Schematic Design Submittal

The Schematic Design Submittal to the University shall be per contract or as discussed prior to submittal. Include the following information as a minimum:

A. Show proposed walkways, vehicular and service access on the site plan. Include existing landscape.
B. Identification of each room or space by functional name on floor plans.
C. An updated Project Design Schedule.

6.2 Design Development Phase

Based upon the approved schematic submittal, the Designer shall prepare the Design Development documents.

Design Development Submittal

The Design Development Submittal to the University shall be per contract or as discussed prior to submittal. Include the following information as a minimum:

A. Site drawing(s) showing adjacent buildings, significant existing features including existing landscaping, site utilities, proposed construction limits, proposed site improvements, and other site data furnished on the previous submittal.
B. Floor plans shall identify each room or space by name and number. All room numbers must reflect the permanent room numbering signage system. The University will establish the room numbering system prior to committing to the drawings (See Section B, 5.12)
C. Elevation drawings of every exterior side of each structure showing materials, features, openings, floor and rooflines, grade lines, footings, and everything exposed to view above eaves or parapets. Show partial elevations of adjacent campus buildings on elevation drawings.
D. Section(s) through the entire building selected to best show the relationships of architectural and engineering features.
E. A room finish schedule showing the type of material to be used for floors, walls, and ceilings. The proposed interior finishes concept shall be presented to the University for approval. The University must approve all finish materials selections prior to their specification by the Designer. This shall include concepts for the following:
    - All floor material types and locations.
    - All wall finish materials and locations.
    - Identify exterior materials, including wood species, brick and/or stone.
    - Identify millwork locations and materials
    - Identify ceiling materials and locations.

F. Equipment and furniture layouts for all rooms indicating the adequacy of the arrangement and configuration of such rooms for planning telephone and data requirements.
G. An outline specification indicating materials, types of construction, and equipment to be used. Include a description of each plumbing, HVAC, fire protection and electrical system design concept. Include elevator characteristics, and include the names of proposed manufacturers of HVAC, plumbing, fire protection, special systems, electrical equipment and fixed equipment.
H. The maximum hot water and chilled water demand--for the purpose of determining whether the existing heating and cooling systems will be adequate to meet anticipated demand or whether modifications to these systems or a new stand alone system will be required.
I. A tabulation of building data, including square feet of floor area, cubic content, roof deck "U" factor, heating load in BTUH, air conditioning in tons, plumbing load in drainage fixture units, water demand in peak GPM, electrical loads in KVA, the design live loads and number of occupants.
J. An up-dated Project Design Schedule.

6.3 Construction Documents Phase

Based upon the approved Design Development Submittal and written notice to proceed, the Designer shall prepare the Construction Documents. As stated in the Designer's contract, the building design must be in compliance with all applicable codes, laws, ordinances, and regulations.

A. Owner's review of Working Drawings are required at stages per the Designer's contact. See Section B, 5.3.
B. At 50% and 100% Final Construction Documents, provide the Project Manager with electronic floor plans in AutoCAD format that include electrical, data, and intended furniture layout.
C. Final Construction Documents Submittal
The Final Construction Documents shall be prepared as per contract or as discussed prior to submittal on sheets specified
- The first sheet of drawings shall include the following information: a tabulation of building data, including square feet of floor area, cubic content, roof deck "U" factor, maximum heating load in BTUH, air conditioning in tons, plumbing load in drainage fixture units, water demand in peak GPM, electrical loads in KVA, the design live loads and applicable codes, laws, ordinances, regulations and number of occupants.
- Provide a "color board" (2 copies) accurately depicting the interior and/or exterior materials, colors and finishes used on the project as well as their location within the project. As previously stated, all material selections must be reviewed and approved by the University prior to submittal of a "color board."
- An up-dated Project Design Schedule.

6.4 Bidding Phase

The Designer, in consultation with the Owner, shall establish the date for receipt of bids. A period of four to six weeks is normally required between the publication of the advertisement for bids and the receipt of bids.

Newspaper notice of bidding the project is not required by law, although the Owner may choose to do so. The University will advertise in the Electronic State Business daily as required by law. **The Designer will place adequate copies of all bid documents in the Dallas - Fort Worth metropolitan area plan rooms**. The following plan rooms are to be used:

DFW Minority Business Development Council
1000 Stemmons Tower South
2720 Stemmons Freeway
Dallas, Texas 75207-2212
(214) 630-0747

CMD/AGC Plan Room
11102 Stemmons Freeway, Suite 101
Dallas, Texas 75229
(972) 484-2030

Dodge FW McGraw Hill Construction Information
1341 W. Mockingbird Lane
Dallas, Texas 75247

In addition, the Designer will notify general contractors known to the Designer or the University to be capable of doing the project. Written invitations to bid will state the name and location of the project, the owner, the designer and the pre-bid and bid opening dates, times and location.

See UNT/HSP Policy in Section C, 10.0

A pre-bid conference will be scheduled to occur after bid documents have been available long enough for bidders to review and develop questions, but far enough before bid opening that bidders can adjust to a formal addendum from the designer answering all questions raised at the pre-bid.

The Designer shall provide bid tabulation forms and conduct the bid opening. Designer will advise the University on the implication of any irregularities or unexpected results of the bidding.

7.0 Construction Phase

The Construction Phase begins with the University's receipt of the fully executed copy of the construction contract(s), performance bond, payment bond and insurance certificate. Upon approval of insurance coverage by the University of North Texas Risk Manager, the University will send a Notice To Proceed to the Contractor.

7.1 Pre-Construction Conference

The Designer, in consultation with the University's Project Manager, shall arrange for a pre-construction conference. The purpose of this meeting is to review the requirements of the project and to provide a framework for the coordination of all construction activities. The Designer shall invite all contractors, the University's Construction Manager and all other interested parties to this conference. The Designer shall distribute copies of meeting minutes to the parties outlined above.

7.2 Periodic Observations

The Designer, where required by the design contract, shall provide liaison and necessary observation of the project to ensure compliance with plans and specifications. The University's Construction Manager will also observe work progress periodically and will provide comments to the Designer through the Project Manager.

7.3 Submittal Review

The University's Construction Manager will be responsible for coordinating in-house reviews of submittals with the necessary individuals at the University. After University approval, the Designer shall provide the Construction Manager with a copy of the final approved submittal. The Construction Manager will also coordinate material samples or mock-ups requiring University approval, including, if necessary, appropriate mock-up location.

7.4 Project Close-out Responsibilities

The Designer shall provide the following project closeout services upon completion of the project:

A. Assemble and forward closing papers.
B. Computation and disposition of liquidated damages (if required).
C. Issue Certificate of Substantial Completion & Compliance including punch list / completion list.
D. Provide Record Drawings as stated in Contract. The drawings should accurately reflect the project as constructed including finish materials, colors and any other architectural and MEP changes that occurred during construction.
E. Provide a separate list of all major fixtures & finishes (i.e., lights, wall paints, flooring, laminates, etc.) installed as part of the project.

End of Planning Procedures

B. DESIGN GUIDELINES

1.0 Designer's Relationship to the University

1.1 Campus Design

The underlying goal of the architectural design of any new construction is to enhance and unify the campus. New construction should relate to adjacent buildings in character, mass, dimension, scale, building materials and fenestration.

The Designer must consider the impact of new construction on the existing campus infrastructure. This includes careful consideration of the project's utility, pedestrian, parking, vehicular access and open space requirements. The project development must be consistent with the vehicular/pedestrian open space and utility systems proposed in the long-range plan.

The design must also consider the long term health and retention of mature tree specimens on campus. Do not design any utility lines – electric, sewer, potable water, etc. – to be installed in any trenches UNDER a mature tree. If any trenching absolutely must occur under ANY tree, then utilize AIR SPADE trenching technology, offered by Root Flare Services of Dallas to open the trench.

For projects on peripheral campuses, such as UNT Research Park and UNT Fort Worth Health Science Center, refer to the Supplemental Design Standards in Appendix A.

1.2 Drawings and Specifications Formats

Drawings will be prepared on 30" x 42", black line on white paper, or as specified in the Designer's contract. All specifications shall be prepared in bound form.

Drawings will follow the CAD Standards implemented by Facilities Management and Construction. See Appendix H for information.

1.3 Design Within Available Funds

The Total Project Budget of a Capital Improvement Project includes the project construction cost, the design fee, a construction contingency fee and a number of project reserves. The reserves respond to local requirements and requirements established by the University. Among the University reserves itemized in the project budget are Utilities, Testing, Air Balance, Construction Supervision, Telecommunications and Moveable Equipment. These reserves are excluded from the funding allotted to the designer for construction.

Designers are directed and required to base their designs upon the budgeted funds available. The Designer shall continually monitor program requirements and cost estimates to assure that the project is designed within the available funds and does not deviate from the quality standards established herein. If at any time the Designer believes that satisfying the stated program requirements at the level of quality desired will exceed the budgeted funds available, then s/he must inform the University's Project Manager without delay.

1.4 Building Codes

The following codes must be followed for all UNT projects:

- 2006 International Building Code (IBC)
- 2006 International Mechanical Code
- 2006 International Plumbing Code
- 2008 National Electrical Code
- 2006 International Fire Code
- 2006 International Energy Conservation Code (IECC)
- 2006 International Existing Building Code
- NFPA 101 Life Safety Code
- Texas Accessibility Standards (State mandated)
- ADA (Federal mandated)
- ASHRAE/IESNA Standard 90.1-2004

The authority having jurisdiction is the Associate Vice Chancellor for System Facilities.

1.5 Energy and Materials Conservation

The University is dedicated to the principle of conserving materials and energy. The Designer should scrutinize proposed construction for means of reducing not only the initial cost of energy and non-renewable

resources, but also long-range operating costs. In addition to basic conservation requirements, the Designer should consider the utilization of passive solar energy techniques, non-conventional and renewable energy sources, recyclability, the recycled materials content of specified materials and non-conventional materials. Take into account the climate of the southwest region of the United States and make sure the design reflects that consideration. For instance, windows may be recessed for shading. In the Specification, the Designer should encourage the Contractor to salvage scrap material to the maximum extent practical, especially scrap metals and lumber. In the product specifications, encourage vendors to offer products having recycled content.

Texas Law now requires that all new construction or major renovation undertaken by state agencies and state-supported institutions of higher education comply with the Texas State Energy Conservation Design Standards. The State Energy Conservation Office (SECO) through administrative rule adopted these standards effective August 13, 2002. An overview of the statue and rule follows:

Statutory Reference: Texas Government Code, 447.004
Rule Cite: Texas Administrative Code Title 34, Part 1, Chapter 19, Subchapter C, Rule 19.31-19.34
Applicability: This applies to all new construction or major renovation projects undertaken by state agencies and state-supported Institutions of Higher Education.
Major Renovation Project: A building renovation or improvements that affects the energy or water use of the facility. For instance, a lighting project that requires engineering drawings would require certification, replacing lamps would not.
Standards:

a. The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) / Illuminating Engineering Society of North America (IESNA), Energy Standard for Buildings Except Low-Rise Residential Buildings, ASHRAE/IESNA Standard 90.1-1999, or the most current adopted version.
b. For public low rise residential buildings, the energy conservation design standard of the International Energy Code Council as published in the International Energy Conservation Code for 2000, or the most current adopted version.

Certification: State agencies and state-supported Institutions of Higher Education must require that the design architect or engineer certify that the project complies with the Energy Conservation Design Standard and submit a copy of that certification to SECO prior to construction. This certification form can be found on the SECO website: http://www.seco.cpa.state.tx.us/

Routine maintenance and operational change out of material and equipment, where no engineering or architectural design assignment is necessary, are exempt from the submission of the compliance certification.

1.6 Flexibility

Flexibility in the arrangement and use of a building is a fundamental requirement, and the ability to accommodate growth and change is an important criteria in the design of the structural, mechanical, and electrical systems and the selection of materials. The designer is encouraged to locate stairs and elevators on the periphery of the building to allow large blocks of continuous space inside the building. Flexibility of future use favors the creation of large free span areas of monolithic surface, so long as the design can carry the load.

Buildings over three stories are discouraged. Where expansion at a later time is considered, lateral, rather than vertical expansion is recommended.

1.7 Maintainability

Designers are required to consider long-term durability and maintainability, when selecting and specifying equipment, materials, and finishes. Initial cost is not the over-riding consideration.

Allow service personnel access to equipment without disruption to campus activities. Size equipment rooms to permit maintenance, repair and easy removal of equipment. Locate equipment so that service personnel can easily gain access. Provide permanent ladders and platforms as required. Designers should comply with OSHA regulations for employee access to equipment via industrial stairs, working platform, ladder, etc. Locate mechanical and electrical equipment rooms with access to the exterior; provide convenient service vehicle access. Do not combine service closet and equipment room functions. Provide direct access to each individual service closet and equipment room. Mechanical basements are not allowed. Basements are not allowed. Fan and oil units will not be placed on the roof. No exterior part of the building should have any surface that requires painting.

1.8 Accessibility

The University is committed to making all buildings and areas of the campus physically accessible to all students, faculty and staff. Therefore, Designers are required to accommodate the special requirements of all segments of the University population – including wheelchair users, those who use walking aids and the hearing and visually impaired – in their design. All new construction shall fully comply with the Americans with Disabilities Act (ADA) of 1991 as amended. To the greatest extent possible, renovation projects shall bring the project areas within the facility to full ADA compliance.

1.9 Exterior Windows

Windows are not desirable in classrooms, class laboratories, auditoriums, or conference rooms, but they are desirable in public areas and offices. In general, do not extend windows below 30 inches above the floor or more than seven feet above the floor in offices. The general orientation of the building should consider the south and west solar exposure in the arrangement of windows and glass to minimize direct sunlight.

1.10 Standard Stock Items

Designers are directed and required to base their designs upon standard stock items whenever possible. Where custom-built items are required, the Designer shall clearly state this fact.

1.11 Recruitment and Selection of Minority Businesses

The University has a commitment to encourage the participation of minority businesses in construction projects on campus.

1.12 Dangerous Chemicals, Liquids and Gases

The floor plans and storage arrangement of chemicals, flammable liquids and gases are subject to review for compliance with all applicable codes, and for common sense.

1.13 Radiation Sources

The floor plans and equipment arrangement of all radiation sources are submitted to the Radiation Safety Officer, UNT Risk Management Office, for their review and approval. The Radiation Safety Officer shall submit safety recommendations as required.

1.14 Special Scheduling and Construction Constraints

Projects on campus require special steps to avoid or minimize interference with on-going campus operations. See Section C – The Construction Contract.

1.15 Colors: Materials/Finishes

The University encourages the use of UNT colors. The Designer should refrain from using any colors that might resemble those that are representative of other universities in the region.

2.0 Site Design

2.1 Project Site

The Designer may be asked to participate in the siting of the project. The Designer shall visit the site and evaluate proposed possible locations for the project and discuss problems related to siting with the Project Manager before beginning design sketches. The Designer may suggest arrangements differing from those shown in the program requirements if site conditions warrant.

2.2 Site Limits

The Designer shall establish the limits of the construction site in coordination with the University. Indicate these limits on the design development drawings. Temporary use of existing parking lots for staging area is discouraged. If use of parking lots for staging is required by the project, show the location of site fences, staging area and parking.

Enclose the construction area with a six feet (6') high (minimum) chain link type fence with top rail. The Contractor is required to remove the construction fence completely, including all portions of footings below ground level, at completion of the project. Remove fence posts -- do not saw off flush with the soil line. Drawings shall also specify the area used for material storage during construction.

2.3 Walks, Ramps, Steps and Building Entry

Walkways

- Carefully plan new walkways that connect major destinations and offer pedestrians a safe, accessible and relatively direct means of travel. Indicate these new walkways on the schematic design site plan.
- Give special consideration to locations where pedestrian pathways cross vehicular routes. Avoid steps and other features hazardous to the visually impaired. Where pedestrian traffic is meant to dominate, brick paving material should continue across the vehicular route. In other situations, mark the pedestrian crossing with generally recognized "cross-walk" stripes on the asphalt-paving surface (see Appendix G, Figure 3).
- Match existing brick paving materials and patterns. Brick walks should be dry-laid (see Appendix G, Figure 3). Construct brick walks, which provide service or emergency vehicle access, on a concrete base.
- Maintain consistent walkway widths across the campus. Remove walkways not in use.
- The standard walkway widths are:

Major pedestrian corridors	16 feet wide
Major pedestrian walks	8 feet wide
Minor walks	6 feet wide

Ramps and Steps

- Ramps and steps shall meet accessibility requirements in all locations. Provide railings and guards at stairwells, steps, bridges, loading docks and ramps. Treads and landings are to have positive drainage away from the building. Provide runways and ramps in all buildings where bulk supplies are handled. Ramps should have a non-slip surface as per Appendix G, Figure 4. Carborundum or similar abrasives are not permitted. (Also refer to Section B, 2.12)

Building Entry

- Building Entry should be on grade. No monumental stairs.
- In new University buildings, all entrances must be ADA accessible.

2.4 Parking

Parking areas must be clearly defined and physically separated from roads. Preserve existing trees to the greatest extent possible. Visually separate large parking lots into smaller modules (see Appendix G, Figure 5). Major lots should be paved, striped, delineated with curbs and gutters and proper illumination for safe evening use is required (see Section B, 2.10)

The Designer must provide parking for emergency and delivery vehicles, as well as University service vehicles. In the case of dormitories and similar buildings, provide for the significant loading and unloading parking demands associated with student move-in/move-out days.

See Section B, 6.5 for parking lot painting requirements.

2.5 Paving

All paving repairs shall match existing materials. Exposed aggregate will not be used.

2.6 Outdoor Spaces

Careful design of spaces in between buildings will integrate these interstitial spaces into the network of campus open spaces. Within these spaces there is the opportunity to create gathering spaces - “outdoor rooms.” Take care to locate these outdoor rooms where their activity and use will not disrupt or distract nearby classrooms or similar established activities. In developing outdoor spaces, the designer should look to the existing campus for precedents of form and material as well as lighting, signage and landscaping.

2.7 Site Drainage

Grade the site, including paved areas, loading dock, service yards, and landscaped areas, so that gravity runoff occurs at all points. Slope all areas away from the building at a minimum gradient of 1/4 inch per foot. Grade all terrain surrounding the building, including loading and parking areas, in such a manner as to

prevent water flow into the building should storm drains serving the area become stopped up. Provide an underground storm sewer system to accommodate the roof drainage system.

Tie drainage from new construction into existing underground storm drains whenever possible. Design the storm drainage system for assumed minimum rainfall intensity of two inches per hour for a five-hour storm. In addition, use 2.0 cubic feet per second per acre as the minimum runoff value in the storm drainage design.

The maximum permissible horizontal distance between a catch basin and other inlet shall not exceed 75 feet. This applies to grass areas, paved areas, elevated parking areas, etc.

2.8 Erosion and Sediment Control

The Designer's Erosion and Sediment Control Plan for the project should clearly delineate between which measures are temporary and which are permanent.

2.9 Landscaping

Landscape Design:

Design is to be water saving in nature. All plants are to be native or indigenous to the area that can survive with minimal additional water (with exception of establishment year). Beds are to be curvilinear in nature and design – no square corners, radius corners please. Designs are to draw the eye to various points or flow from point to point and lead to entry/exits and offer exciting visual vistas as pedestrians walk through the campus. Designs are to be interesting and relaxing to the viewer and should compliment the building and surrounding landscape. Designs are to include sitting areas – or areas of reflection, quiet or study. Designs are to cascade from the building in stair step fashion – tall, medium and short in order to make the building a part of the landscape and not rigidly separate. Soften all vertical corners whenever possible. Designs are to include seasonal native perennial color for interest. Avoid continual 'line of sight/view' obstructions. Occasional tall accent plants are acceptable. For examples see Appendix G, Figures 6 & 7.

Site work:

Remove 6 inches of acceptable topsoil from building site, if available, and store on UNT property for future use in the landscape. Should any asphalt parking lots be removed from the site, grind up the material and provide UNT with first option of such material for use on UNT land. Removal of concrete site work to be complete and will be removed from UNT property and disposed of in an appropriate environmentally sound manner. Transfer of this material to a company that crushes the concrete for reuse is the most environmentally sound solution for the proper disposal of said material. Simply burying the material in a landfill is not a suitable alternative. Trees that will be saved should be protected during excavation of the site.

Tree Protection:

Tree protection will be constructed using metal t-posts and either orange construction fencing or chain link fence. Fence to be a minimum of 3' outside of the drip line of the tree. Fence to be maintained and not taken down for any reason without approval from UNT Grounds Manager. Install and maintain a minimum of 3" composted material comprised of shredded hardwood, compost or cypress mulch. City of Denton, Jemasco and Living Earth are examples of materials available for use. Water trees during construction to maintain moisture levels enjoyed by the tree prior to construction.

Any roots broken and disturbed during construction trenching operations shall be immediately cleanly cut and sprayed with root sealant. Do not leave uncut, frayed roots without immediate treatment and UNT is to inspect any trench before filling occurs.

Do not mechanically trench under trees - please trench using Air Spade Technology offered by Root Flare Services, Dallas, TX, hand dig or bore underneath. If roots greater than 1" are encountered and severed, dig back along the root and find solid rootwood, then flush cut and treat with an acceptable root sealant immediately. If the roots cannot be treated immediately, cover with moist burlap to prevent desiccation until they can be treated.

No lighting is to be placed in trees. Do not pile any soil, equipment or materials under drip lines of trees - maintain original soil level for any tree remaining on site during construction.

General:

Plants need triangular spacing – do not plant on square patterns. Plan the spacing for mature size of the plants – DO NOT CROWD plantings. Shrubs that will be large at maturity should be planted at 4' O.C. (on center) or greater spacing. Most small and medium shrubs should be planted a

minimal 3" O.C. See appendix G, Figure 8 for shrub planting detail. Plant spacing to be verified by Landscape Architect and the UNT Grounds Manager prior to installation as site adjustments may be needed. Ground covers can be as close as 6" O.C. if in small containers or as much as 18-24" O.C. if one gallon size or larger. Trees should be planted a reasonable distance from the building determined by the mature size of the tree, so as to minimize maintenance requirements in future years. See Appendix G, Figures 9 & 10 for tree planting details. Plants/shrubbery located next to walls, fences, etc, need to be a minimum 3' from those surfaces; and shrubs should be planted a minimum of ½ their mature size/width from sidewalks so as to prevent constant maintenance of said shrub off the walk. Plants/shrubbery with sticker type leaves need to be a minimum of ½ half the diameter of a mature plant size plant x1.5 away from a sidewalk or pedestrian pathway (e.g.: 4' wide mature Yucca would be 2'(diameter) x 1.5 = 3' from a sidewalk minimum. Spreading groundcovers to be planted 2 feet off edges or other hard surfaces to allow for growth. Groundcovers such as clump grasses may be as close as 6 inches from a hard surface. No climbing vines are allowable (e.g., ivy).

Bed preparation to include amending the existing site soil to a minimum depth of 14 inches. Acceptable bed preparation is the following: Once construction is complete, remove the top 8 inches of garbage soil and trashy materials in all areas to be landscaped. Add 3 inches of expanded shale and rototill 8 inches into the subsoil. Then add 3 inches of pH balanced compost and rototill that into the top 6 inches of subsoil /shale mixture.
The expanded shale can be purchased from TXI Materials and the pH balanced compost can be purchased from Soil Building Systems – both companies are Dallas based.
All landscape beds to receive 3 inches of shredded hardwood mulch, such as Jemasco or equivalent. A sample should be provided.

Sidewalks:

See Section B 2.3.

Turfgrass:

Turfgrass bed preparation includes the following: remove all construction debris, such as wood, rock, brick, cement, pipe, sheetrock, metal, paint, plastic, glass etc. from site prior to final prep work.

Thoroughly rip/disrupt/break up/shatter the soil to a minimum depth of 8", preferably deeper due to typical construction site compaction. Re-compact to industry standards using a standard gill or comparable piece of equipment. Remove non-soil materials listed above and unacceptable clays, then re-grade subsoil to established grades for proper drainage.

Once subsoil is lightly but firmly re-compacted, add a minimum depth of 4" compacted topsoil to the rough subsoil for the turfgrass growth zone. Add this topsoil from the outside of the site in, so the subsoil and topsoil create an interface (mingled) layer instead of two distinct layers with the possibility of a pan layer being generated. New topsoil to be sandy loam in nature and to be free of deleterious material such as roots, rocks, limbs, trash, paint or any material foreign in nature to the topsoil.

Do not drive over regraded/scarified subsoil clays- dump topsoil on the outside of the site and with a tractor/dozer push topsoil onto scarified clays. Make equipment ride on top of topsoil as this will allow topsoil to partially mix with subsoil clays creating an interface layer instead of a compacted pan layer.

Miscellaneous:

Trees which were dug in the wintertime need to be Balled and Burlapped (B&B),. UNT DOES NOT WANT container grown trees due to the typical circular nature of roots having been grown in pots. Tree planting holes to be dug 3x's the width of the ball (minimum) and 1 inch short of the height of the ball. Amend the removed clay soil with ¼ by volume compost or other accepted amendments. Stake newly planted trees with 2 – 6 foot metal t-posts, wire and rubber hose. Perform percolation test on each tree hole to verify water drainage. Test to be filled and 24 hours later reviewed to determine water retention. If water is retained, determine why and make adjustments to site or provide the ability to drain the excess water.

Planting bed preparation details: see GENERAL above for detail

Irrigation:

Plans are to provide thorough landscape coverage. Turfgrass zones are to be kept separate from landscape zones. Plans are diagrammatic in nature and can be altered on site, if needed. If alteration does occur, irrigation contractor is to provide as,built drawings of the system. Run one extra wire from controller to end of last electric valve. All pipe to be Schedule 40 PVC - no other type or class of pipe is allowable. Water tap, meter and backflow device to be minimum 2" in size. Ball valves are to be placed before each electric station valve for isolation purposes. Control wires are to be placed under the mainline pipe and to the side. Wrap wires with nylon tie wraps every 10 feet and loop at every mainline 'ell'. Use thrust blocks on mainline 'ells,' if needed. Mainline is to be buried a minimum 16-18 inches from top of pipe. Laterals to be buried a minimum of 12 inches from top of pipe. Spray heads to be Irritrol. Large turf heads to be Hunter PGP, and Athletic fields Hunter I-40 or I-25. Sprinkler heads to be minimum 2 inches away from a hard surface such as a sidewalk, and to be flush mounted with soil level. Quick coupler to be a brass Rainbird 3RC. All valve boxes are to be large enough – a minimum of 10 x 17 inches – to perform work in, such as repairing valves, without removing. Leave no rocks in contact with pipe when filling and settling trenches. UNT wants to inspect system under pressure. All joints are to be left visible to the eye before, during and after the test until approved. After approval, properly compact trenches in 8 inch lifts when backfilling in order to avoid settling at a later date. Install yellow caution tape a minimum of 8" above the mainline and wires.

The following is the plant list approved by the University:

Perennials	
Achillea 'Coronation Gold'	Yarrow
Aniscanthus quadrifidus	Flame Acanthus
Aquilegia chrysantha 'Hinkleyana'	Texas Gold Columbine
Aster oblongifolia	Fall Aster
Coreopsis auriculata 'nana'	Mouse Ear Coreopsis
Coreopsis lanceolata	Pure yellow Coreopsis
Coreopsis rosea 'Lime Rock Ruby'	Thread Leaf Coreopsis
Dicleptera suberecta	Mexican Honeysuckle
Echinacea angustifolia	Purple Coneflower
Echinacea purpurea 'White Swan'	White Cone Flower
Gaura lindheimeri 'Siskiyou Pink'	Pink Gaura
Lantana horrida	Lantana
Liatris spicata 'Kobold'	Gayfeather
Lupinus texenis	Bluebonnet
Malvivscus drummondii	Turk's Cap
Melampodium leucanthum	Blackfoot Daisy
Pavonia lasiopetala	Rock Rose
Phlomis russelian	Jerusalem Sage
Plumbago spp.	Plumbago
Rudbeckia hirta	Glorioso Daisy
Ruellia brittoniana 'Katie's Dwarf'	Dwarf Mexican Petunia
Salvia coccinea	Scarlet Sage
Salvia darycii	Red Flowering Sage
Salvia farinacea	Mealy Blue Salvia
Salvia gregii	Autumn Sage
Salvia leucantha	Mexican Bush Sage
Scutellaria suffrutescens	Pink Scullcap
Tagetes lucida	Mexican Marigold Mint

Groundcovers	
Liriope muscari	Liriope
Ophiopogon japonicum	Mondo grass
Ophiopogon japonicum ' Nana'	Dwarf Mondo Grass

Ornamental Grasses	
Calamagrostis acutiflora	Feather Reed Grass
Chasmanthium latifolium	Inland Sea Oats

Imperata cylindrica	Japanese Blood Grass
Liriope gigantea	Giant Liriope
Miscanthus sinensis 'Cabaret'	Japanese Silver Grass
Miscanthus sinensis 'Gracillimus'	Maiden Grass
Miscanthus sinensis 'Peunktchen'	Little Dot Grass
Muhlenbergia rigens	Deer Grass
Nassella tenuissima	Mexican Feather Grass
Pennisetum alopecuroides 'Little Bunny'	Miniature Fountain Grass
Pennisetum alopecuroides 'Moudry'	Black Fountain Grass

Shrubs

Berberis trifoliate	Agarita
Callicarpa Americana	American Beautyberry
Hesperaloe parviflora	Red Yucca
Hydrangea quercifolia	Oak Leaf Hydrangea
Hypericum patulum 'Henryii;	Saint John's Wort
Ilex vomitoria ‘Nana’	Dw. Yaupon Holly
Leucophyllum frutescens	Texas Sage
Myrica pusilla	Dwarf Wax Myrtle
Rhapiolepsis indica	Indian Hawthorn (okay to use)
Rhus virens	Evergreen Sumac
Rosmarinus officinalis 'Hills Hardy'	Rosemary (prostrate is preferred)
Salvia greggii	Autumn Sage
Santolina chamaecyparissus	Gray or green Santolina
Symphoricarpos orbiculatus	American Coralberry
Yucca pendulosa	Soft Leaf Yucca

Trees

Cercis canadensis 'texensis'	Texas Redbud
Chilopsis linearis	Desert Willow
Diospyros texana	Texas Persimmon
Ilex decidua	Deciduous Holly
Ilex vomitoria	Yaupon Holly
Lagerstoemia indica	Crapemyrtle
Myrica cerifera	Wax Myrtle
Prunus mexicana	Mexican Plum
Quescus accutissima	Sawtooth Oak
Quercus macrocarpa	Bur Oak
Quercus muhlenbergii	Chinkapin Oak
Quercus shumardii	Red Oak
Quercus virginiana	Live Oak
Sophora affinis	Eve’s Necklace
Taxodium distichum	Bald Cypress (no knees)
Ulmus crassifolia	Cedar Elm
Ungnadia speciosa	Mexican Buckeye
Viburnum rufidulum	Rusty Blackhaw Viburnum
Vitex agnus-castus	Vitex

Lawn Grasses

Cynodon dactylon	Bermudagrass
Cynodon dactylon x C.transvaalensis	Tifway 419
Zoysia – Zorro Blade, El Toro, Palisades or Crowne	Zoysiagrass
Buchloe datyloides	Buffalograss

2.10 Exterior Lighting (Street, Walkway, Parking Lot and Area Lighting)

Lighting constitutes the first line of defense in the overall security and safety plan of the campus. Lighting provides the needed visibility for vehicles, and more importantly, pedestrians to safely travel around the campus. The University has an on-going project to upgrade the campus site lighting. This project was established in order to improve the overall safety of the campus for students and other pedestrians after dark.

Lighting typically falls into the following categories: (a) streets, (b) parking lots, (c) walkways, (d) athletic and (e) common areas around buildings. It is the goal of the University to preserve the ambiance of the campus while ensuring well-lit areas of travel about the campus. This requires the continuity of fixture types and luminaries. The majority of campus is currently lit with high mast lighting. As part of the project, high mast light poles serving the project area should be removed. New light poles should be "pedestrian friendly" to achieve a more human scale and characteristic campus lighting.

The standard specification for exterior campus lighting is as follows:
Louis Poulsen 12' Nyhavn single head pole, color: black, straight round aluminum arm
100w/MH, 120/277v
NYPT-SRA-SINGLE-12'-BLK(RAL9005)
One out of every five light poles is required to have a GFI outlet.

Outdoor lighting systems shall be designed to provide the illumination levels in the chart at the end of this section using the following University standard poles and luminaries. Lights in pedestrian walkways, bicycle paths and bicycle rack areas should be 20' poles with 175-watt metal halide or MVP luminaries. Lights at roadways and parking lots should be 30' poles with 400-watt metal halide or MVP luminaries. New and/or replacement fixtures shall conform to existing fixtures in and around the general area under consideration and shall be of equal or better quality. An example of an acceptable fixture is Hess America Valencia Series or approved equal. The use of lighting bollards is discouraged. Fixtures should be of the extruded type and represent a minimum maintenance item for the long term. As a minimum, lighting levels should conform to the following:

Location	Min. Footcandle Level	Average Footcandle Level
Pedestrian Walkways	1.0	--
Bicycle Paths	1.0	--
Bike Racks	1.0	--
Roadways	.25	1.0 to1.5
Parking Lots	.40	1.5 to 2.0
Building Entrances	5.0	1.5 times floodlighting design levels if the building has flooodlights

All outdoor fixtures shall be photocell relay operated. Multiple lighting fixtures shall be on a contactor that should be operated photocell on, TAC off that controls all lights within an area.

Lighting in relationship to a new or remodeled facility may typically involve removal of existing fixtures, addition of new self-standing fixtures and addition of new wall-mounted fixtures.

A. Removal of Existing Fixtures

It may be necessary to remove some existing fixtures to facilitate the transition between a new fixture and the existing fixtures, or to improve the lighting level. Removal of all existing fixtures is accomplished by the contractor and delivered to the UNT Facilities, or relocated as specified in the construction documents. Include associated costs for this work within project budgets. There are many fixtures on campus that are very old, and as such, almost impossible to replicate. Exercise great care when handling these fixtures. The preferred electric distribution allows for power to be supplied to all fixtures from the respective building load center. Fixtures may or may not be all on one circuit. Use appropriate breakers and contactors in conjunction with rated photocells.

B. Addition of New Free Standing Fixtures

When the need arises for adding new free standing fixtures, care should be given to ensure uniformity in fixtures and lighting levels with surrounding fixtures and lighting levels. Detail should be given to all obstructions which result in a "cutoff" of the required light pattern. Electric distribution prefers that power is supplied to all fixtures from the respective building load center.

C. Addition of New Wall Mounted Fixtures

Wall -ounted fixtures are strongly discouraged. When the need arises for mounting fixtures on an outside wall of a building, design the lighting system to ensure adequate lighting levels without creating glare or nuisance lighting in other areas. Mount these lights for ease of maintenance and connect to a source in the building load center. Contact the Project Manager regarding available voltages and sources, fixture styles, types and placement prior to preliminary design.

Provide cast-in-place concrete light pole bases. Bases should be embedded no less than 1/3 the height of the pole.

2.11 Outdoor Solid Waste Collection Site

The University is dedicated to maximize efforts to (1) reduce the amount of solid waste the University generates, (2) recycle material recoverable from solid waste originating at University facilities and (3) purchase and use products made wholly or in part from recycled materials.

Locate outdoor solid waste collection sites at major building service areas where their need is observed or anticipated. Locate sites as visually inconspicuous as possible. Gates are preferred when practical. All sites shall accommodate pick-up by a 40 foot long by 8 foot wide truck, including turn around space. Screen all sites from public view with constructed elements compatible with the architectural character of adjacent buildings. Landscape planting shall supplement these screens.

Allow a 25 foot clearance above the dumpsters for servicing by dumping truck. Provide a service ramp and pathway to transport service equipment from the building's service door or loading dock to outdoor recycling and solid waste collection site. This service ramp and pathway shall have a minimum width of 6 feet.

When planning a new outdoor collection site, refer to Appendix G, Figures 11-14. The Designer shall seek approval from the City of Denton for the location and design.

2.12 Site Accessories

Benches, Tables, Ashtrays and Waste Receptacle

- The preferred means for providing informal seating are seating walls (see below speicification for Seating Walls).
- If it is determined that freestanding furniture is necessary for a particular environment, then park benches, tables, trashcans and ashtrays are to be *Wabash Valley*, plastisol type or equivalent. Style is to be *City Limits, Food Court* or *Estate*, the pattern is to be rib or diamond and installations are to be in the ground*. Landscape Forms* is an acceptable alternative. Site furnishings are normally not part of the construction contract.
- Locate waste receptacles where the need is observed, but keep themvisually inconspicuous. Locate receptacles at the intersections of major pedestrian corridors, plaza areas and entries to major student areas. The units should be contiguous to walks and on a paved area extending outward from the walk. The unit should be level and firmly secured to the ground. A single receptacle type should be used throughout all University properties.

Bicycle Racks

- The University campus standard for bicycle racks has been adopted for use at the UNT main campus buildings and locations. Every bicycle parking rack shall be a 'wave' style galvanized pipe in an "M" or inverted "U" shape. See Appendix G, Figure 15. All new buildings and structures shall include on the final construction and bid documents a budgeted line item for bicycle parking racks. Include bicycle parking racks and parking surface in the bid documents and consider it as part of the construction costs. The number of bicycle racks for new construction is determined in joint consultation with the Project Manager.

- Locate each bicycle rack site as close as possible to the perceived destination of the bicyclist (doorways, entranceways, etc.). Use building overhangs and other sheltered locations for bicycle racks when possible to afford protection from the elements. Include street curb cuts and ramps for bicycle riding access to buildings and structures. When sitting bicycle racks, choose locations that

are accessible by bicycle - avoid paths with outdoor stairways. Bicycle parking sites shall be considered at the schematic design phase, and final site locations determined before the final construction documents are let out for bid.

- Every campus bicycle parking rack is to be installed on a paved surface, concrete or asphalt is preferable. See Appendix G, Figure 15 for installation details.

Bollards

- Bollards restrict vehicular movement while allowing pedestrian circulation to continue unimpeded, and are used as a means for filtering vehicular circulation from pedestrians. Removable bollards are used where occasional vehicular access is required.

- One contemporary style of bollard is used throughout the campus wherever bollards are required, but two bollard types are available. The first type is for highly visible public areas where the unit needs to emulate surrounding building materials and styles. A second bollard type is a service bollard intended for more general and practical use.

- With both types of bollards, the surrounding surfacing material should extend to the base of the bollard. No "new" or different surfacing material is used as a bollard base.

- Bus shelters are typically provided and installed by the UNT Police Department.

Bus Stop Shelters

- The University, in consultation the University Police, shall determine where to locate bus stop shelters when ridership volumes justify use and adequate space is available.

- The shelters are of the aluminum frame, clear Lexan wall panel type and are bolted to anchors in the pavement as opposed to pouring pavement around support legs. It should be appropriately illuminated and adequately transparent to ensure user security and safety. Provide a suitable clear space around the shelter to allow for visual accessibility and maintenance and integrate related site furnishings, such as waste receptacles, lighting, newspaper machines, public telephones and landscaping features, into the space surrounding the shelter. It should have a fixed sitting surface inside. See Appendix G, Figure 16.

Fences

- The use of metal fencing is generally discouraged and is used only where necessary. Brick walls are preferred, where practical.

- When fencing is required in visually prominent locations, it should be a custom-designed application generally following the standard design shown in the enclosed drawing. It is also recognized that chain-link fencing may be the only economical alternative in areas away from public view. See Appendix G, Figure 17.

Newspaper Racks and Machines

- When newspaper racks and machines are needed, they,should be accommodated within buildings, whenever possible. If it is not feasible to accommodate the racks inside of buildings, group them at entrances to major buildings or other high traffic areas where their location does not interfere with pedestrian movements. Groups of racks should be as inconspicuous as is possible, and should be enclosed on three sides by a screen wall which leaves only enough clearance as may be required for use and servicing.

Railings

- Railings should be used only where accessibility requirements need to be met.
- Railings should be stainless steel or powder coated/ baked enamel soft steel.
- Refer to Appendix G, Figure 33 for post mounting detail.

Seating Walls

- The primary means for providing informal exterior seating is the use of seating walls. Seating walls can accommodate fluctuating volumes of users, require less maintenance and are visually less obtrusive than benches.

- Seating walls should be incorporated as part of all courtyard and outdoor space development where the potential desire for seating exists. They should be 16 to 18 inches high and 18 inches wide. They should be constructed of masonry and have generally level tops.

2.13 Exterior Signage

The Designer is expected to make provision for a sign in the landscape design. See Appendix G, Figures 18 - 19.

Signs other than building signs are typically masonry backing with anodized raised letters, masonry raised or recessed letters. The Designer will discuss these signs with the Owner, if appropriate.

2.14 Site Utilities

Underground utilities and other structures shall be designed so that the installation will prevent or minimize damage to existing landscape plants and trees. Do not trench under the drip line of any campus tree, seek alternate design criteria. If a trench must occur, utilize boring or AIR SPADE technology as discussed in the Design Guidelines, Section 2.9, Tree Protection.

Installation of an irrigation system meter and tap generates a City of Denton connection fee that the Designer/Contractor is responsible for?

Water and Sanitary Sewer Service

- Water and sanitary sewer services to buildings on the campus are provided and maintained by UNT from the building to the mains, which are owned and maintained by the City of Denton. All water and sewer lines must be constructed in accordance with City of Denton Standards and Specifications.
- Denton water/sewer tap and impact fees for new connections to existing water or sewer mains will apply to all new University projects. However, the Designer must confirm this determination for each specific project. On projects where these fees do apply, the Designer shall make appropriate provision for these fees, which include the water/sewer service fees, tap/meter installation fees and all other applicable fees, in the project development budget, either by allowances in the construction contract, or by reserving funds outside of the construction contracts which is the preferred method. Public sewer mains must be ductile iron. Any existing sewer mains that would fall within the footprint of a new building must be relocated outside the building footprint.

Fire Hydrants

- The Designer should coordinate the location of fire hydrants with the UNT Project Manager.

2.15 Shielding of Equipment

Shield cooling towers, transformers, trash containers, etc. from view with architectural treatment compatible with adjacent structures.

2.16 Protection of Underground Tanks and Pipes

All underground piping must meet requirements for proper installation, leak detection, corrosion protection and spill/overflow prevention. Underground storage tanks are not permitted. Consider concrete vaults or above ground tanks with secondary containment.

2.17 Emergency Phones

Provide UNT standard emergency phones as part of all new University projects. The Designer should coordinate the location of any new emergency phones required by the project with the Project Manager. See Appendix G, Figure 21-22 and website http://www.codeblue.com/Products/Brochure/CB_I-s.pdf for specifications. All emergency phones should be located on an ADA accessible route.

3.0 Building Envelope

3.1 Exterior Materials

The selection of the predominant exterior materials for new construction is extremely important in achieving the degree of contextual compatibility required among buildings on the campus.

Brick

- Brick is the predominant construction material on campus and is an appropriate exterior wall material because it is a low maintenance material. However, brick in unusual colors is not

appropriate. Stone sills, copings and story-bands are typically used to articulate the mass of a brick envelope.

- For structures removed from the heart of the main campus, the Designer may consider other exterior materials. However, there must be compelling reasons for using other materials and other means must be used to integrate the structures into the fabric of the campus.

Roofing

- UNT has a standard specification for roofs that should be incorporated into the construction documents. Generally the specification calls for a four-ply modified bitumen roofing system to include a base sheet, two intermediate fiberglass felt plies and a granular surfaced polymer reinforced modified bitumen cap sheet applied in moppings of hot asphalt over rigid insulation boards. The insulation system should be a two-layered system over a steel deck, consisting of a base layer of rigid insulation board mechanically fastened to the deck in compliance with FM 1-90 wind uplift resistance, followed by a top layer of rigid insulation board set in a mopping of hot asphalt
- No flat roofs. Must have at least a 1:12 slope.

3.2 Glazing

Use double-glazed insulated windows in conditioned spaces. The orientation and solar gain potential of windows is always an important consideration, however, the use of mirror glass is discouraged.

When possible, provide windows that can be washed on both sides from inside the building. When that is not possible, provide safety belt anchors placed on the outside of all windows. Provide guardrails on windows with sills less than two feet from the floor.

3.3 Doorways

Frameless glass doors are not permitted. Hollow metal doors with glass panels are preferred.

3.4 Exterior Storefronts

Exterior storefronts to be glazed with insulated glass in 41/2'' thick frames.

3.5 Roof Access

Provide safe roof access. Ladders inside closets are not acceptable. Consideration should also be given to the need for access to different roof levels. Provide permanent ladders or stair access to all roof levels. Roofs with numerous mechanical devices, such as exhaust fans on laboratory buildings, must have one stairwell extend to the roof.

3.6 Ledges and Bird Roosts

Avoid designing ledges and openings, which can become bird roosts.

4.0 Superstructure

4.1 Special Foundations

A geotechnical engineer shall provide a thorough subsurface exploration program for all new construction projects. The Designer shall determine the number, locations and depth of soil borings, or other similar tests required to establish a reasonable estimate of the elevation of bearing strata or depth of the foundation system. Based on the findings of the soil exploration program, and the recommendations of the geotechnical engineer, the Designer shall recommend a shallow foundation or one or more available types of deep foundation systems that are deemed feasible. The designer will also estimate the footing and tip elevations of pilings or bottoms of drilled shafts. The foundation system report shall include the geotechnical engineer's estimate of the properties of underlying rock, location and characteristics of ground water and subsurface conditions which may require increase the cost of the foundation.

5.0 Interior Layout and Construction

5.1 General

Entry/Lobby

- Provide an air lock or vestibule at each entrance to the building for energy conservation purposes and thermal comfort.
- Exterior double doors must have removable mullion.

Public Restrooms

- Be mindful to break sight lines through doors and mirrors.
- Provide large volume waste cans for paper towels.
- Provide a recessed book/backpack shelf in each restroom.
- Restroom partitions should be floor mounted, overhead braced and comprised of ½" solid phenolic or stainless steel.
- Ceramic Tile should be used on the floors and walls.
- Refer to Section B,8.5 for water heater and floor drain information.
- Paper towel, toilet tissue and soap dispensers typically will be provided and installed by UNT.

Breakrooms

- Flooring shall be hard surface (e.g., VCT, ceramic tile, exposed concrete). No carpet, unless approved by University.
- Provide taps from sink water supply for icemaker and coffee makers. Installation of these items will be outside of construction contract, unless otherwise specified by Owner.
- Add GFI outlets for coffee makers and microwaves.

Ceilings

- No gypsum board ceiling unless prior written approval by owner.
- Ceiling should be a standard 2' X 4' lay-in in tile. Use Armstrong 1729 Fine Fissured, non-directional, humidity resistant *HumiGuard Plus* and *BioBlock* paint for mildew and mold resistance.
- Grid should be 15/16" Exposed Tee system.

Ceiling Fans

- Ceiling fans are no permitted.

Wall Construction

- The specifications for dry wall and metal studs is as follows: 3 ½'' studs on 16'' centers, 16 gauge with 5/8'' sheetrock.
- All metal store front frames are 4'' wide.
- Metal door frames are for a 4 7/8'' set up for 3 ½'' metal stud with 5/8'' sheetrock on both sides.

Building Plaque

- For new buildings, provide a cast bronze dedication plaque. The Designer shall provide an appropriate setting for installation of the memorial plaque. The University will furnish the exact wording and specifications for the plaque provided by the contractor.

Corridors

- Provide recesses in corridors for drinking fountains, telephones and paper recycling containers.
- Provide durable finish materials in recesses that will withstand repeated scrubbings.
- Provide corner guards at all outside corners in high-traffic areas.

Changes in Level

- Avoid split levels floors, depressions or elevated floor sections.

5.2 Space Organization

- In a typical multi floor academic building, the heaviest traffic, classrooms and open computer access labs, should go on the ground floor, while teaching labs would occupy intermediate floors, and research labs or other light traffic spaces such as offices, etc. occupy the top floors
- Basements are generally discouraged. No mechanical basements. Outside on grade access to large mechanical rooms is highly desirable

5.3 Office Standards

- Over the course of time, UNT has developed functional standards with regard to size of newly created offices in conjunction with our own experience and the recommendation of the Texas Higher Education Coordinating Board. Although we recognize that hardwall offices are preferred by most users, modular wall systems provide the benefit of future flexibility to accommodate growth and change*. Our recommendations for modular offices are indicated in the chart below.

Personnel	Office Size Designation	Modular Office Systems	Hardwall Offices	Square Footage Range
Clerical Staff	"A"	Yes*	No	50-60 s.f.
Faculty/Staff	"B"	Yes*	Yes	125-135 s.f.
Dept. Chair or Equivalent	"C-1"	Yes*	Yes	140-170 s.f.
Dean or Equivalent	"C-2"	Yes*	Yes	170-220 s.f.
Vice President or Equivalent	"D"	No	Yes	250-300 s.f.

*Modular office systems are typically based on a 3' to 4' module. Worksurfaces should not exceed 48" in length.

- See Appendix G, Figures 23-27 for typical office layout corresponding to each office size.
- See Appendix G, Figure 28 for various typical office storage cabinet layouts.
- No office will be designed to include interior windows except as approved by the University.
- Where hardwall offices are required, shelving may either be wall hung system furniture or wooden shelving mounted on shelf standards. Refer to Appendix G, Figure 29 for wooden shelving detail.
- All offices should be provided with 3-4 duplex outlets and 1 voice/data outlet.
- Offices should be grouped together rather than dispersed in isolated groups

5.4 Classrooms

UNT Classroom Support Services (CSS) Group is responsible to maintain General Use Classrooms (type 110). However, the Designer will be responsible to plan for all the necessary requirements, e.g., electrical, data, etc. Project Manager will provide the Designer with the latest CSS Classroom requirements and Audio/Visual Equipment design criteria.

Classrooms other than General Use Classrooms should generally comply to the same standards.

Classroom access at the rear is preferred.

UNT Center for Distributed learning (CDL) is responsible for providing design services to all classrooms or any other rooms equipped with Video Conferencing capabilities (see Appendix D). The Designer is responsible for coordinating all necessary electrical and data requirement with CDL.

5.5 Custodial Closets

Provide one Basic Custodial Closet for every 6,000 square feet of useable building floor space (or portion thereof) with at least one custodial closet per floor. This space is for the exclusive use of housekeeping staff. Do not locate plumbing, mechanical, or electrical equipment in this room. Locate these rooms throughout the building to avoid moving equipment long distances. The following should also be provided:

- Custodial closets shall be a minimum of 90 square feet and shall be equipped with a 3'0" minimum door that opens out.
- Floor mounted porcelain service sink with hose bibb, 3'0" x 3'0" with 4" to 8" sides.
- Reinforced Hot and Cold water faucets, 30" above the bottom of the service sink.
- Three or more wet mop hooks or clips arranged to permit dripping of wet mops into sink basin.
- Three or more dry mop and dust mop hooks or clips on wall opposite sink basin.
- A minimum of 2 GFI duplex electrical outlets located near the corridor door and 18" above the ground.
- A floor drain, with the entire floor sloped a minimum ¼" per foot, to the floor drain.
- Floors shall be sealed concrete or other approved finish.
- Wood shelving on wall above service sink, shelves shall be 12" deep on adjustable heavy duty standards and brackets. First shelve shall be 24" above the floor. Top shelve shall be 18" below the ceiling. At least 15" of adjustable shelving.
- No other services shall be located in the custodial closet. No electrical panels, pipe chases, entrance doors adjoining rooms, telephone switchgear, elevator panels, water heaters, or similar equipment.
- Lighting shall be 30 footcandles, flush in ceiling.
- Provide positive ventilation, e.g. exhaust fan.

- Custodial closets shall be located on all floors throughout the building and always open to the main corridors. They should not be located in machine areas, restrooms, utility chases or utility corridors.
- Wall finish should be FRP, epoxy paint or other approved finish to 48" AFF and 24" past the floor sink.

5.6 Hazardous Materials Room

All buildings used for laboratory research shall have a room designated for use by the Risk Management Office for short-term storage of chemical and radioactive waste. Design the room in accordance with NFPA 30 for an inside flammable storage room to provide for spill containment, classified wiring, automatic sprinklers, fire rated walls, exhaust ventilation, etc. The size of room is dependent on the size of the research building and nature of anticipated research projects – a floor area of 70-100 square feet is typical. Whenever possible, locate the Hazardous Materials Room near or accessible to the loading dock.

5.7 Mail Service Facilities

Department office suites usually require a series of mailboxes located in the department suite. The Designer will determine exact requirements with Users.

5.8 Mechanical & Electrical Equipment Rooms

Size mechanical and electrical equipment rooms to accommodate the building's mechanical and electrical systems and allow maintenance personnel easy access. Locate transformers, boilers, pumps, tanks, heat exchangers and other large equipment to permit easy servicing, operation and removal. Provide adequate circulation areas around equipment, including valves and accessory piping. Mechanical rooms may be entered directly on grade from the outside or from public corridors. Steps leading to mechanical rooms are not permitted.

5.9 Recycling Alcoves

Every building containing more than 10,000 square feet of useable floor space shall have a recycling alcove. This space is used exclusively for the storage of recycling equipment and material. Locate this area on the ground level, near the loading dock or service entrance. The minimum acceptable size of this area is 40 net square feet.

Architect shall design recessed areas within mail circulation paths that will also accommodate recycling containers wherever possible.

5.10 Telecommunications (See also Appendix B)

There are basic building elements required for the development of a telecommunications system. These elements must be incorporated into the building design. See Appendix B for an explanation of these elements.

NOTE: Telecommunications rooms (TRs) differ from equipment rooms (ERs) and entrance facilities in that they are generally considered to be floor-serving (as opposed to building- or campus-serving) spaces that provide a connection point between backbone and horizontal distribution pathways. TR design should consider incorporation of other building information systems in addition to traditional voice and data needs, such as community antenna television (CATV). TRs provide an environmentally suitable and secure area for installing: Cables, Cross-connects, Rack- and wall-mounted hardware, and Telecommunications equipment. The design depends on the size of the building, floor space serviced, occupant needs, telecommunications services used, and future requirements. A dedicated telecommunications distribution facility is necessary because of increased demand for desktop automation, voice and data integration, desk-to-desk information exchange, and integration of the other building systems into the structured cabling systems

These standards apply to all telecommunication installations at the University of North Texas (the University).

These standards are UNT-specific applications of and extensions to the TIA/EIA 569-A and BICSI standards. Where this standard does not specifically address an issue, the TIA/EIA 569-A and BICSI standards should be applied.

Space Allocation

The University's allocation of space for equipment closets will be based on the following matrix. It allows for equipment space requirements to service an immediate need for a designated number of jacks, growth of voice and data jacks and some expansion of services:

Maximum # of Jacks Served	Minimum closet size
400	135 ft^2 with each dimension a minimum of 10 ft.
200	75 ft^2 with each dimension a minimum of 7.5 ft.
96	6'x8'
48	5'x8'

The above requirements are sized to provide significant growth capacity such as might occur during normal future expansion of the network or deployment of new equipment to provide additional services. After initial installation, the number of faceplates serviced from a closet may increase. However, this increase will not be permitted beyond the capacity of equipment or racks which may be installed in a room according to the above guidelines.

If practical, each floor should have its own telecommunications closet and the telecommunications closets should be vertically stacked.

In some cases, it may not be feasible or economically viable to have a telecommunications closet on each floor. In such cases:

- A telecommunications closet will only be permitted to service one floor above and one floor below its location, in addition to the floor on which it is located.
- If a telecommunications closet is used to service more than one floor, it should service not more than 100 faceplates.

Telecommunication Closet Requirements:

All Telecommunications Closets shall have direct access to the hallway or other such corridor.

Each wall of the closet will have ¾" fire retardant plywood installed. If fire rated plywood is not available then the plywood shall be painted with at least two coats of fire resistant white paint.

In new telecommunications closets there will be three (3) dedicated, isolated, grounded 20-amp quads at eight feet (8') high. There will be standard 20-amp duplex receptacles at eight foot (8') intervals around the closet, which is the standard height.

Environmental control systems standards for equipment rooms

A. The air conditioning used to cool the communications closets will be dedicated to that function and will be separate from the air conditioning for the rest of the building. It may consist of one or more units and will be of sufficient capacity to cool the projected amount of equipment for the supported closet(s) plus a growth factor of 40%. HVAC sensors and controls must be located in the equipment room and should be located 5 feet above the floor. Cold air must be introduced to the room at floor level. Return air will be eight feet (8') AFF. The BICSI Manual HVAC OPERATION states:

B. "Telecommunications equipment usually requires the HVAC system to function properly at all times (24 hours per day, 365 per year). In all nonscientific buildings provide a standalone HVAC unit with independent controls for the equipment room. If an emergency power source is available in the building, connect the HVAC system that serves the equipment room to it."

C. The telecommunications distribution designer must consider the HVAC requirements of each piece of equipment that will be placed in the equipment room. The final equipment room design must accommodate any special or specific requirements. However, typical equipment requirements can be used as general guidelines until specific equipment requirements are known.

D. Temperature and Humidity Requirements
   - Closets that do not contain active equipment:

Temperature Range: 10 degrees C to 35 degrees C (50 degrees F to 95 degrees F). It is preferable that temperature be maintained to within plus or minus 5 degrees C (plus or minus 9 degrees F)
Humidity: Below 85% relative humidity.

- Closets that contain active equipment:
  Temperature Range: 18 degrees C to 24 degrees C (64 degrees F to 75 degrees F).
  Humidity: 30% to 55% relative humidity.

E. Heat Dissipation should be 750 to 5,000 BTUs per hour per cabinet (One ton of cooling equals 12,000 BTU).

F. HVAC sensors and controls: must be located in the equipment room. Ideally, the sensors are placed one and a half meters (1.5m), or five feet (5') above the finished floor.

Communications closets shall be equipped with smoke detectors. Any sprinklers in communications closets shall be installed such that both the sprinkler system and the smoke detector are triggered before water is discharged in the closet.

Communications closets should have removable grid ceilings without any insulation above them.

Each telecommunications closet will have a minimum number of three four inch (4'') sleeved core holes between floors. Empty core holes will be properly fire-stopped with intumescent fire pillows until they are needed. If a closet serves spaces on other floors core holes must also be provided to enable access from the wiring closets into the ceilings above the floors they serve. A vertical cable pathway passing through a room must also be protected by a conduit or furr out.

The cores of the locks for communications closets shall be converted to the standard for the University's communications closets before any communications equipment is installed in it.

All telecommunications Closets shall be equipped with a grounding bus bar that is tied back to the building's grounding system per TIA/EIA 607. All metal racks, ladder ways and network/telecommunications equipment will be properly grounded per TIA/EIA 607 standards for large systems and NEC 1999 guidelines and procedures.

Wiring requirements:

Telecommunication cabling is usually provided by Owner's independent contractor outside of construction contract, though some projects may require the installation of telecommunication cabling package as part of the project scope. See Appendix B.

For new construction, wiring upgrades or installations, the University will not permit the installation of cable that is not appropriately rated for use in space that is designed as a return air plenum.

After deactivation resulting from a regularly scheduled remodel or systems upgrade, the University will not permit non-plenum rated cable to remain in any space designed as a return air plenum.

Cable Trays and Pathways:

All cable tray pathways must be free and clear of all obstacles, such as sprinkler systems' ducts and pipes, electric conduits, electric motors, a/c ductwork, ventilators, fluorescent lights, etc. There will be 12 inches (12'') of clearance above, below, and to each side of the cable tray. The type of cable tray to be used is FLEXTRAY. The cable tray will be installed via FLEXTRAY Specifications. On certain projects, the use of J-hooks may be approved as an exception.

One inch electrical conduit shall be used to connect the wall outlets to the space above the ceiling and shall include a pull string for pulling cable through it. A maximum of eight (8) cables will be pulled through a single conduit.

For wall outlet locations, single gang boxes should be installed if the projected number of voice and data cables is four or less, and double gang boxes should be installed if the projected number is between five and eight. A single conduit may serve both single gang and double gang boxes.

Jurisdiction:

The Director of System Planning and Development will determine the applicability of the appropriate TIA/EIA and BICSI standards for each individual project. The Director of System Planning and Development and the Director of Network and Communications Services will consult with regard to any recommended variations to the above. Any variation from these standards will require the approval of the Director of System Planning and Development.

5.11 Building Address

New building addresses for the Denton campus will be established by Denton County 911 and coordinated through the UNT Facilities Senior Construction Manager.

5.12 Room Numbering

Each interior space, including mechanical equipment rooms and custodial closets, is given a unique room number with the sequence of these numbers such that it shall aid a visitor's orientation within the building. This room numbering system is 100's for the first floor, 200's for the second floor, etc. Suites of rooms will all have the same number with a letter suffix, for example 206A to 206Z. UNT will establish room numbers. The Designer is required to coordinate during the Design Development Phase prior to committing numbers to paper. Once the room numbering system is established during the Design Development Phase review, it may be modified thereafter. The room numbering system on the construction documents will match final room signage.

5.13 Temporary Egress

Provide a temporary means of egress when a building addition or renovation project involves temporarily eliminating or closing an existing required means of egress. Obtain prior agreement from UNT through the Project Manager before closing any existing means of egress.

5.14 Laboratory Buildings

All laboratories using hazardous materials must be designed in accordance with the applicable sections of one of the following standards:

- NFPA-45 "Standard on Fire Protection for Laboratories Using Chemicals"
- NFPA-56 "Standard for Laboratories in Health Related Institutions"

All laboratory buildings should have conveniently located flammable liquids storage rooms designed in accordance with NFPA-30. Provide laboratory units using flammable liquids or acids with an approved flammable liquids storage or acid cabinet, as required.

Provide laboratory buildings with conference rooms or break rooms on each floor for laboratory and housekeeping personnel to take coffee or lunch breaks.

5.15 Asbestos in Buildings

The University's Risk Management Office conducts surveys and maintains records describing the extent of asbestos in campus buildings. Address materials containing asbestos in all renovation projects. It is the responsibility of the Designer to assess the existing conditions and to make recommendations to the Owner and the appropriate agencies having jurisdiction regarding corrective action.

Perform all demolition or renovation work which involves the removal or disturbance of asbestos containing fire proofing, finish material, insulation or other material containing asbestos in strict accordance with approved State Asbestos Abatement Procedures. Asbestos removal contractors must be on the latest approved list from the State.

5.16 Interior Signage

The Designer is expected to comply with UNT Interior Signage standards (See Appendix F) while preparing the required signage drawings and specification. This work is to be considered as part of the Designer's basic scope of work unless stated otherwise in the Owner-Designer contract agreement. The signage package should include all materials, labor and installation of all components including graphics, bulletin boards and building directories. Signage submittal should include a schedule and floor plans for review by UNT.

6.0 Finishes & Equipment

6.1 Selection and Procurement

The Project Manager will coordinate the review and approval of interior issues. The University requires a review period for all interior finish selections. Upon receipt of approvals or revisions, the Architect shall incorporate this information into the Construction Documents. As a general rule, custom designed colors and interior design finish materials are discouraged due to the difficulty in replacement during maintenance and repairs.

6.2 Floor Materials

When selecting or recommending any flooring materials, factors to consider are: safety, maintenance and future repairs or replacement. Painted or rough brick floors are not permitted.

- Vinyl Composition Tile
  Use commercial grade with 'through pattern' vinyl chip construction.
- Sheet Vinyl Flooring
  Use commercial grade, acid resistant with integral base sheet vinyl flooring.
- Ceramic Tile
  Use ceramic tile on shower floors. Restroom floors shall be ceramic tile or terrazzo. No custom colored ceramic tile is permitted. All ceramic tile floors shall have a ceramic tile base with an acid resistant grout. The grout on the floor should be a medium range color.
- Floor Mats area
  Provide slip resistant hard flooring material at all exterior entrances. Coordinate material with UNT Project Manager.
- Carpet
  All carpet is part of the construction contract and specified by the Designer. Consider only contract, commercial grade carpet. The University has standard carpet specifications and a list of the major manufacturers' carpet lines that meet the specifications. The Designer is not required to use the Owner's list of manufacturers, however, the carpet must meet the specifications and ADA requirements.

  No solid color field carpet will be permitted. Selections shall be made from manufacturers' standard product line – no customs. The Designer is requested to minimize the number of carpet types and colors. Solution dyed/yarn dyed preferred – no piece dyed goods. Minimum 10-year wear warranty required.

  Modular carpet is preferred. Broadloom may be used with prior approval.

  Roll goods (broadloom) shall have a minimum of 18-20 tuff bind with branded yarn, nylon, and minimum 28 oz. per square yard. Cut pile broadloom carpet is not permitted. Installation shall be direct glue down. Modular carpet tile to be a minimum 20 oz. per square yard, same yarn specifications as twelve foot (12') goods. Direct glue carpet..

- Wall Base
  Unless otherwise approved, wall base shall be rubber 4" high cove type base – no straight base. No pre-formed molded pieces. Light colors are not preferred.

6.3 Interior Wall Finishes

Do not use wallpaper. Fabric wallcovering is permitted in special areas only. All wood paneling and acoustical wallcovering shall be Class "A" fire rated for vertical surfaces. The flame spread ratings of walls and ceilings shall comply with NFPA 101 -Life Safety Code.

Interior Paint Standards

- UNT maintains a current list of approved standard paint colors. Contact Project Manager for the current list.
- When selecting specific colors that will identify location of image, be mindful of guidelines referenced in Section B, 1.15.
- Paint should be Sherwin Williams or an approved manufacturer of equal quality. When specifying interior paints, refer to the requirements below for the sheen (or equivalent):

  Offices: "Harmony" eggshell
  Trim: "ProClassic semigloss
  Corridors and Classrooms: "Harmony" semigloss

6.4 Exterior Painting

Traditionally, the palette of color on the exteriors of buildings throughout the campus is derived from the use of "UNT Blend" brick and light-colored stone, stucco or trim. When selecting specific colors that will identify location of image, be mindful of guidelines referenced in Section B,1.15. All exterior color of buildings needs approval by the University.

Paint or factory finish exterior fixtures and containers, such as lamp posts, bicycle racks, railing, bollards, posts, barriers, drinking fountains, street signs, trash receptacles. UNT to approve all color selections.

Exterior equipment, such as air conditioner compressors, mechanical equipment and the like, may be required by the University to be painted. UNT to approve all color selections.

6.5 Painted Curbs in Parking Lots

Any changes in the parking lot configuration must be coordinated and approved by UNT. The following are the type of spaces, the color and identification that will be required for any curbs painted in the parking lots:

Space Type	Colors	Stencil
"A" Parking	Dark Green curb / White letters	LOT # - 1-A – 1
"D" Parking	Dark Blue curb / White letters	D – PERMIT
Visitors Parking	White curb / Black letters	VISITOR PARKING
Handicap Parking	White curb / Black letters	HANDICAP PARKING
Service Vehicles	Black curb / White letters	SERVICE/STATE VEHICLES ONLY
Motorcycle Parking	Black curb / White letters	MOTORCYCLE PERMIT
Residents Parking	Orange curb / Black letters	R – Permit
Premium Parking	Dark Gray curb / White letters	P – Permit

6.6 Safety Color Coding

The University recognizes the following general safety color coding system for all items except pipe identification. (Colors are stated in terms of OSHA Safety Color Designations.)

Type of Hazards	Color Identification
Fire protection equipment, containers of flammable liquids, lights at barricade obstructions, and stop bars or switches on machinery	Safety Red
Caution/physical hazard	Safety Yellow
Caution/radiation hazard	Safety Yellow on Black
Dangerous parts of machinery	Safety Orange
Caution/equipment under repair	Safety Blue
Safety/first aid equipment	Safety Green
Traffic and housekeeping markings	Black and white

6.7 Pipe and Duct Identification

Completely paint piping systems in mechanical rooms with the applicable colors listed below with appropriate self-sticking or strap-on identifications and arrows indicating direction of flow. Piping and ducts in chases above ceilings, etc. should be color banded and have stencil markings at appropriate intervals. On straight runs of piping, space marking no further than 30 feet apart. Stencil identifications, color bands, and direction arrows should be placed near each valve, pressure reducing valve, heat exchanger, etc. When a pipe passes through walls or floors, mark near the penetration on both sides. Provide markings at each directional change of all piping systems. Mechanical room pipe color and the colors of bands are as follows:

GENERAL:

Piping System	**Sherwin Williams Color Reference #**	**Color**	**Stencil Identification**
Water, Chilled Supply	866(Rustoleum)	Marlin Blue	CWS
Water, Chilled Return	866(Rustoleum)	Marlin Blue	CWR
Water, Cold Domestic	BM 78-8-BXK-769	Dark Green	DOM CW
Water, Distilled	BM 80-12-BW-1129	Slate Gray	DSTW
Water, Condenser to Cooling Tower	933 (Rustoleum)	Fed. Safety Green	CT
Water, Condenser to Condensers	933 (Rustoleum)	Fed. Safety Green	CC
Water, Hot Domestic	BM 1-8-BK-9	Red	DHW
Water, Hot Domestic Recirculating	BM 11-8-BXK-207	Orange	DHWR
Water, Hot Heating	BM 80-21-BW-1121	Light Gray	HWS
Gas	BM 80-8-BX-957	Black	GAS
Air	BM 80-14-BX-949	Dark Gray	AIR

Nitrogen	BM 80-19-BW-1139	Pastel Gray	
Helium	BM 80-19	Pastel Gray	
Hydrogen	BM 80-8-BX-957	Black	
Vacuum	BM 73-26	Beige	VAC
Chemical	OSHA Yellow BK-247	Yellow	
Sprinkler	Safety Red	SPKR	
Fire Line	Safety Red	FIRE	
Ductwork	Light Gray		
Supports, Hangers	Black		

RESEARCH PARK:

Piping System	**Sherwin Williams Color Reference #**	**Color Name**	**Stencil Identification**
Water, Chilled Supply	A88W00053	Safety Blue	CHWS
Water, Chilled Return	B42W000113	Calico	CHWR
Water, Cold Domestic	B54T00104	Dark Green	DCW
Water, Distilled	BM80-12-BW-1129	Slate Gray	DSTW
Water, Condenser to Cooling Tower	B54W000101	Aspen Green	CWS
Water, Cooling tower to Condensers	B54W00113	Green	CWR
Water, Hot Domestic	BM1-8-BK-9	Real Red	HDCW
Water, Hot Domestic Re-circulating	SW6599	Begonia	HDCWR
Water, Heating supply	Y16R00058	Safety Red	HWS
Water, heating Return	Y38T000154	Vibrant Pink	HWR
Natural Gas	SW6903	Safety Yellow	GAS
Compressed Air	A88W00053	Prussian Green	Compressed Air
Nitrogen	SW6088	Tan	N02
Helium	BM80-8-BX-957	Black	Helium
Hydrogen	BM80-19	Pastel Gray	Hydrogen
Vacuum	SW6309	Charming Pink	VAC
Chemical		Hispano	
Sprinkler	A86W00053	Tuscany Blue	Fire Protection
Fire Line	A86W00053	Tuscany Blue	Fire Protection
Ductwork	SW6068	Coffee Brown	Ductwork

Pipe identification should contrast in color to the pipe colors and be easily readable. The width of color bands should be equal to the size of the stencil indicated below:

For insulated pipe systems, stencil sizes are as follows:

Pipe diameter	Stencil Letter Size
Less than 1 inch	1 inch
1 inch - 2 inches	2 inch
2 inches - 6 inches	3 inch
Greater than 6 inches	4 inch

For uninsulated systems, stencil sizes are as follows:

Pipe Diameter	Stencil Letter Size
Less than 1 inch	1/2 inch
1 inch - 2 inches	1 inch
2 inches - 6 inches	2 inch
Greater than 6 inches	3 inch letters

Identify at each floor level and roof level each exhaust air duct from safety cabinets and fume hoods by two-inch (2") wide painted black bands and lettering identifying the specific type of safety cabinet or hood (fume hood, perchloric acid hood, etc.). Abbreviations may be used but need to be itemized.

Pipe identification standards at Research Park vary from campus standards. Coordinate with the Project Manager.

6.8 Window Covering

Unless specified building requirements or design context differ, the University standard for windows exposed to direct sunlight is 3 inch vertical blinds. The Designer shall specify blinds. The general contractor shall purchase and install them as part of the general contract.

6.9 Elevators

New buildings should have a minimum of two passenger elevators, with one adequate to serve deliveries to the upper floors. Design all passenger elevators to meet the ADA and Texas Accessibility Code . Except in unusual situations, elevators are not designed for exclusive use as freight elevators. If the building size and nature is sufficient to justify a passenger elevator near the front of the building and a freight elevator at the service entrance to the building, the designer is encouraged to do so.

Design elevators and elevator machine room equipment to provide smooth and quiet operation. Isolate sounds and vibrations from the building structure.

Shunt-trip shut-off devices are not permitted.

Design elevators to return to the ground (exit) floor upon activation of fire alarms.

Provide an electrical receptacle in the corridor on each floor adjacent to the elevator landing for housekeeping purposes.

See Policy on Elevator Shunt-Trip Devices in Appendix G, Figure 30.

6.10 Elevator Controller

In addition to normal elevator specifications, the following must be included:

The elevator power controller shall utilize a microprocessor based logic system and shall comply with ANSI/ASME 17.1 safety code for elevators. The system shall provide comprehensive means to access the computer memory for elevator diagnostic purposes without the need for any external devices, and shall have permanent indicators to indicate important elevator statuses as an integral part of the controller. All diagnostics shall be non-proprietary. Systems that require hook-up of external devices for trouble-shooting and adjusting are not acceptable.

6.11 Elevator Equipment Rooms

Provide convenient access to pits and equipment rooms. Do not use elevator equipment rooms for access to roof or other parts of the building. Access to elevator equipment rooms is not permitted through housekeeping or other such space. Provide each elevator pit with either a drain or sump pump as necessary to remain clear and dry. If a sump pump is provided, control by a float switch. Each elevator pit shall have a work ladder and a light installed with the switch easily accessible from the door.
The elevator pit shall be acid etched and finished with one coat thinner 50/50 and then one unthinned coat of gray porch and deck synthetic enamel.

Elevator equipment rooms shall have sufficient ventilation or cooling to limit the maximum temperature in the space to 90 degree F. If exterior supply air is provided, filter the intake. Ventilation fans should be sidewall mounted if possible. If necessary to install roof mounted fan, install a permanent ladder for access.

The elevator mechanical equipment room shall have fluorescent fixtures mounted above, in front of, and behind all control circuit panels. Provide adequate lighting for the hoist machine.

If elevator mechanical equipment room for a traction elevator is located on the bottom floor, provide fluorescent lighting at the top of the hoistway with a work platform, a light switch and adequate access.

Provide a safely accessible ladder and platform for any mechanical equipment room above roof level.

The penthouse, where necessary, shall have a minimum seven foot (7') ceiling and shall have sufficient ventilation or cooling to limit the maximum temperature in the space to 90 degree F. If exterior supply air is provided, filter the intake.

6.12 Door Hardware

Door Closers

- All door closers will be supplied by L.C.N. only, and the two series to be used are the 4040 and 1461. The 4040 series is for hollow metal, solid wood doors, and exterior wide style storefront doors. The 1461 series is for interior storefront narrow style doors.
- Finish to match frame, unless otherwise specified.
- Installation will meet all factory specifications and provide positive latching of locking hardware and the smooth operation of the door.

Exit Devices

- All exit devices will be Von Duprin 99 or 33 depending on style of door.
- Trim style to be NL-TP, unless otherwise specified.
- Finish to be 26D, unless otherwise specified.
- Installation should meet factory specifications, using proper fastening devices, thru bolts and screws to install device. Shall be installed to provide positive latching and proper function of trim.

Cylindrical Locksets

- Best 93K heavy duty grade one, lever lockset.
- Function specified by Owner.
- Finish to be 26D, unless otherwise specified.
- Installation should meet factory specification and provide positive latching and function of hardware.

Cores

- All cores shall be Best Kaba Peaks to match University system, unless otherwise specified.
- Keying of cores shall be performed by Best Access Systems.
- Keying instructions shall be provided by UNT.
- 7 pin construction cores shall be provided during construction.
- Owner will install all permanent cores.
- Lever style type to be #16 (curved no return), unless otherwise noted.
- Rose Style to be type D (3" convex-no ring), unless otherwise noted.

Card Swipe Lock Sets

- For stand-alone card access systems, use Locknetics Model CM-5196-MGK.
- Any hardwired card access system at the Research Park must be connected to the DSX system.
- On the main campus, a standard hardwired card access system has not yet been established and is under review by UNT.

7.0 Furniture and Equipment

7.1 Furniture Selection and Procurement

UNT Facilities is responsible for the selection, specification and procurement of project furniture for all projects. Every effort is made to coordinate furniture issues with the Designer during all phases of the project, especially during the Design Development and Construction Document phases. The Designer shall provide final floor plans to the University for the preparation of furniture layouts. See Appendix G, Figure 23-28 for typical furniture configurations.

7.2 Furniture Coordination

Prior to the completion of the Construction Documents, UNT Facilities will be given an opportunity to review and coordinate all furniture layouts with the building systems including thermostats, electrical outlets or junction boxes, lighting, telephone and data outlet locations.

7.3 Power Clusters at Private Offices

Power clusters at private offices shall be located within 36'' of corner opposite door.

7.4 Modesty Panels on Modular Furniture

Where modular furniture “casegoods” rest against hard walls, partial-height modesty panels must be specified for power and telecommunication access

7.5 Fixed Equipment

Designer shall coordinate infrastructure, space and code requirements for any Owner provided fixed equipment (such as lab equipment, sterilizers, dishwashers, ice machines, etc) that will require hard wiring or plumbing connections.

7.6 Moveable Equipment

All other moveable equipment, such as microwaves, refrigerators and centrifuges, are purchased and installed by the University.

8.0 Building Service Systems

8.1 General

Install all piping, conduits, etc. in the ground adjacent to buildings parallel to, or perpendicular to, the building construction. Independently support all equipment, conduits, piping, etc. from building construction.

8.2 Energy Conservation

Energy conservation is an essential factor in the design and development for all new construction and renovation projects. For all new construction and major renovation projects, the ASHRAE/IES 90.1, latest edition, “Energy Code for Commercial and High Rise Residential Buildings” shall serve as the minimum acceptable standard for the design and specification of materials and equipment.

In the design of HVAC and electrical systems, consider different building utilization during various seasons or times of the day – plan for conservation of energy during summer and winter vacations and for other periods of minimum occupancy. For example, research laboratories and spaces for animals (and other spaces which might require operation 24 hours per day) should be served by systems separate from offices (which might operate only 10 hours a day) and classrooms (which might shut down during summer and vacation periods).

The HVAC Designer should consider waste heat recovery, the utilization of outside air for cooling and the use of enthalpy controllers whenever possible. The Designer should use the pulse width modulation (PWM) type of adjustable frequency fan drives for variable volume systems.

Design electrical lighting systems for maximum efficiency consistent with required minimum lighting levels. Use natural lighting to the maximum extent practical.

Use energy efficient motors for all motors 1 HP and above.

8.3 Central Utility Distribution System

The UNT Central Utility Plant maintains and operates a hot/cold water distribution system serving part of the University campus. All new facilities, and all expansion of existing facilities, shall utilize this district heating system whenever possible.

GPM	LENGTH (ft)	PIPE SIZE
0-150	0-400	4”
150-250	0-200	4”
	200-1000	6”
250-600	0-250	6”
	250-1000	8”
600-1000	0-400	8”
	400-1000	10’
1000-1500	0-500	10”
	500-1000	12”
1500-2000	0-800	12”
	800-1200	14”
2000-4000	0-500	14”
	500-1000	16”

The designer shall consider the following items when preparing the bridge performance table:

- Average return temperature from all building loads at design conditions (Designer must calculate this value). This average return temperature will be the set point for TCVA. A return temperature of 59° F is preferred and 55° F is the minimum acceptable return temperature.

- Supply temp for all building loads at design conditions (Designer must calculate this value). The supply temperature must not be less than 45° F. A separate interface must be provided if specific equipment needs a lower supply temperature.

- Total flow for all building loads at design conditions (designer must calculate this value).

- Distribution system supply temperature (from Chilled Water Engineer).

- CHW flow in distribution system branch connections to building at design conditions (Designer must calculate this value).

- Pressure differential across the distribution mains at the point where the branch lines to the building are connected (from Chilled Water Engineer).

- Flow head loss due to piping in the branch lines between the distribution mains and the chilled water bridge bypass tees at design conditions (Designer must calculate this value).

Ex: Bridge Performance Table	
Building CHW design return temp	59 degrees F
Building CHW design supply temp	45 degrees F
Building design CHW flow	545 GPM
Distribution system supply temp	42 degrees F
CHW Bridge flow	449 GPM
Press differential at mains	Max: 20 psi Min: 5 psi
Pipe flow resistance from mains to bridge bypass tees at CHW Bridge flow	3 psi

The bridge return temperature control valve table shall have the following information:

- Column 1 shall be percent of valve rotation with increments of 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%.

- Column 2 shall be the percent of design bridge flow at the rotation indicated in the first column and additional conditions in columns 3-5.

- Column 3 shall be the piping pressure loss that develops in the branch lines due to water flow at each increment of valve travel (based on item 7 above).

- Column 4 shall be the pressure drop across the control valve.

8.4 Building System

The building system includes all hot/chilled water piping in the building, water pumps, cooling coils, heat exchangers and other equipment using hot/chilled water. The Designer must consider the following when designing the building hot/chilled water systems:

- The total head requirement for the building system must not exceed 50 feet at design flow.
- The cooling coils and heat exchangers must be designed for variable flow, constant temperature differential.
- The building pumps must be selected for the building system head and flow requirements. Variable volume pump is recommended, particularly in buildings with large cooling loads.
- The control valves and control systems on equipment served by the chilled water system must be capable of accurate low load control and close off across the building pump shutoff head. The shutoff head requirements can be lowered if a variable volume pump is used.

- In a building that has several types of cooling loads, the design and operation of one type of load shall not have a negative impact on the operation of another type of load under the full range of expected loads.
- Designer to be aware that Denton water pressure is maintained at lower pressures than other cities in the metroplex and that a booster will be required on any multiple story building design.

8.5 Plumbing Systems

The following statement is to be added to all bid specifications in regards to plumbing work performed: "Any person performing plumbing work on UNT property will have a current State of Texas Plumbing License."

Access Panels

- Provide adequately sized access panels to pipe chases and to valves above ceilings or otherwise concealed. Plaster or gypsum board ceilings under rooms which have reasonable possibilities of water in them, such as rest rooms with floor drains, will have access panels.
- Install laminated plastic identification signs on the wall immediately below or adjacent to any concealed valve unless its location is obvious (such as immediately above or behind fixture). The sign shall identify type of service (hot water, cold water, etc.) and indicate the location by arrow or legend. Prominently identify fire protection valves at each valve location.

Backflow Preventers

Protect fixture valve outlets with hose attachments, hose bibs, and lawn hydrants with an approved back-siphonage backflow preventer or vacuum breaker on the discharge side of the valve. Each building must have a back flow preventer with a sediment strainer/trap on the water main. The design will be such that the debris can be flushed from the trap without interrupting water to the building.

Cutoff Valves and Unions

All main lines and all hot/cold water lines – especially those serving group toilet rooms – shall have shut off valves for isolation purposes and valves shall be accessible. Furnish accessible water supply cutoff valves where each piece of equipment is connected. Install unions to facilitate removal of traps, valves, strainers, etc.

Domestic Hot Water

Domestic hot water heater should be electric. UNT uses small 1-5 gallon heaters or instant heaters at point of use (i.e., restrooms, break rooms, custodial closets). Circulating domestic hot water heaters are discouraged, but may be required in special areas such as science labs.

Floor Drains.

Provide floor drains in all equipment rooms, custodial closets, rest rooms and locker rooms with floors sloped to drains. Floor drains shall empty into the sanitary sewer. Infrequently used floor drains shall have traps resealed by trap primer from clear water fixtures. Drains of exterior stairwells shall be a drain well with grate type cover.

Public restrooms with more than one station will have a floor drain located under a stall partition.

Safety Showers

Provide emergency eye wash stations and/or safety showers where chemicals harmful to the body and eyes are handled and stored. Provide an audible alarm when the safety shower is activated.

Water Pressure

Anticipated domestic water pressure on top floor of high rise buildings shall be stated. Provide pressure reducing valves in high pressure areas. Due to wide seasonal fluctuations in the City of Denton's water pressure and to allow the building main water tap to be downsized thus reducing tap fees, all of UNT's new construction is to have a house pump, and, if required, a fire sprinkler pump. Pre-design water pressure readings should not be relied upon as the sole source of information regarding normal operating pressure.

8.6 Fire Protection Sprinkler Systems

All buildings will have fire sprinkler systems per applicable codes.

8.7 HVAC Systems

General

UNT will provide Air Balancing outside of general contract. UNT Air Balancing contractor must be provided with plans and specifications at plan review phases. Comments from Air Balancing contractor should be addressed in the same manner as owner's comments. See Section A, 5.3.

Design

A building air conditioning, heating and ventilation system should provide a safe and adequate environment suitable for the functional programs supported by the building as well as providing a comfortable environment for the occupants. Special purpose facilities will require special definition of appropriate interior design conditions.

The central utility plant does not run hot water in the summer. No AC system shall require central plant hot water in the summer. Zero threshold damper boxes with fan powered recirculation of air from the return plenum is highly desirable. Treat all zones as exterior, with heat and cooling capabilities.

Outside winter design temperature is 0° F. for 100% outside air units. Provide preheat coils for air handlers with entering air mixed temperature below 35° F. Locate preheat coils downstream of heat reclaim coils. Size preheat coils with the heat reclaim not operating.

Ventilation Considerations

Re-circulation: The building air conditioning system may re-circulate air from the office, classrooms, and similar areas; however, there must be no reintroduction into the building supply system of air delivered to mechanical rooms, toilet rooms laboratories, or other areas where supply air may become contaminated.

Make-up Air: Provide outdoor make-up air to all occupied spaces, including computer rooms according to ASHRAE Standard 62-1989R "Ventilation for Acceptable Indoor Air Quality".

Location of Air Intakes: The location of air intakes should be remote from sources of pollutants, and the building air intake and exhaust outlets shall be remotely located from each other to prevent contamination. Take special care to ensure that exhausts from hoods, emergency generators, etc., is not pulled into the building through make-up or fresh air intakes. Install hardware cloth on outside of louver to eliminate leaves, debris, etc. from lodging behind louvers, and painted the same color as the louvers.

100% Outside Air: Provisions should be made for use of 100% unconditioned outdoor air whenever ambient conditions satisfy design and humidity requirements.

Energy Management and Control System (EMCS)

A campus wide energy management and control system exists on the University campus for the monitoring and control of electrical, heating, ventilating and air conditioning (HVAC) systems. This TAC Americas based control system serves the University utilities department and has control strategies built into it for electrical, hot and chilled water load shedding required to balance available supply with priority level demand. All new HVAC equipment located at the building level shall be connected to the University's TAC Energy Management and Control System (EMCS) located in the Facilities Main Office building. In order to standardize this System, a guide has been created (see Appendix E).

System Design Requirements:

All terminal units shall be electronic direct digital control (DDC) by TAC (i.e.: box damper controls, reheat coil valves and electronic room sensors).

All air handling units shall have electronic control devices (e.g. chilled water valves, hot water and steam valves, return air, outside air and relief/exhaust air dampers) and be controlled by DDS controllers wired back to a common terminal strip using sensors and wiring specified by UNT. All reheat and preheat converters shall contain electronic control valves controlled by DDC controllers wired back to a common terminal strip using sensors and wiring specified by UNT.

Equipment Location and Access:

Outdoor Equipment Location: For ease of unit maintenance as well as roof maintenance, mount condensers and allied equipment at ground level on concrete slabs appropriately screened with attractive fencing or plantings.

Mechanical Rooms: Whenever possible, place mechanical equipment in mechanical rooms, rather than mounting above the ceiling or in similar locations where access is difficult. Size mechanical rooms to provide adequate space for normal maintenance and change out of components including pulling tubes for converters and hot water generators and coils in air handling units. Provide adequate means of access for replacement of the largest piece of equipment without removing walls. Include doors or panels for maintenance access to plumbing, heating and air conditioning components. Every mechanical room shall have sufficient lighting and duplex convenience outlets to enable maintenance to plug in drop cord trouble lights, operate small tools, drills, etc. Do not obstruct lighting with ductwork and piping – include column and wall mounted lighting as necessary. The room shall be adequately ventilated by a thermostatically controlled fan and shall have a floor drain. Every mechanical Room shall have a minimum of one (1) hose bib.

Equipment Access: Access to major equipment and working platform surfaces for employees shall be convenient and safe. [Note: For large pieces of equipment an industrial stairway may be required in accordance with 29 CFR 1910.24(b).]
Terminal boxes shall be located so that space and access is provided for service and filter change. If fan powered VAV boxes are to be used in ceiling, they should be mounted above entrance doors and access panel at ceiling height.

Do not install fan coil units above ceilings. Provide access for service of unit and filter change. If ceiling mounting is the only alternative, provide recess mounted units. Floor mounted fan coil units shall have sloped tops to eliminate storage on top of units.

All controls (relays, starters, etc.) will be mounted where they are accessible without having to use a ladder.

Condensing Units for Walk-in Boxes:
Install units behind the box in pipe chase, with adequate ventilation provided for air cooled condensing units. Both air cooled and chilled water cooled condenser units are acceptable on University projects.

Refrigerant:
In compliance with EPA requirements, it is unlawful to release Group I or Group II refrigerants containing CFC's (chlorofluorocarbons) and HCFC's (Hydrochlorofluorocarbons) into the atmosphere. This includes the refrigerants R-11, R-12. R-22, and R-500. Modify existing equipment to either contain or reclaim the refrigerants or to replace very old and inefficient equipment. All new equipment must be compatible with more acceptable refrigerants, such as R-123, R-134a, or R-22.

Cooling Towers:
If the budget allows, the UNT standard for cooling towers is a reduced draft, counter flow, field erected cooling tower within a reinforced concrete structure and related accessories. Avoid placing cooling towers or condenser on the roof. Preferred location is on the ground near the mechanical room. If the condenser pump is in the mechanical room, water must gravity flow from the cooling tower to it.
If space or funds are not available for a permanent structure, stainless steel cooling towers are acceptable. Construction should be stainless steel without galvanized or FRP components, although financial conditions may require consideration of towers with components other than stainless steel. Under these circumstances, UNT insists that the hot and cold-water basins must be made of stainless steel. *Evapco, BAC, Marley* are acceptable manufacturers.

HVAC Pumps
All HVAC pumps shall be frame mounted mechanical seal.

HVAC Chillers
Carrier, Trane, and York are acceptable manufacturers.

Refrigerant Monitor will be required
Yokogawa is an acceptable manufacture.
No "motor starters" are permitted to be located above the ceiling.

8.8 Power Distribution

Campus Primary Electric Distribution System
The electric distribution system serving the UNT Campus is operated and maintained by the University through two substations forming a loop to serve the campus. Power is purchased from the City of

Denton at the substations. The primary voltage of the campus electric distribution system is 12,470/ 7,200 volts, grounded Y. It is installed primarily in an underground conduit and manhole system.

All new facilities, facility additions and facility modifications requiring new or modified primary electric system service should be served via the underground duct bank and manhole system. All electric facilities associated with the project, such as duct banks, manholes, cable, transformers and associated materials, are included in the project scope.

The electrical designer shall contact obtain from the UNT the point of service to the project. Provided the contractor taps into the University's distribution system, the cost of electricity for construction and bringing the building on-line shall be born by the University. The capacity of the service conductors from the transformer should provide for the full-connected load plus 25% additional load capacity for future growth.

The design of the electric system for the project should begin at the service delivery point designated by Electric Distribution. The preferred cable size for transformer connections is No. 2 copper 15 kV medium voltage cable (EPR insulated). All system connections, medium voltage cable termination's and splices and the high voltage transformer connections shall be made part of the project by the contractor.

Transformers

The KVA size of the transformer(s) on any project should be based on the diversified KVA demand expected on the transformer(s). Oversizing of transformers is discouraged. Metering should be mounted on the outside of the transformer secondary compartment. Typical secondary voltages from padmount transformers are 208/120 volts Grd Y and 480/277 volts Grd Y. In addition, 120/240 volts single phase and three phase, 208/120 volts three phase and 480 volts single phase are available.

Primary transformers are normally three phase, loop feed, dead front padmount design. Locate padmounted transformers at an acceptable site outside the building, at a sufficient distance from any building opening (door, window or loading dock). Do not locate transformers within or on buildings or within closed spaces. Transformers must be accessible to maintenance personnel and truck-mounted cranes. Maintain at least 10 feet clear distance in front of the transformer for access to the primary and secondary compartments. The 10 foot distance is necessary for hot-stick operation of the terminations and cables. Keep the areas above, around and behind of the transformer free of any obstacles that may interfere with transformer removal or installation. All transformers are to be of a "less flammable" design using an insulating fluid such as R-temp fluid or silicone oil.

Use significant care to ensure that the transformer pads are adequate for the transformers placed on them. Typical difficulties include: a) inadequate openings for the primary and secondary conduits; b) inadequate primary and secondary compartment sizes (width, depth, height); c) improper location of primary or secondary conduits (conduits do not fit the available openings in the transformers).

All transformer installations shall comply with the latest edition of the National Electrical Code, Article 450.

Busways

The University discourages the use of busway in electrical system design from a maintenance standpoint. The use of busway on the line (service) side of the service disconnect is prohibited. Aluminum busway is prohibited.

Computer Room Power

Electrical service for areas used for computers or microprocessors should have:

- Dedicated circuits for computer use only.
- Isolated ground receptacle and wiring to be used in conjunction with dedicated circuits.
- Line isolation and filter transformer provided for small main frame computers.
- For large main frame or real time computers, an uninterruptable power supply should provide the power to critical components even if emergency power is available.

Electrical Outlet Strips at Laboratories

Use only Wiremold 4000 series.

Wireless Atomic Clock

Use Primex as the manufacturer for all wireless atomic clocks.

Emergency Generators

Wherever possible, locate emergency generators in weather-protected space contiguous with the building which the generator serves. Duct generator exhaust to discharge remote from any air intake for the building. Generators shall be air cooled, natural gas powered.

Receptacles

For use with housekeeping floor maintenance equipment, provide a 20 amp, 120 volt electrical receptacle every 30 feet in corridors, on each stairway landing and close to each exterior door. To the maximum extent possible, circuit these receptacles so that more than one piece of high amperage floor maintenance equipment may be operated simultaneously in each corridor.

Conduit

Horizontal runs of conduit are not allowed.

Electrical Boxes

When installing electric outlet boxes in walls and studs, use a box mounting bracket as per Appendix G, Figure 32.

8.9 Interior Lighting

Use fluorescent lighting in most indoor building applications, especially where dimming is not required. Because of its poor efficacy and poor lamp life, use incandescent lighting only where other more efficient sources are unsuitable – prior written approval by owner will be required. In these cases, use improved efficacy sources such as halogen and reflectorized lamps. Avoid the use of chandeliers. Lighting should not exceed an average of 1.5 watts per gross square foot.

Use one voltage exclusively throughout a building. Where 480Y/277V is available use 277 volts for lighting.

Lighting Fixture Types

- For general offices and classrooms where dimming is not required, and all other indoor building applications not mentioned below, use "general use" lay-in fluorescent fixtures. These are 2 x 4 or 2 x 2 fixtures.
- For electronic offices, and similar applications where the occupants will use CRT screens, use "electronic office" lay-in fluorescent fixtures. These are 2 x 4 or 2 x 2 fixtures.
- For all T8 light fixtures use the Philips “F32T8/TL841/ALTO” light bulb model.

Lighting Level Guidelines

Unless safety and security requirements dictate greater illumination or specific visual tasks require either more or less illumination, lighting designs shall conform to the following guidelines:

Interior Space Type	Lighting Level
Open offices, general use	50 foot-candles
Individual offices	60 foot-candles (maximum) with controls to produce a range of lesser illuminations.
Laboratories, drafting rooms, libraries, and similar close-task areas	75 to 100 foot-candles.
Classrooms	50 foot-candles.
Corridors and stairs	10 foot-candles.
Shop areas	30 foot-candles, with task lighting as required
Lobbies and lounges	20 to 30 foot-candles
Emergency lighting	2 foot-candles
Specialized areas	In accordance with recommendations of the Illuminating Engineering Society Lighting Handbook
Conference tables	30 foot-candles with background lighting 12 foot-candles

Lighting of Large Interior Areas

Use High Intensity Discharge (HID) lighting for all warehouse, gymnasium and similar applications. For gymnasiums and similar areas, use metal halide HID luminaries.

Design for illumination levels as follows:

Interior Space Type	Lighting Level
General recreation.	50 foot candles
Competition areas.	75 foot candles
Televised athletic events	100 foot candles

For multiple usage facilities, provide 3 stage switching.

For warehouses and similar areas, use metal halide or color corrected high pressure sodium with a temperature rating not less than 2500 Kelvin. Design for an illumination level of 30 foot-candles with special allowances for specific tasks.

Lighting of Mechanical Equipment Rooms

Light mechanical equipment rooms with either fluorescent or High Intensity Discharge (HID) lamps at 30 foot-candles. Electrical and pneumatic control panels shall have task lighting designed at 50 foot-candles.

Locate switches for mechanical room lighting fixtures inside the room and beside the door – large mechanical rooms with more than one door shall have 3-way switches to provide control at each entrance. Place mechanical room lights on emergency circuits from the emergency generator.

Lighting Control

Provide individual switching to control lighting in all areas. For areas over 200 square feet, provide multiple switching to reduce the lighting. Use three tube fluorescent fixtures. Classrooms, lecture halls and conference rooms will have one bulb in each fixture of the back row switched separately from the rest of the room to allow subdued lighting during media presentation. See Appendix G, Figure 31. Specific chalkboard lights will also be switched separately from the rest of the room. Other areas may be so equipped if feasible.

Provide wall-mounted toggle switches for all lighting except exit and night lights. Use dual switching for classrooms, large offices, auditoriums, library stacks and other suitable areas.

Specify programmable control of all building lighting tied in with the campus computer control and monitoring system (CMS) unless shown to be economically undesirable. Provide control capable of remotely reducing lighting levels by 1/2 to 2/3 in all building areas.

Maintenance Considerations

The lighting design must address accessibility for re-lamping, cleaning and other maintenance procedures. The following guidelines are provided:

- Do not locate fixtures directly over hazardous chemicals, mechanical equipment and laboratory benches. Install fixtures on the perimeter of such equipment and properly directed.
- The Designer should make special provisions for solving the maintenance problem associated with lamps located in high ceiling areas.
- Mount stairwell fixtures so that maintenance personnel can reach them safely from an 8' or shorter ladder.

8.10 Fire Alarm & Detection Systems

For Fire Alarm Specifications, refer to Appendix C.

The University of North Texas Fire Marshall must approve the design of the Fire Alarm System.

The University has a Central Alarm Receiving System (CARS) located in the UNT Police Office, which is capable of supervising fire, burglary, or other trouble signals from any campus location. All fire alarms should have the provision to transmit an alarm signal to this location. The EMS system will be notified when any fire alarm occurred.

Equip each building with an annunciator panel, per specifications, that will indicate the occurrence and location of any abnormal condition. Such a condition, when occurring, is indicated in the panel by a flashing

light identifying the abnormal system, and by a continuous audible sound. The annunciator shall identify the following: fire alarm, trouble indicator and supervisory condition.

Unless existing conditions require it, no conduits to fire alarms should be surface mounted.

8.11 Rooftop Equipment

The University requires that Designers minimize the visual impact of any items located on roofs. The University prefers not to have equipment placed on the roof. However, where rooftop equipment must be used, the design shall minimize penetrations of the roofing system. Provide maintenance access walkways to all rooftop equipment.

8.12 Lighting Protection

All buildings over 75 feet in height shall have a lighting protection system. For all buildings less than 75 feet in height, the Designer shall provide a recommendation regarding the inclusion of a lighting protection system for consideration.

END OF DESIGN GUIDLINES

C. THE CONTRUCTION CONTRACT

1.0 General

All capital construction contracts for UNT will address the following concerns in the Uniform General Conditions and the Supplementary General Conditions.

2.0 Shop Drawings, Submittals, Samples, Data (Add to GC, Article 5)

2.1 Selection of Brick or Cast Panel for Exterior Walls (If Applicable)

The manufacturers shall present samples to the Designer for his selection from which sample patterns are to be erected or shown on the job site. Coordinate with the Construction Manager as to the location of these panels. UNT will notify the Designer of the final selection. In the case of cast stone panels, small samples may be submitted for selection purposes. See Section A, 7.3.

Completed panels must cure for at least three weeks before they are reviewed by the Owner. In addition, three weeks are required to schedule this review. Therefore, the panels must be completed by the Contractor a minimum of six weeks before the brick selection is needed.

3.0 Materials, Equipment, Employees

3.1 Specification of Competitive Materials

Products are generally specified by ASTM or other reference standard, and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as equally acceptable, the Contractor has the option of using any product and manufacturer combination listed. However, the Contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict Bidders to a specific brand, make, manufacturer or specific name – that they are used only to set forth and convey to Bidders the general style, type, character and quality of product desired and that equivalent products will be acceptable. Substitution of materials, items or equipment of equal or equivalent design is submitted to the Architect or Engineer in accordance with the Specification for approval or disapproval (see Section A, 7.3); such approval or disapproval is made by the Architect or Engineer prior to the opening of bids.

3.2 Condition of Contiguous Work

If any part of the Contractor's work is dependent for its proper execution, or for its subsequent efficiency or appearance, on the character or condition of contiguous work not executed by him or her, the Contractor shall examine and measure such contiguous work and report to the Designer in writing any imperfection therein, or any condition which renders it unsuitable for the reception of his or her work. In case the Contractor proceeds without making such written report, he or she is held to have accepted such work and

the existing conditions, and the Contractor is responsible for any defects in his or her work consequent thereon. The Contractor is not relieved of the obligation of any guarantee because of any such imperfection or condition.

4.0 Permits, Inspections, Fees, Regulations

4.1 Permits and Fees

The Contractor is responsible for obtaining all permits required for the installation of his or her work. The Contractor is responsible for fees as outlined in the Specification. The Contractor shall determine the amounts prior to bidding and shall include this (these) amount(s) in the bid. Building permits and inspections by the City of Denton are not required.

5.0 Protection of Work, Property and the Public

5.1 Protection of Underground Utilities Lines

Each Contractor or subcontractor who does excavation work must use the Texas Excavation Safety System (1-800-DIG-TESS) as the one-call notification center. The Contractor may obtain the services of a commercial utilities locator and/or call the various utility companies who may have lines in the area. The Contractor is responsible for the consequences of any utility interruption caused by his or her excavation, and is responsible for the cost of repairing any damage done to the utilities themselves.

5.2 Protection of Storm Drainage System

The contractor must obtain appropriate storm water permits and provide appropriate measures, such as block, gravel filters or silt fences, during construction as required to protect catch basins, storm drains and streams from the entry of all silt and construction debris.

Contain the residue from the cleaning of ready-mix trucks, wheelbarrows, concrete buddies, etc. and remove from the campus with other refuse.

No dumping of debris into drains or catch basins is permitted. Contractor is responsible for cleaning or replacing drain lines if a violation occurs.

The Designer's Erosion and Sediment Control Plan for the project should clearly state which measures are temporary and which measures are permanent. The Contractor is required to remove all temporary erosion control measures including silt fencing, inlet protection measures and sediment traps after the site is stabilized and prior to final inspection.

5.3 Protection of Existing Landscaping

Give special attention to any trees, shrubs or lawn remaining inside the construction area. To protect such materials, install a landscape protection fence prior to the initial stage of grading, excavation or tree removal. This fence or barricade must be a minimum of 3 feet high and is required to remain in place for as long as is practical. The landscape protection area shall extend to at least the drip line of any trees or shrubs that are to remain.

No storage, access or activity of any kind is permitted in the landscape protection areas. This specifically includes the felling of trees into the landscape protection areas. No limbs, tops, stumps, fill, material storage or equipment is permitted in the landscape protection areas at any time.

Take care to protect trees and shrubs from damage by cranes, falling objects, etc. The Contractor shall not move or prune trees and shrubs. When pruning or moving is necessary, notify the Designer and the Owner shall in turn perform the work at no cost to the Contractor.

Protect plants and trees outside the construction limits from (see also Section B, 2.9):

1. Compaction of root areas by equipment, materials, or fill dirt.
2. Trunk damage by moving equipment, material storage, mauling or bolting.
3. Poisoning by pouring solvents, gas, paint, etc. on or around roots.
4. Damage of branches by improper equipment activity.
5. Cutting of roots within the drip line of the tree.

It is specifically prohibited to fell or bulldoze trees into a wooded area that is adjacent to the site being cleared for construction. Site clearing should be done so as to prevent damage to wooded areas adjacent to the project.

Do not use trees as props or anchors for materials, guy wires, cables or utility wires.

A tree surgeon or nurseryman shall repair or replace damaged trees, shrubs or lawns in a manner acceptable to the University with the cost of the repairs or replacements paid by the Contractor.

Maintain landscape with proper fertilization and irrigation during construction.

Contractor to provide a specific "chemical or caustic" material mixing/staging area. This area is to be self contained and will not allow spread to any soil.

5.4 Protection of Campus Buildings, Streets and Sidewalks

The Contractor is responsible for protection of existing buildings, roofs, trees, shrubbery and lawn areas from damage by vehicles, equipment, overhead cranes, falling objects, etc.
The Contractor is responsible for protecting the campus streets and walks connecting to the project from deposits of mud, sand, stone, litter or debris in any form. Clean off all mud collected on vehicle wheels before leaving the construction area. Should any mud or debris collect on the streets from the construction project, remove immediately.

Where equipment must cross walks, lawns and other transitional areas used by pedestrian and vehicular traffic, the Contractor shall provide minimum 3/4" thick plywood protective sheets for equipment to roll over.

5.5 Shutdown of Existing Fire Protection Systems

The shutdown of existing fire protection systems for renovations shall be kept to a minimum. The Contractor shall review with UNT any scheduled shutdown of fire protection systems.

5.6 Generating Smoke, Heat, or Dust

When conducting smoke, heat or dust generating operations, take care to not set off smoke detectors installed in buildings. Contractor shall review with UNT any protection of smoke detectors planned during construction and to review any required scheduled shut downs of smoke detector equipment by Facilities.

5.7 Safety Measures

Take appropriate steps at each construction site to protect the general public from hazards created by demolition and construction operations.

All projects shall comply in full with NFPA 241 Standard for Safe-guarding Building Construction and Demolition Operations, NC-OSHA Regulations.

Separate the demolition or construction site from public access by fences, barricades or other appropriate security measures. Accident prevention signs and markers shall comply with OSHA regulations to warn of dangers (e.g., overhead electrical wires) and restrictions (e.g., restricted access areas, hard hat areas). Where necessary, provide protected detour routes for vehicles or pedestrian traffic.

Barricades and signs must meet OSHA, DOT, and University approval, and be substantial enough to deter bypassing, vandalizing or theft. In addition to meeting all applicable codes and regulations, keep signs neat and legible at all times. Hand-made signs are not acceptable.

All barricades, temporary walkways and protection of work and materials shall accommodate access, provide adequate warning and protection to all segments of the University population, including wheelchair users and those using walking aids and the hearing and visually impaired.

5.8 Security Measures

The University will provide only those security measures which are deemed prudent for its own operations. The Contractor shall provide the necessary security means to protect his or her work, materials, tools, and construction equipment from vandalism, theft and fire. The Contractor shall supply watchmen services as he or she deems necessary. Contractor shall review with UNT the security measures for the construction site and submit the name of outside security contractor for approval by the Owner. The Contractor is responsible for replacement of his or her materials, machinery, equipment, tools and supplies which are the subject of

theft or mysterious disappearance. Clearly mark all tools and equipment with the Contractor's identification. The Contractor shall clearly mark all tool boxes.

The Contractors shall provide the Owner with a list of day and night phone numbers to use in case of emergencies during the course of the project.

5.9 Hazard Communication Standards

All Contractors shall comply with the OSHA Hazard Communication Standard. The written Hazard Communications Program and Material Safety Data Sheets for each hazardous chemical shall be readily available and centrally located on site.

5.10 Asbestos containing materials

Under no circumstances shall the Architect specify, or shall the Contractor permit, the installation of asbestos containing materials as defined by any authority having jurisdiction.

6.0 Inspections and Testing

The Contractors shall give reasonable notice of construction activities requiring testing and inspection to allow scheduling through the Construction Manager.

The University will also arrange for independent testing agencies to perform special testing and inspections of work in progress. Again, the Contractors shall give reasonable notice of such construction activities requiring special testing and inspection to allow scheduling with the testing agency.

In addition to the special inspections, the Construction Manager will conduct all other testing and inspections as per the contract, including but not limited to above ceiling inspections, pre-final inspections, fire detection and alarm system testing. Do not cover any items without the approval of the Construction Manager, i.e., underground, formwork, walls, ceiling, etc. Any of these inspections which are not completed satisfactorily are repeated at no cost to the owner and without time extension.

7.0 Use of Premises

7.1 Use of Owner's Drinking and Toilet Facilities

On major capital projects, the Contractor's personnel are not allowed to use the Owner's toilet and drinking water facilities. The General Contractor shall provide temporary toilet facilities for all construction personnel. Each individual Contractor will provide drinking water facilities for their personnel.

7.2 Contractor's Working Hours

The Contractor may establish a work schedule of his or her own choosing, but the Contractor shall submit his or her regular daily work schedule to the Construction Manager and to the Designer, and shall notify the Construction Manager in advance of any deviations from this schedule. The University reserves the right to limit the Contractor’s activities when they conflict with University operations.

Work is normally permitted on the days of sporting events and concerts, but traffic is extremely heavy on those days. Contractors may experience delays getting to and from the job site.

Work is normally permitted on student move-in/move-out days, but traffic is heavier than normal, parking is restricted and some campus roads are temporarily closed or designated one-way.

7.3 Noise-Making Activities

In most cases, the University will require the Contractor to comply with the City of Denton Noise Ordinance; however, there are other situations where stricter noise control is required. If the project involves work in or near a building in which an examination is being conducted, the Contractor is required to restrict operations which are disturbing to students during the hours of the exam(s).

7.4 Temporary Interruptions of Utilities and Traffic Movement

Procedures for making temporary disruptions to existing utilities, roads or pedestrian walks shall be planned well in advance of the work, and the work shall be executed in a manner to provide reasonably continuous service throughout the construction period. Connections to existing utilities are made only at times approved by the University. The University typically schedules interruption of services at times other than the

Contractor's normal working hours. Only designated University personnel are authorized to interrupt services. Frequently, outages are scheduled to reduce disruption of classes and special events.

For interruption of service in major utility systems, the Contractor must submit to the Construction Manager a step-by-step sequence of operations planned to accomplish the work. This outline must show tentative dates and times of day for shut-off and restoration of services. Upon approval of the planned operations, the Construction Manager shall make arrangements with appropriate University personnel for interruption of services.

Road and sidewalk cuts shall be scheduled in advance, and made only after they have been approved by the University and the City of Denton in the case of city streets. Contractors shall plan and coordinate their work to minimize the duration of such disruptions. Appropriate detours shall be planned, subject to the approval of the University, giving consideration to the handicapped. The Contractor shall install warning barricades and signs as well as informational signs indicating detours. No service disruptions nor excavations are permitted until barricades and signs are in place to protect the public. If the nature of the site does not allow placement of barricades prior to the excavations, the barricade materials must be physically present on site before excavation begins, in order that they may be erected as soon as possible.

7.5 Site Limits

Enclose the construction area with a six foot (6') high (minimum) chain link type fence with top rail. At the completion of the project the Contractor shall remove the construction fence completely including below ground level. Fence posts shall not be sawed off flush with the soil line.

7.6 Contractor Parking and Storage

Parking is extremely limited at the University of North Texas. Parking lots and the streets in the immediate vicinity of the University are permit only parking. The Contractor may park work vehicles (having equipment attached to the vehicle) within the site, as space permits, as well as a reasonable number of logo bearing supervisor vehicles. The Construction Manager, with the University Police, will provide at no cost a reasonable number of parking permits for the Contractor to distribute to workers for their personal vehicles, which will be specific for certain lots or areas. If these areas are not adjacent to the site, workers are invited to ride one of the free shuttle busses to the site. The contractor is expected to regain the permits and redistribute them to new subcontractors as the project progresses. Vehicles parked in other than the designated areas within the University controlled area may receive tickets. Tickets will not be excused. Vehicles receiving tickets which are not paid may be impounded. If the project is not in the inner campus area, the contractor may allow his employees to park inside the fence, as space permits.

All contractors are responsible for informing their employees that they cannot park at any locations on the campus other than the allocated spaces. All existing University parking regulations are enforced.

Parking for large storage trailers is limited to within the construction site. If additional trailer parking is required, the Construction Manager and the University Police will work with the contractor for a solution.

8.0 Utilities, Structures, Signs

8.1 Utilities

The University operates the electric, hot water and chilled water cooling distribution systems serving part of the campus.

Telephone service is provided by GTE Southwest, Inc. to a central point on campus, and owns the lines to the Main Distribution Room (MDR) in each building. The Contractor installs as part of the general construction, and the University then owns the twisted pair wiring to each outlet. GTE will run wires to the jumper boards in the MDR, the Contractor runs the wires from the jumper boards to the outlet and the University's Telecommunication office makes the jumper board cross connects. The Contractor should contact GTE directly for Contractor's telephone service during construction.

Water and sewer service is provided by the City of Denton. The Contractor should contact the City of Denton to establish water and sewer services.

8.2 Signs at Construction Sites

Identification of a construction project and those principal parties participating in the project is provided by the Contractor. Only one identification sign is permitted per project. No additional signs identifying participants is allowed.

The design of the project identification sign must be approved by UNT. The sign shall give the name of the University, the title of the project and, in smaller lettering, the names of the Designer and Contractor(s).

Provide warning and safety signs as required. Keep all other informational signage to a minimum.

All signs shall be kept clean and free of graffiti and maintained by the Contractor.

8.3 Identification by Room Number

During construction, once the interior layout is partitioned off into rooms, all rooms shall be identified on the site with a room number that corresponds with the room number on the design drawings.

9.0 Cleaning Up

Keep the construction site, and adjacent campus areas, free of trash, litter or debris at all times. Empty trash cans/dumpsters and remove the contents from campus before they overflow. The Contractor shall remove litter, rubbish and debris on a daily basis. Use of University trash receptacles for such debris is not allowed. The outdoor burning of trash debris on campus is not allowed.

The Contractor is fully responsible for the containment of mud and debris on the site as well as removal of these items from roads and walkways.

The Contractor shall trim/mow grass, irrigate grass and other vegetation on the construction site as often as required to maintain a neat appearance.

Do not allow debris to accumulate in corridors or stairways. As construction is completed, protect the work to prevent soiling or spotting, particularly with regard to flooring systems. The carpet shall be cleaned and kept free of spots or traffic patterns. Resilient floors shall be cleaned, sealed and properly finished to provide a uniform appearance without streaks or smears.

10.0 HUB Subcontracting Plan (HSP)

In accordance with Texas Government Code (TGC) §2161.252 and Texas Administrative Code (TAC) Title 1, Part 5, Chapter 111, Subchapter B, Rule §111.14, each state agency (including institutions of higher education) as defined by TGC §2151.002 that considers entering into a contract with an expected value of $100,000 or more shall, before the agency solicits bids, proposals, offers or other applicable expressions of interest, determine whether subcontracting opportunities are probable under the contract.

If subcontracting opportunities are probable, each state agency's invitation for bids or other purchase solicitation documents for construction, professional services, other services and commodities with an expected value of $100,000 or more shall state that probability and require a HUB Subcontracting Plan (HSP).

In accordance with Texas Government Code §2161.181 and §2161.182, each state agency shall make a good faith effort to increase the contract awards for the purchase of goods or services to HUBs based on rules adopted by the Commission to implement the disparity study described by TGC §2161.002(c).

The purpose of the HUB Program is to promote equal business opportunities for economically disadvantaged persons (as defined by TGC §2161) to contract with the State of Texas in accordance with the goals specified in the State of Texas Disparity Study. The HUB goals per TAC §111.13 are: 11.9% for heavy construction other than building contracts; 26.1% for all building construction, including general contractors and operative builders contracts; 57.2% for all special trade construction contracts; 20% for professional services contracts; 33% for all other services contracts; and 12.6% for commodities contracts.

The contracting agency does not endorse any company or individual identified on any listings/directories included or referenced herein. A complete list of all State of Texas certified HUBs may be accessed via the Internet at http://www.tbpc.state.tx.us/cmbl/cmblhub.html or http://www.tbpc.state.tx.us/cmbl/hubonly.html

The contracting agency will determine if the value of subcontracts to HUBs meet or exceed the HUB subcontracting provisions specified in the prime contractor's HSP. If the contracting agency determines that the prime contractor's subcontracting activity does not demonstrate a good faith effort, the prime contractor may be subjected to provisions in the Vendor Performance and Debarment Program (1 TAC, Part 5, Chapter 113, Subchapter F).

End of The Construction Contract

D. SELECTION AND EVALUATION POLICY

1.0 Architect Selection Process

1.1 General

A procedure for the selection of design firms has been implemented at UNT. It is a two-part process that targets the qualifications and experience of prospective firms with regard to the particular needs of the project for which they wish to be considered.

1.2 Evaluation

In Phase I, a Request for Qualifications is advertised in the Electronic State Business Daily. All applicant firms are then evaluated and scored by the Evaluation Committee based upon the qualifications of the respective firm. A short list of four or five firms is selected for further consideration.

In Phase II, the individual team members are evaluated. The office of each firm is visited by the Evaluation Committee. At this time, specific design team members are introduced, design philosophy and individual achievements are discussed and clarifications, if any, are exchanged. Following the meeting, a formal Proposal documenting each of the above elements is submitted and evaluated by our committee.

The team that demonstrates the highest level of qualifications is recommended to the Board of Regents for award of the design contract.

2.0 Contractor Selection Process

2.1 General

A procedure for the selection of Contractor and Construction Manager firms has been implemented at UNT. It is a two part process that targets the qualifications and experience of prospective firms with regard to the particular needs of the project for which they wish to be considered. The State approved Construction Delivery Techniques are as follows:

Competitive Bid
Competitive Sealed Proposal
Construction Manager At Risk
Construction Manager / Agent
Design Build
Job Order Contract

2.2 Evaluation

In Phase I, a Request for Qualifications is advertised in the Electronic State Business Daily. All applicant firms are then evaluated and scored by the Evaluation Committee based upon the qualifications of the respective firm. A short list of four or five firms is selected for further consideration.

In Phase II, the individual team members are evaluated. Each firm is interviewed by the Evaluation Committee, at which time specific team members are introduced; and individual experience and achievements are discussed and clarifications, if any, are exchanged. Following the meeting, a formal Proposal documenting each of the above elements, along with their response to a series of pertinent questions, is submitted and scored by our committee.

The team that produces the highest level of qualifications is recommended to the Board of Regents for award of the contract.

3.0 Competitive Sealed Proposal Evaluation And Scoring Process

3.1 General

The instructions must be read in conjunction with the evaluation and scoring spreadsheet. The project Owner's Evaluation Committee must assign a "value" for each of the evaluation categories. These "values" should be assigned prior to the receipt of proposals. The sum total of all category "values" must equal "100%".

The "rating" is the amount assigned by the Evaluation Committee, except for the Contract Amount and Time categories, based on judging the proposer's submittal of requested data in each category. The Evaluation Committee determines the "ratings" by assigning a numerical amount between "0" and "10".

The "score" is the mathematical result of multiplying the "rating" by the pre-determined "value" in each category.

The proposer that offers the lowest proposed Contract Amount receives the "rating" of "10" in that category by default. The remaining proposers "ratings" are formula driven based on the differential of each proposer's amount as compared to the amount of the lowest proposal. The formula converts these differences to a "0" to "10" numerical "rating".

3.2 Formulas

As described above, the evaluation process for the Contract Amount and Time categories are formula driven. The formulas for these calculations are written in as follows:

$$R=\frac{[100 - (\frac{\text{PROPOSED CONTRACT AMOUNT} - \text{LOW PROPOSED CONTRACT AMOUNT}}{\text{LOW PROPOSED CONTRACT AMOUNT}}) 100].10}{}$$

$$R=\frac{[100 - (\frac{\text{PROPOSED TIME} - \text{LOW PROPOSED TIME}}{\text{LOW PROPOSED TIME}}) 100].10}{}$$

4.0 Proposal Evaluation and Ranking Procedures For Selecting a Construction Contractor Through Competitive Sealed Proposals

The following procedures shall be used to evaluate and recommend a construction contractor for selection by the University of North Texas through the use of Competitive Sealed Proposals, as authorized in Subchapter S, Section 51.783 of the Texas Education Code.

4.1 Proposal Evaluation Committee

For each construction project utilizing the Competitive Sealed Proposal method of procurement, the following individuals shall convene a Proposal Evaluation Committee (Committee):
University Architect – Chairman
Director of Planning – Member
Director of Construction – Member

Alternate Committee members shall be available as needed in order to provide full Committee involvement in the event of a member's absence. Alternate members will include the following individuals.
Construction Representatives – Alternates

4.2 Proposal Evaluation Committee Function

The Committee shall perform an evaluation of all submitted proposals and shall recommend an order of selection ranking of all proposers to the Associate V.P. for Systems Facilities.

4.3 Proposal Evaluation Committee Procedures

The following procedures will be utilized by the Committee in the evaluation process:
As soon as possible following the public opening of proposals, the Committee will meet to conduct a preliminary examination of each proposal for compliance with the published requirements.

The Committee shall conduct thorough discussions and evaluations of all proposals.

Within forty-five (45) days after publicly opening the proposals, the Committee shall produce a ranking of proposers in the order of the best value to the System.

The recommended ranking shall be based on the data furnished by the proposers in response to the Request for Competitive Sealed Proposals. The following is a list of rating categories and values for each

category. These categories and values may be revised by the Committee based on the project type and conditions at the time proposals are requested.

RATING CATEGORY	VALUE
Proposed construction contract amount	60.00
Proposed construction contract time	10.00
Qualifications of key Project Personnel	5.25
Demonstrated ability to schedule and maintain proposed construction progress – Subcontractors	5.00
Similar project experience	3.50
Overall reputation of the proposer, record of claims, incidences and litigation experiences over the past five (5) years	3.50
Safety program and record	3.00
Reference responses from Project Owners and A/E's on similar projects	3.00
Proposer's current workload and availability of personnel and equipment	2.25
Financial sufficiency	1.75
Proposed scope revision suggestions to reduce project cost and/or construction contract time	1.50
Adequacy and completeness of proposer's response to requested qualifications information.	1.25
Total of Weighted Value	100.0

4.4 General Evaluation Procedures

Proposed Construction Contract Amount and Proposed Construction Contract Time will be rated using mathematical processes described below. Each of the other listed rating categories shall be evaluated on a scale of zero to ten. Each rating category response will be evaluated and the Committee shall produce a single evaluation determination in each category for each proposal received.

Proposed Construction Contract Amount Evaluation

This evaluation ranking shall be based on a value of ten (10) assigned to the lowest proposed amount. In increasing order of cost, each proposed amount shall receive a value based on the percentage difference between each of the higher proposed amounts and the lowest proposed amount. The percentage difference for each proposer in order is subtracted from "10", which results in the rating for each proposer.

These resulting ratings are then multiplied by the value of this rating category, producing the Construction Contract amount score for each proposer.

Proposed Construction Contract Time Evaluation

The evaluation ranking of Proposed Construction Contract Time shall be accomplished by the same mathematical process as the Contract Amount Proposed Construction Contract Time.

These resulting ratings are then multiplied by the value of this rating category producing the Construction Contract time score for each proposer.

4.5 Scoring

Proposers may receive equal ratings in the Proposed Contract Amount category if their proposed amounts in these categories are identical.

With the exception of the Proposed Contract Amount, all category rating determinations among proposers may receive identical values if, in the opinion of the Committee, the qualifications data provided by proposers are determined to be equal for a selected category.

Upon determining a rating for each category, a categorical score for each proposer shall be calculated by multiplying the category value by the Committee determined rating.

The total score for a proposer shall be determined by the adding the scores received for each category. The maximum score attainable for all categories shall be one thousand (1,000).

The Committee shall produce a tabulation of scores which identifies the proposers, their Proposed Abatement Amounts and their individual total scores.

END OF SELECTION AND EVALUATION POLICY

Appendix A: Peripheral Campus Standards

A. UNT Discovery Park Supplemental Design Standards Revised 6/11/07

(Note: This list is not comprehensive but covers most of the common issues at the Research Park. Refer to the Design and Construction Guidelines for all other requirements).

1. Any project that adds or removes walls in an existing Office or Lab affect utilities. (Electrical, Air Conditioning, Plumbing & Exhaust systems.) In order to prevent future Utility & Maintenance issues the Facility Management & Construction (FMC) assigned Project Coordinator must involve Senior Facilities Maintenance personnel as assigned by Facilities Maintenance Management (FMM) from design through project completion.
2. Once design is complete, project drawings shall be issued by FMC for review.
3. **Roles and Responsibilities of assigned Facilities Personnel**
    - **a. FMC Project Coordinator**
        - i. To request the assignment of Senior Facilities Maintenance Personnel to a project.
        - ii. Solicit design input from Senior Facilities Maintenance Personnel assigned to project
        - iii. Solicit approval input for submittals from Senior Facilities Maintenance Personnel assigned to project
        - iv. Perform the oversight and coordination of all assigned project work.
        - v. Conduct Pre-construction Meeting
        - vi. Single point of contact between FMC Client, UNT Facilities and General Contractor
        - vii. Coordinate any MEP shutdowns with Facilities Maintenance Personnel, and any department affected by shutdown
        - viii. Maintain paper trail of any and all project documents, change orders, request for information (RFI), request for pricing (RFP) etc.
    - **b. Senior Facilities Maintenance personnel as assigned to a project**
        - i. Provide support for FMC Project Coordinator.
        - ii. Give input on design issues and submittals.
        - iii. Perform the actual shutdown of any MEP system affected
        - iv. Observe progress of assigned project,
            1. As construction issues arise, communicate issues to FMC Project Coordinator
            2. Answer question for and ask questions of GC & SC on construction issues, but do not give direction to GC or SC.
            3. Report any safety issues to FMC Project Coordinator, & Facilities Safety Manager.
4. A pre-construction meeting is required prior to the beginning of any construction project. Attendees will be the FMC assigned Project Coordinator, General Contractor (GC) representative, Sub-contractor (SC) representatives, and Senior Facilities Maintenance personnel as assigned. The Facilities Construction office will perform the oversight and coordination of the work.
5. GC is responsible to provide submittals for approval on any Mechanical, Electrical, and Plumbing (MEP) equipment needed for project to the Project Coordinator.
    a. Project Coordinator is responsible to solicit input from Senior Facilities Maintenance personnel as assigned, before approving submittals.
    b. MEP SC must have approved submittals before ordering any MEP equipment.
6. Any direction that results in a “Change in Scope”, Change Order, or increase in price will come from the FMC Project Coordinator to the GC only. Conversations between Senior Facilities Maintenance personnel as assigned and GC or SC are never to be considered “directing of a contractor”
7. Both floors of Wing E and Wing F will have a perimeter 8’ to 10’ wide corridor running along the exterior walls on the west, south and east sides. This is how the building is designed to allow for direct travel to fire exits, access to mechanical rooms, and to allow natural light into the interior space. The main “trunk” ducts also run down this hallway.
8. No rooms on exterior walls in Wing E, F and B.
9. Whenever possible, transportation/delivery vehicles (such as golf carts and fork lifts) will use the tunnel system to move from one part of the building to another. The first and second floor concourse will be reserved for pedestrians only, as much as possible.
10. It would be a violation of fire code to allow storage in the tunnel system. The tunnels will remain clear as vehicular access to freight elevators and also access to elevator machine rooms.
11. Use university standard “Best” door hardware throughout.
12. Color and finish selections should either match existing or follow the new standard finishes “pallet” developed for the Research Park.

MEP General

13. All new conduit, ducts, pipes, etc. installed in the open ceiling cavity to be painted to match existing.

14. Manufacturer for equipment such as circuit panels, switchboards, and variable frequency drives should be Square-D.

Mechanical

15. The building has a process-cooling loop that will be maintained at 75 degrees F for lab cooling water requirements. Existing HVAC chilled water lines are reserved for HVAC use only.

16. The building has a central compressed air system for building wide use. Pneumatic air connections shall have building standard taps (check valves, valves & filters).

17. Existing HVAC & Lighting Control System is T.A.C. T.A.C. will provide controls for any mechanical remodeling.

18. Existing VAV boxes in an area that is to be remodeled should be replaced as part of the project.

19. All new VAV boxes must have 277 or 480 VAC electric reheat, and TAC controls. Preferred Manufacture will be Trane, Price is acceptable substitute based on price and availability.

20. Installation of MEP equipment such as VAV boxes and ductwork may require full or partial shutdown of building systems. Prior to the beginning of the work the shutdown must be fully coordinated through the Facilities Construction office.

21. All new Air Handler Units shall be direct drive. All new AHU's and FCU's shall be manufactured by Trane unless the unit is a specialty unit that is not available through this manufacturer.

Electrical

22. All building original light fixtures need to be replaced with single voltage / 277vac electronic ballast fluorescent fixtures with T-8 lamps. If a decision is made to upgrade any original lighting fixtures, ballast must be replaced with single voltage ballasts only. No dual voltage ballasts. No 8" fixtures will be retrofitted to T-8, All 8" fixtures must be replaced. T-12 lamps must be properly disposed of in accordance with EPA guidelines 40 CFR.

23. All building columns are also electrical power chases. The design should take this into consideration so that power is supplied from these columns wherever possible and the use of "power-poles" is kept to a minimum.

24. All electrical receptacle and voice/data cover plates shall be smooth nylon, color: ivory.

25. All lighting in Areas A, B, D, E, F, G and M are on our Energy Management System (EMS), each area is divided into lighting zones. All remodel projects must take this into consideration and maintain the lighting zone. Or alter the existing lighting zones as appropriate to meet the needs of the end user and Facilities.

26. All electrical wiring should be run in high voltage tray in flexible conduit only. Conduit should be tied at intervals per N.E.C. No EMT, IMC, or rigid conduit will be run or laid in cable trays.

27. All hallway electrical receptacles circuits must be on separate electrical circuits from offices.

28. Rooms or Labs that house EMI Sensitive Equipment must be isolated from any electrical power or lighting circuits including circuit neutral conductors that do not direct feed power necessary for the operation of the room or Lab. This would necessitate the removal of all lighting circuits, their neutral conductor, and grounding conductors from the existing lighting grid as they pass through said rooms or Labs, and rerouting them around rooms or Labs as necessary to retain our lighting control zones. Also all traveler conductors necessary for 3 way lighting control switches must be installed in separate conduit and routed outside said rooms or Labs. 3 way switching should be eliminated from Rooms or Labs that house EMI Sensitive Equipment whenever possible

Data & Communications

29. Any existing abandoned datacom cable in existing datacom cable trays will need to be removed prior to the installation of new datacom wiring as part of the remodeling project.

30. Datacom work that will be included as part of each remodel project at the Research Park will include: cable from the MDF to the IDF for that area, the equipment in the IDF for the area, and the drops to each service point as well as the HVAC and power in the IDF.

31. Each IDF room must be cooled 24/7, therefore a separate air handler unit needs to be provided for each room. The AHU should be connected into the existing chilled water loop system. The capacity of this unit will be 1.5 tons (600 CFM). The bottom of the unit should be mounted at 8'-0" AFF with a supply duct connecting to a supply register at 18" AFF. Also provide a thermostat to the unit in the room and a secondary galvanized steel emergency condensate drain pan. The drain line should be piped to discharge at a location where no equipment will get wet and where any discharge will be quickly detected. Each of the two (2) drain lines should be piped to separate drains.

32. All datacom wiring will be by owner. Contractor will provide conduit and j-boxes at each outlet location.

33. Power for all MDF and IDF rooms including power for lighting must be on a separate independent circuit from other building power functions.

Cable Trays

34. Cable tray usage: Fire alarm & energy management shall use the north and west sides of the cable tray. Telecom shall use the south and east side. Each trade must keep to their respective side and all cable shall be neatly tied at all times.
35. Where cable leaves the cable tray, it will immediately enter into EMT conduit.
36. Use only MC type cable in electrical cable trays.
37. Cable trays should not be used to support anything. If an exception is necessary it must first be approved by UNT, then it should be kept to a minimum.
38. When attaching to a cable tray use beam clamps bolted to the outside lower flange of the cable tray. Then attach the object you wish to support to the beam clamp with all thread and the appropriate hanger.
39. When transitioning from MC cable to conduit, attach a 4x4 electrical box to the outside of cable tray. This can be done by drilling the appropriate sized hole through the side of the tray and using a close nipple, lock nuts, nylon bushing on the box side, and a ridged conduit coupling on the inside of the tray to connect the MC connector to. This not only secures the box to the tray, it also creates a path for the wiring. If needed, a bolt on beam clamp only should provide additional support for the 4x4 box. At no time should anything be attached to a cable tray with a screw.
40. If it becomes necessary to seal a cable tray where it penetrates a wall, the plug must be made of a material that can be removed intact and replaced easily to allow for the addition or removal of cable in the future.

Plumbing

41. All plumbing waste and vent pipes are to be cast iron.
42. Trenching of the slab for waste lines is to be kept at a minimum.
43. All water supply lines to be copper.
44. Limit the number of roof penetrations for plumbing vent pipes. Where possible vent pipes should penetrate roof/ceiling at the mechanical rooms, however keep in mind that the max. Horizontal travel distance allowed for vent pipes is 20'.
45. No wax seals at wall mounted toilets and urinals.
46. The standard for water heaters is to use instant heat type under-sink water heaters. No water heaters installed above ceiling or in remote locations.

B. UNT Health Science Center Supplemental Design Standards **Revised 11/02**

- No exposed aggregate sidewalks. No steps in sidewalks.
- No monumental entry stairs. Entry will be on grade with positive drainage from the building in all directions for a minimum of 25 feet with 6 inches drop.
- Any exterior handrail anchor, base, or pocket will not be rustable. The actual handrail may be steel if it can be easily removed for waterproof coating and reinstalled without damaging the coating. Galvanized or powder coated steel should be considered.
- ADA building access will have one pathway with automatic doors.
- Faculty/Staff Offices 110-120 sf, 10'x11', 10'x12', or 9'x12'.
- Department Head/Chair Offices 140-160 sf, 10'x14', 12'x12', or 11'x14'.
- One duplex per wall, one voice/data outlet per office. Two duplexes on voice/data wall
- Minimum of one duplex outlet per 10' length of wall.
- Offices should be grouped together, Labs should be grouped together.
- Classrooms and computer labs should be on lower floors, research labs should be on upper floors.
- No windows below 3' AFF.
- Glass to be ¼" thick tempered glass. Consider high performance glass.
- Basements are generally discouraged. No mechanical basements. Outside on grade access to large mechanical rooms is mandatory.
- Elevators, stairs, and vertical mechanical chases need to go on the perimeter of the building or outside the basic building footprint.
- In general there will be (a)passenger elevator(s) at the main building entrance, and a service elevator at the service entrance.
- Alcoves for drink vending machines and paper recycling bins should be located on the ground floor near the service entrance.
- Each building will have a domestic water strainer and double check valve located in the mechanical room, capable of being serviced while standing on the floor.
- No exterior sump pumps, except for elevator pits and sewage ejectors, design for gravity flow away from the building.
- Public restrooms more than one station will have a floor drain under a partition.
- No flat roofs. At least 1:12 slope is required. Use modified bitumen 4 ply.
- Exterior double doors must have removable mullion and Von Duprin type panic bar.
- Door Hardware – Sargent full mortise lock sets, 8200 Series LNB, Less cylinder, US 26D, Satin chrome finish. Typical functions are 05 Office and 25 Dormitory, U.N.O. Best removable core cylinders required. Best permanent cores will be purchased by the contractor, but will be delivered directly to the Owner and installed by the Owner. Cores must be ordered as early as possible since there can be up to a 90 day lead time from receipt of order to delivery.
- Fluorescent fixtures will be 4 ft., electronic ballast, T-8 bulbs
- Gypsum wallboard to be 5/8" thick, Studs should be 25-gauge roll formed galvanized steel on 16" centers, provide two (2) studs at each jamb of each door and window frame.
- Utility chases with laboratories on both sides is the preferred design. Labs do not open into chases. Chases are considered mechanical rooms and are keyed as such.
- Contractor shall repair, patch, and fire tape any holes above ceilings in sheet rock fire rated walls, which exist within the project boundary as they occur on either side of walls.
- Owner has standard colors for paints to simplify maintenance. Architect may be directed to alter close matches to owner's standard. For instance, Pittsburg-Bruning 141-1W Bone is the standard for hallways.
- New door openings as well as existing openings, which require door swing change, will require new hollow metal frames. No used frames will be allowed for reuse once removed from any wall. No knock down type doorframes are allowed.
- No gyp board ceilings without written prior approval from owner. Armstrong Mina Board in Cortega Design #769 is standard 2'x4' ceiling tile.
- Classroom access is preferred at the rear. Tiered lecture halls will also have access at the front. The best classroom length to width ratio is 1:1. Classroom dimensions may not exceed 1:1.25.
- Classrooms, conference rooms, and laboratories should not have windows. Offices should have windows.
- Contractor to provide voice/data outlet boxes (2"x3 ½" electrical) and ¾" conduit from the box to the top of the wall above ceiling, curving the end toward the contractor installed wire way, which is usually over the corridor ceilings. UNTHSC will provide wiring from the datacom rooms to each location, faceplates, and equipment in datacom rooms under separate contract.

- Datacom rooms and file server rooms must have 24-hour/day cooling. Heat is never required. The cold air will be supplied at floor level with the return at 8'AFF. Areas of buildings that recycle air are usually turned off at night and on weekends.
- Pad mounted transformers will have meter mounted on transformer.
- Emergency generators will be diesel fired. Preferred location is in a mechanical room with combustion air and exhaust ducted.
- Building heat will be hot water rather than steam.
- Zero threshold damper boxes with fan-powered recirculation of air from the return plenum are highly desirable. Treat all zones as exterior, with heat and cooling capabilities.
- If condenser pump is in the mechanical room, water must gravity flow from the cooling tower to it.
- All HVAC pumps shall be frame mounted mechanical seal.
- York chillers are not acceptable. Carrier and Trane are acceptable.
- UNTHSC will contract testing and air balancing outside of the general construction contract.
- Elevators are push button operated. Key operation only for firemen or restricted access floors. Elevator specifications must prohibit proprietary diagnostic software, procedures or equipment for trouble shooting or repair. The elevator manufacturer will supply the emergency telephone in the elevator.
- Control Systems International, CSI or TAC, is sole source for HVAC control.
- ADA Requirements – The designer is responsible for total compliance with TDLR.
- Notifier fire alarm system is to be used and tied into existing system.
- No building should have two or more separate fire alarm panels controlling parts of the building unless they are from the same manufacturer and communicate with each other. All fire alarm systems will comply with NFPA 72 and applicable ADA standards.
- Fire extinguishers will be installed according to NFPA 10.
- Fire sprinkler systems should be installed to the proper NFPA standards (13, 13R, 13D, 25 etc.).
- Carpet - 12' roll goods should have an 18-20 tuff bind with branded yarn, nylon, minimum 28 oz. per square yard. Solution dyed/yarn dyed yarn preferred, no piece dyed goods. Modular carpet tile minimum 20 oz. per square yard, same yarn specs. as 12' goods. Direct glue carpet. No carpet over pad with tack strips. Covebase on carpet preference is 4" without molded corners. Covebase is more forgiving when it comes to concealing carpet and VCT cuts along wall areas. Molded corners are the first to get knocked loose and come off. They're rarely in line with the base and typically the color is slightly off..
- In high traffic areas install corner guards, typically stainless steel.
- The room finish sheets of the construction documents will provide space for the architect to document the as built finish material used in each area with manufacturer, model, and color. The architect will complete this data as a part of the "as builts" supplied to the owner in electronic and reproducible sheet format, listing the actual finishes used in the project.
- Landscape material should be native plants. Red Oaks to be Shummard.
- Turf grass areas get at least 3" topsoil. Planting beds must have a minimum of 6" of topsoil. Planting beds need 4" compost roto tilled into 6" topsoil. Top dress all beds with minimum 2" compost or shredded cypress/pine bark. No hardwood bark chunks, chips, or shred.
- Triangular spacing of plants, not square.
- Landscape irrigation pipe will be schedule 40 PVC. Ball valves before every valve. ¾" pipe minimum. 12" minimum coverage on laterals and 18" minimum of mains.

Appendix B: Telecommunications

Table of Contents

PREFACE

This specification covers procurement of components, installation and testing of the intra-building Unshielded Twisted Pair (UTP) cable for the University of North Texas (UNT). These specifications cover the general requirements for the installation of equipment by the Contractor and outline the general conditions to be met by UNT in connection with the premises wherein the equipment is to be installed.

1. GENERAL EXPECTATIONS FOR CONTRACTORS

1.1 Contractor Qualifications:

1.1.1 The Contractor installing this wire plant must be a qualified telecommunications company with a minimum of three years experience with telephone wiring and category 5 wiring installation. Contractor must provide proof of experience for each team leader.

1.1.2 The Contractor will commit to the following:

1.1.2.1 There will be a minimum of 6 employees in each building at all times. The 6 technicians that start the building will finish the building before being pulled off for other jobs.

1.1.2.2 There will be a BELDEN/PANDUIT certified project foreman in each building and at least 2 of the 6 technicians working in that building will be BELDEN/PANDUIT certified.

1.1.2.3 If any work is subbed out, at least half of the subcontractor's crew must be BELDEN/PANDUIT certified.

1.1.2.4 The Contractor must provide the Project Foreman, i.e., this position cannot be subbed out.

1.1.2.5 The certifications for both the vendor's workers and the subbed out workers must be submitted before the contract is signed.

1.1.3 UNT reserves the right to disqualify an installation Contractor on the basis of poor prior work at UNT or other institutions.

1.1.4 Personnel involved in the installation, splicing and testing of the copper and fiber optic cable shall meet the following requirements:

1.1.4.1 Three (3) years experience in the installation of copper and fiber optic cables, including splicing, terminating and testing. Testing on fiber optic cable shall include single and/or multimode if applicable.

1.1.4.2 Two (2) installed systems consisting of 1000 or more UTP cable drops used for both voice and data applications in which the systems have been in continuous satisfactory operation for at least two (2) years. The Contractor shall submit as proof, supporting documents and the names, addresses and telephone numbers of the operating personnel who can be contacted regarding the installed systems.

1.1.5 The standards defined in section 2.1.2 and 2.1.4 also apply to the employees of any subcontractor employed by the Contractor.

1.1.6 Contractor must supply insurance certificates in accordance with the attached Service Agreement to UNT for Workmen's Compensation, General Liability, and Automobile before work is begun.

1.2 Adherence to Standards

1.2.1 In the installation of this work, the Contractor shall comply in every way with the requirements of local laws and ordinances, the laws of the State of Texas, the National Board of Fire Underwriters, and the National Electrical Code. If, in the opinion of the Contractor, there is anything in the plans or specifications that will not strictly comply with the above laws, ordinances, and rules, the matter shall be referred to the attention of UNT for a decision before proceeding with that part of the work. No change in the plans or in the Specifications shall be made without full consent in writing of UNT.

1.2.2 The following documents of the exact date and issue indicated form a part of this specification:

1.2.2.1 The latest revision and pertinent addenda of the National Electrical Code (which shall be used for minimum requirements but not necessarily as a design criterion).

1.2.2.2 The latest revision and pertinent addenda of the National Fire Protection Association (NFPA) Publications.

1.2.2.3 The latest revision of the Uniform General Conditions and Supplementary General Conditions for State of Texas Building Construction Contracts.

1.2.3 The Contractor will provide all materials, equipment and installation in compliance with the latest applicable standards from ANSI, ASTM, TIA/EIA, IEEE, NEMA, REA, UL and shall follow BICSI guidelines.

1.2.4 The Contractor will provide all materials, equipment and installation in compliance with the latest applicable standards for:

1.2.4.1 TIA/EIA-568-A Standard, Commercial Building Wiring Standard, using the 568-A pinout standard.
1.2.4.2 TIA/EIA-569 Standard, Commercial Building Standard for Telecommunications Pathways and Spaces.
1.2.4.3 TIA/EIA-606 Standard, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
1.2.4.4 TIA/EIA-570 Standard, Residential and Light Commercial Building Wiring Standard.
1.2.4.5 IEEE 802 10BaseT Standard.

1.2.5 In the event of a conflict between documents referenced herein and the contents of this specification, the contents of this specification shall be considered the superseding document with the exception of the NFPA publications which shall have precedence. Any discrepancies between the Communications Drawings and the written specification shall be brought to the attention of UNT's Project Manager, prior to installation, for clarification.

1.3 General Work Expectations

Persons performing work for the Contractor shall:

1.3.1 Maintain a professional work ethic at all times; UNT will not tolerate inappropriate behavior, as determined by the university, of any kind.
1.3.2 Follow guidelines set by the UNT Project Manager for entry into private offices and dormitory rooms.
1.3.3 Be responsible for moving items as needed and replacing them as found.
1.3.4 Remove all excess material and debris from areas worked in and return those areas to their original state of cleanliness each day.
1.3.5 Wear distinctive uniforms and carry identification cards.
1.3.6 Leave a preprinted note provided by the University in offices or dormitory rooms where work has been done.
1.3.7 Ensure all doors are locked upon exit. Doors shall not be propped open at any time.
1.3.8 Install the materials in accordance with the manufacturer's specifications.

1.4 Definition of Work to be Done by Contractor

The Contractor will:

1.4.1 Acquire material for the execution of this wiring specification if so indicated in the bid document and award.
1.4.2 If cable tray is not done by electricians, voice and data contractor will furnish and install.
1.4.3 Install, terminate, test, and document all cable runs between the wall jack in the Work Area Outlet and the corresponding jack in the telecommunications closet, including installation of the Work Area Outlet and termination of the jack in the wiring closet and inserting it into the patch panel provided.
1.4.4 Install intercloset conduit and cabling if so indicated in the bid document and award.

1.5 Contractor Responsibilities:

The Contractor will:

1.5.1 Obtain UNT's permission before proceeding with any work necessitating cutting into or through any part of building structures such as girders, beams, concrete or tile floors, partition ceilings.
1.5.2 Promptly correct all defects for which the Contractor is responsible.
1.5.3 Be responsible for and repair all damage to buildings due to carelessness of workmen, and exercise reasonable care to avoid any damage to UNT's property. The Contractor will report to UNT any damage to buildings that may exist or may occur during the occupancy of the quarters.
1.5.4 Wiring, materials, and equipment will be delivered and stored in a clean dry space. They will be properly packaged in factory fabricated type containers and protected from damaging fumes, construction debris and traffic until job completion.
1.5.5 Be responsible for installation of proper grounding and bonding as per TIA/EIA 607 in large systems.
1.5.6 Take necessary steps to ensure that required fire fighting apparatus is accessible at all times. Flammable materials shall be kept in suitable places outside the building.
1.5.7 Remove abandoned non-plenum rate cable in areas where new cable is pulled in return air plenums

if indicated in bid document.

1.5.8 Provide a Manufacturer's fifteen (15) year warranty for parts and labor. The Warranty shall commence at system acceptance.

1.5.9 Report all cables that may need to be replaced to the UNT Project Manager the same business day of discovery.

1.6 Project Management Expectations:

Contractor shall:

1.6.1 Coordinate all work with UNT Project Manager or that person's designated assignee.

1.6.2 Provide an installation schedule within one week of bid award, identifying milestones necessary to install the system by the appointed date.

1.6.3 Submit weekly progress reports to UNT during the contract and notify UNT immediately of any significant delays to the schedule.

1.6.4 Conduct tests and inspections after installation has been completed in order that the customer may be assured that the requirements for installation has been met.

1.6.5 Insure that all records and reports, City relations, engineering, metering, inspections, testing, quality or service standards and safety measures comply with standards applicable for the State of Texas.

1.6.6 Promptly notify UNT of the completion of the work or such portions thereof as are ready for inspection by written notice

1.6.7 Make any needed changes to the layout drawings as to accurately depict the as-built condition of all the above as they were installed. These scale drawings shall be of high quality, reproducible material and shall be turned over to UNT not more than twenty (20) days after acceptance of the initial system installation. Final payment will not be made until these drawings are received and accepted by UNT.

1.6.8 Provide a floor plan drawing showing the overlay of cable routes.

2 UNT OBLIGATIONS

The University of North Texas shall:

2.1 Allow the Contractor reasonable access to the premises and facilities to permit the cabling plan installation.
2.2 Assign a Project Manager as the primary liaison between the University and the Contractor.
2.3 Provide any available detailed drawings of the buildings, including maps of each building with planned cable routes marked and drop locations marked.
2.4 A list of room numbers and the number of cables to be pulled to each room from a designated telecommunications closet.
2.5 Perform asbestos abatement as needed both for telecommunications closet construction and wire pulls.
2.6 Build the telecommunications closets needed for the execution of the project, including installation of fire resistant plywood.
2.7 Install electronics in the communications racks as needed when determined by UNT.
2.8 Perform all cross-connects between station jacks on patch panels and supporting electronics.
2.9 Provide the Contractor access to existing commercial power necessary for installation.
2.10 Promptly make such inspections as it deems necessary.
2.11 UNT will provide the patch cords.

In some cases the University may opt to:

2.12 Install communications racks in the telecommunications closets as needed when determined by UNT.
2.13 Install patch panels in the communications racks as needed when determined by UNT.

If this is the case it will be clearly stated in the Invitation to Bid for the project at hand.

3 GENERAL DESIGN PARAMETERS

This wire plant is designed to handle voice and high speed data transmissions over unshielded twisted pair wire. TIA/EIA 568-A Wiring standards with the 568-A pinout standard are the foundation of UNT's Network practices. The following sections define the specific parts and techniques to be used at UNT to implement the TIA/EIA 568-A cabling standard.

The following standard will be used in determining the minimum number of drops per room pulled and terminated to each room (additional drops will be pulled where required, as designated by the UNT Project Manager):

3.1 For dormitory rooms the minimum is (1) Datatwist 350 cable per room to support voice applications and enough Datatwist 350 cables to match the room's maximum occupancy.
3.2 For faculty/staff offices the minimum is (3) Datatwist 350 cables.
3.3 For classrooms the minimum is (3) Datatwist 350 cable.
3.4 For conference rooms the minimum is (3) Datatwist 350 cable.
3.5 For telecommunications cross-connects the minimum is (2) MediaTwist 350 cables from the main closet to each/all other closets, a 6 strand plenum multimode fiber from the main closet to each/all other closets, a 6 strand plenum multimode fiber from the main closet to the multimode fiber demarc point, and a 6 strand plenum single mode fiber from the main closet to the single mode fiber demarc point in the building.

4 CONSTRUCTION REQUIREMENTS

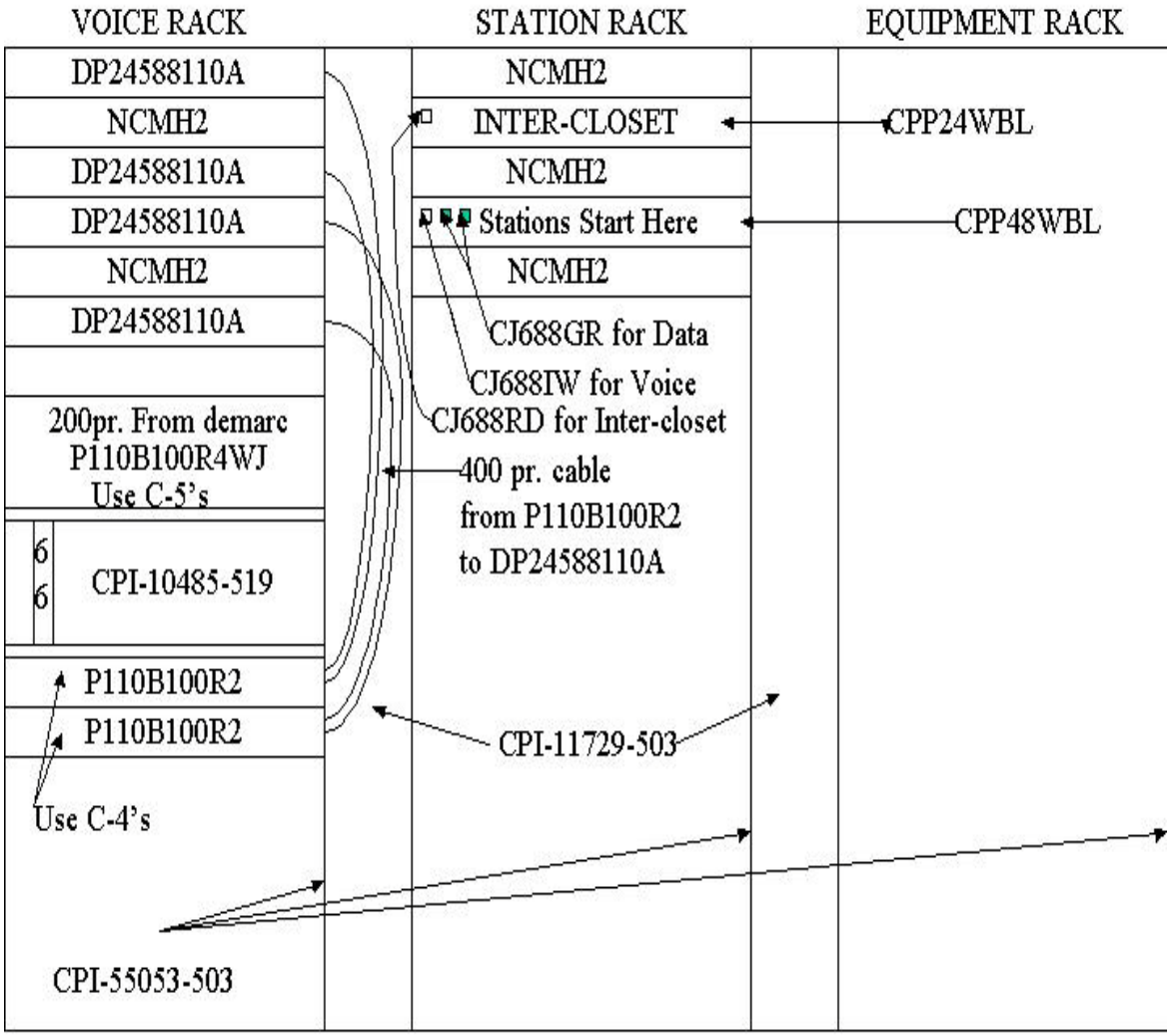
4.1 Telecommunications Closets:

Closets use designators in accordance with BICSI TDMM Ch. 7 Equipment Rooms and TIA/EIA 568-A procedures and guidelines. The following procedures shall be followed when planning for space and layouts of telecommunications closets:

4.1.1 All Telecommunications Closets shall have direct access to the hallway or other such corridor.
4.1.2 Telecommunications closets shall not share space with electrical equipment (i.e. electrical distribution panels or transformers).
4.1.3 Telecommunications closets shall not contain any type of sink or be used as storage for custodial (i.e. cleaning carts, solvents, buffers) or any other such equipment or supplies.
4.1.4 Telecommunications Closets shall not be used for storage of any kind (i.e. books, furniture, A/C filters, light bulbs, etc.)
4.1.5 Floors in telecommunications closets shall be concrete or tile. Carpeted floors are not acceptable.
4.1.6 Each telecommunications closet will have a minimum of three 4 in. sleeved core holes between floors. Where one core hole is installed there will be 2 added for future use. Empty core holes will be properly fire-stopped with intumescent fire pillows until they are needed.
4.1.7 All electrical outlets in the telecommunications closets will be 8 feet high and have an isolated ground.
4.1.8 The size of the telecommunications closets shall be determined based on the University of North Texas Telecommunications Standards published by UNT.
4.1.9 At least one long wall of a telecommunications closets will be covered in ¾ in. fire rated plywood from floor to ceiling. If fire rated plywood is not available then the plywood shall be painted with at least two coats of fire resistant white paint.
4.1.10 All Telecommunications Closets shall be equipped with a grounding bus bar that is tied back to the building's grounding system as per TIA/EIA 607.

4.2 Main and Intermediate Distribution Frame (MDF & IDF) Construction

4.2.1 MDF's and IDF's shall be constructed in each telecommunications closet in compliance with the TIA/EIA 492, 588, 569 and 606 Standards.
4.2.2 All backbone cable will be terminated at the MDFs and the IDFs with corresponding labels.
4.2.3 Distribution rings are required above and below termination blocks to support the cross connects.
4.2.4 Voice and data cables shall be separately sheathed cables extending from each workstation location to the IDF.
4.2.5 All cable pairs shall be end to end terminated in accordance with the TIA/EIA 568 Commercial Building Wiring Standard, IEEE 803.3 (l0BaseT) Standards using the 568-A pinout standard.
4.2.6 The following diagram shows the general organization of the MDF/IDF racks:



CLOSET RACK LAYOUT

Variations from this layout should be approved in advance by the UNT Project Manager.

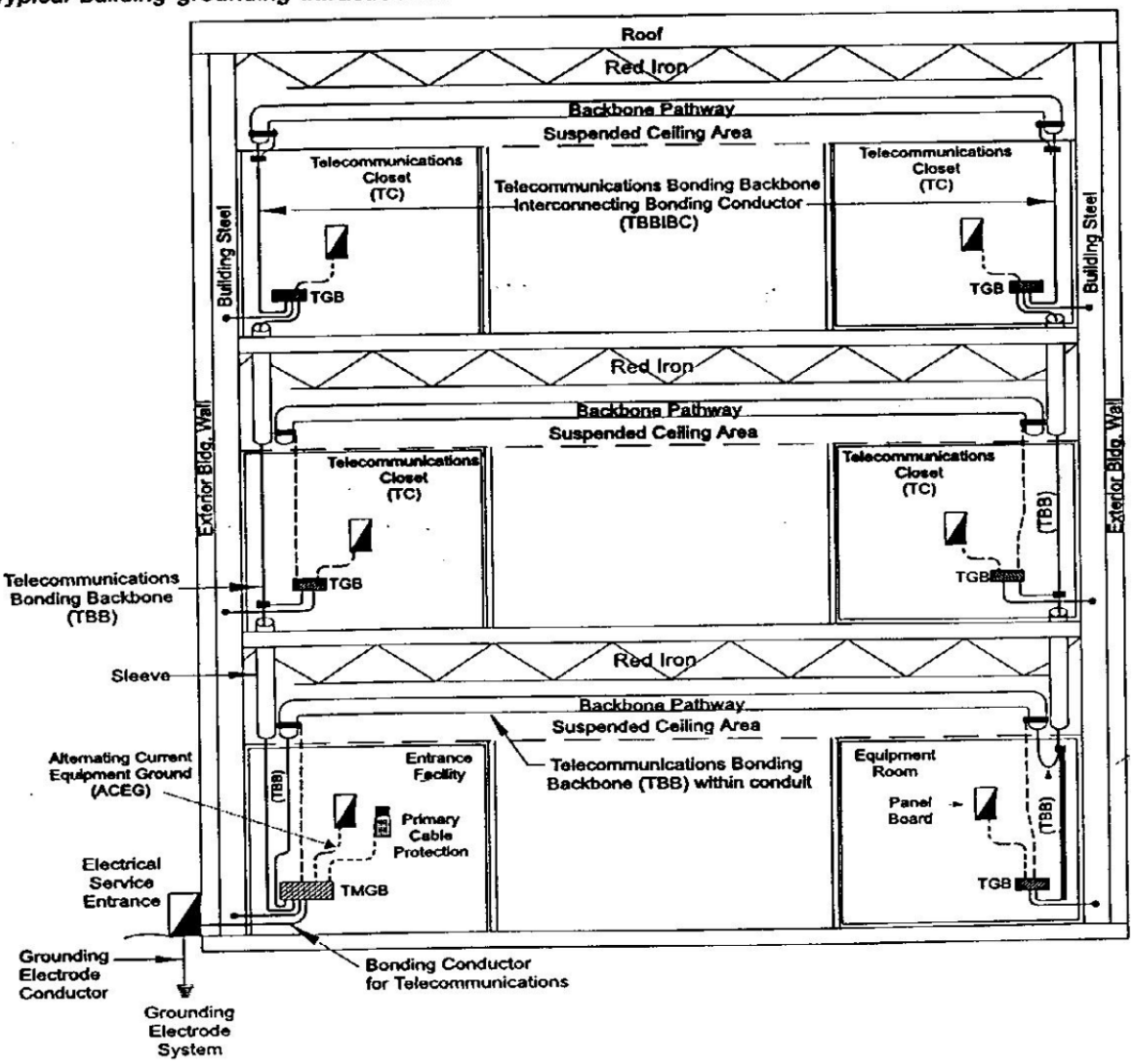
4.3 Transition Between Floors

4.3.1 When cables come off a 7 ft. rack and over a ladder way to go down they must be properly secured to the vertical section of ladder rack going to the ground.

4.4 Grounding and Bonding Procedures.

4.4.1 All metal racks, ladder ways and network/telecommunications equipment will be properly terminated per TIA/EIA 607 standards for large systems and NEC 1999 guidelines and procedures. The following illustration taken from the 2nd edition of the TCI Manual shows a typical building grounding infrastructure.

Figure 1.67
Typical building grounding infrastructure



This general scheme should be used with the final grounding plan to be approved by the UNT Project Manager.

4.4.2 The final connection to the building's main ground will be performed by a licensed electrician to be designated by the UNT Project Manager.

5 GENERAL MATERIAL SPECIFICATIONS

5.1 GENERAL

5.1.1 All wiring, materials, and equipment must be listed and labeled by a nationally recognized testing laboratory. Original Equipment Manufacturer (OEM) documentation must be provided to UNT Telecommunications Technical Representative, which certifies performance characteristics which meet TIA/EIA 568-A standards. The representative will sign a pre-approved form for use of all materials before installation.

5.2 Network Data Connections

5.2.1 All cable used for Network Data Connections will be BELDEN Datatwist 350.
5.2.2 All cables will be Plenum rated.
5.2.3 The color of the cable will be blue.
5.2.4 Cable will be installed under the strict Belden guidelines for the installation of Datatwist 350 cable. (No shiners or exposed wire will be accepted).
5.2.5 Cable on reels purchased for use in the project will be a minimum of 1000'.
5.2.6 Subsequent shorter runs on the same project will take advantage of short spools of cable. The longest drops will be pulled first to maximize the number of drops per spool.
5.2.7 Left over cable will be turned over to the UNT Office of Telecommunications upon completion of the Project.

5.3 Network Voice Connections

5.3.1 All cable shall be Belden Datatwist 350.
5.3.2 All cable will be Plenum rated cable.
5.3.3 The color of the cable will be blue.
5.3.4 Cable on reels purchased for use in the project will be a minimum of 1000'.
5.3.5 Subsequent shorter runs on the same project will take advantage of the short spools of cable.
5.3.6 All cable will be 4 pair 24 awg cable.
5.3.7 Left over cable will be turned over to the UNT Office of Telecommunications upon completion of the Project.

5.4 Intercloset Data Cables and Fiber

5.4.1 All Fiber shall be run in 1-1/4" Plenum flexible conduit.
5.4.2 There shall be two MediaTwist 350 cables from each closet in a building to the main closet in that building.
5.4.3 There shall be a six strand plenum multimode fiber cable from each closet in a building to the main closet in that building.
5.4.4 There shall be a six strand plenum single mode fiber cable from the main closet in a building to the single mode fiber backbone demarc point in the building.
5.4.5 There shall be a six strand plenum multimode fiber cable from the main closet in a building to the multimode fiber backbone demarc point in the building.

5.5 Telephone Trunk Cables

5.5.1 Trunk cables of 25 pair and up shall be 24 awg, solid conductor cables.
5.5.2 Trunk cables shall be in standard increments of 200 pair.
Trunk cables shall be terminated on 110 style blocks in the Main Distribution Frame
5.5.3 (MDF) and terminated on Panduit Brand Part # P110B100R4WJ at the closet locations in a rack.
5.5.4 Contractor shall be responsible for installation of voice feeder cable from MDF to newly established telecommunications closet, size to be determined by UNT.

Note: No cable of any kind will be scrapped or thrown away without approval from UNT. The waste or theft of any telephone or network cable used on UNT projects will be prosecuted to the full extent of the law.

6.6a Jacks (inserts) Mod-Com (existing installations):

6.6a1 Panduit Brand Part # CJ688GR Cat 6 Network Data jacks are used for all Work Area Outlets (WAOs) (GREEN)
6.6a2 Panduit Brand Part # CJ688RD OR Cat 6 jack shall be used for all Telecommunications Closet cross connect cabling. (RED)
6.6a3 Panduit Brand Part # CJ688IW Cat 6 jack shall be used for all telephone/voice circuits. (INTERNATIONAL WHITE).
6.6a4 Work Area Outlet (WAO) Faceplate – shall be a Panduit Brand Part # CFPSE4IW on all concealed W.A.O.'s and for exposed where possible. (INTERNATIONAL WHITE). The fourth slot will be filled with Panduit Part # CMBIW-X.
6.6a5 A Panduit Brand Mod-Com box Part # MBX41W may be substituted on exposed pathways.
6.6a6 Where there are more than four (4) cables Panduit Brand Part # MEFP61W or Panduit Brand Part # MEFP10IW may be used on concealed pathway installations.
6.6a7 A Panduit Brand Multi-Media box Part # MBXD6IW can be used on exposed work if necessary.

6.6b. Jacks (Inserts): Mini-Com (All New Installations)

6.6b.1 A Panduit Brand Multi-Media box Part # MBXD6IW can be used on exposed work if necessary.
6.6b.2 Panduit Brand Part # CJ688GR Cat 6 Network Data jacks are used for all W.A.O.'s (GREEN)
6.6b.3 Panduit Brand Part # CJ688RD CAT 6 jack shall be used for all telecommunications closet cross-connect cabling. (RED)
6.6b.4 Panduit Brand Part # CJ688IW CAT 6 jack shall be used for all telephone/voice circuits (INTERNATIONAL WHITE).
6.6b.5 Work Area Outlet (WAO)Faceplate – shall be a Panduit Brand Part # CFPSE41W on all concealed W.A.O.'s and for exposed where possible. (INTERNATIONAL WHITE). The fourth slot will be filled with Panduit Brand Part # CMBIW-X.
6.6b.6 Panduit Brand Mod-Com box Part # JB1IW-A may be substituted on exposed pathways.

6.7. Category 6 Patch Panels

6.7.1 Panduit Brand Part # CPP24WBL shall be used for 24 port patch panels and Panduit Brand Part # CPP48WBL shall be used for 48 port patch panels.
6.7.2 Panduit Brand Part # WBH4 Patch Panels and Wire Management shall be used for wall mount brackets.

6.8. Racks for Patch Panels and Electronics

6.8.1 Racks holding patch panels and electronics may be either floor or wall mounted. In either case it should be properly secured. Floor mounted racks should be held in place with concrete anchors and by wall ladder way with bracing to attach it to the wall.
6.8.2 Chatsworth 19" x 7' 55053-503 Relay Rack(s) shall be used for floor mount installations. Exact placement of the relay racks shall be approved by UNT's Project Manager prior to installation.
6.8.3 Chatsworth (11729-503) Vertical Rack Cabling Sections shall be installed on the previously specified relay racks.
6.8.4 Chatsworth 12" Ladder Rack shall be installed in each MDF and IDF for the support of horizontal and riser cabling.
6.8.5 The rack shall be properly grounded to the termination grounding bus bar.

6.9. Wire Management

6.9.1 Vertical wire management shall be Chatsworth #11729-503.
6.9.2 Horizontal patch cable management shall be accomplished with Panduit WMP1.
6.9.3 All tie straps used to dress cable will not be over tightened. Tie straps that deform the outer cable jacket and that can't be slid easily along the length of cable are to tight.
6.9.4 Velcro straps will be used in the closets and where cable is seen.
6.9.5 When patch cables must be run under tables they should be attached with Panduit TM258-C.

6.10. Patch Cord Designators in Telecommunications Closets:

6.10.1 Voice patch cords should be white.
6.10.2 Data patch cords should be green.
6.10.3 Closet to closet cross-connects should be red.
6.10.4 All computer lab cross-connects are green.

6.11. The following parts list should be used for all internal building fiber optics installations, including connection to the campus backbone and interconnecting the distribution frame closets.

Connectors	For multimode fiber	Unicam MM Ceramic 95-000-51
	For single mode fiber	Unicam SM Ceramic 95-200-52
Wall mount patch panels	Main closet	WCH-06P
	Other closets	WCH-02P
Fiber	Multimode	MM006K88-31130-29
	Single mode	SM006R88-31131-29
Connector panel	For multimode fiber	MM CCH-CP12-15T
	For single mode fiber	SM CCH-CP12-19T

7 GENERAL WIRE REQUIREMENTS

7.1. Horizontal Cable

7.1.1 Cable Specifications

7.1.1.1 All cable shall be installed according to BELDEN specifications for Datatwist 350 installation. Cable shall be installed where possible in multiple runs from reel jacks designed for the purpose.

7.1.1.2 All cable runs are to be straight "home runs" installed to comply with the Cabling Installation Practices (including but not limited to pull tension, cable management, maintaining twists, and minimum bend ratio) set forth in ANSI/TIA/EIA-568-A, except where deviation is agreed to in writing by the UNT Project Manager. No cable sheath may show any signs of damage sufficient to voice the manufacturer warranty. Home run is defined as directly from the wiring terminals MDF/IDF in the telecommunications closet to the jack in the installed face plate without splices, with patch connect point, without cross connect points or other breaks in the wire. All cable installations must be approved by the UNT Project Manager prior to cable termination.

7.1.1.3 Care shall be taken to ensure that during the installation nicks, abrasions, burning, and scuffing of cable is prevented. Cables found to be damaged will be replaced at the Contractor's expense regardless of whether the cable passes testing standards. UNT will be the sole determining agent of cable damage.

7.1.2 Cable Pathways

7.1.2.1 Cables shall follow pre-designated, UNT approved, pathways. These pathways will be constructed from Flextray hung from ceiling wire.

7.1.2.2 Flextray is the preferred method of installation although in dormitory and the rewiring of bldg.'s installations J-Hooks will be accepted. Ceiling support shall be at 48"intervals maximum. Cable pathways shall be so designed to avoid EMF(electrical mechanical field) and RFI(radio frequency interference), including interference from fluorescent lighting fixtures, air handling motors and electrical controls such as starters, lighting Contractors, and power distribution panels. All cable runs must be at least 12" away from all fluorescent lights and EMF sources. Any violations of this rule will be corrected at the Contractor's expense.

7.1.2.3 Contractor will follow proper procedure to assure the bend radius is not exceeded when branching off to other area along a pathway. Such branching should always be done at the tray or the J-Hook.

7.1.2.4 Under carpet wiring and flat wiring shall not be used.

7.1.2.5 Cable should not be run parallel with electrical conduits nor strapped to them.

7.1.2.6 Every cable, whether an individual or many grouped together, shall be supported.

7.1.2.7 Wherever possible cable shall be grouped together in pathways. Cable pulls should always include a 4' minimum and 6' maximum service loop at the work area outlet and in each closet. At the closet the service loop will be 10'. It will be one big loop, not several little loops.

7.1.2.8 Plastic cable ties should not be cinched (i.e., if it deforms the outer cable jacket it is too tight). The ties should be trimmed of any excess length and never be snug only.

7.1.2.9 If ever a cable support must be secured to a building structure, it may never be hung, connected to, or fixed to any other support or supported element.

7.2. Vertical Wall Drops

7.2.1 Concealed or Flush Mounted

7.2.1.1 All jacks should be terminated in accordance with TIA/EIA 568A and Panduit MOD-Com guidelines using the 568-A pinout standard.

7.2.1.2 Concealed drops should be restricted to hollow wall spaces that are made up of sheetrock on at least one side with no fire blocks. Wall openings shall have a Carlon Bluebox #B114R. Levels should be used to ensure that faceplates are mounted correctly. Faceplates should be mounted at the same height from the floor as electrical outlets unless otherwise specified.

7.2.2 Exposed or Surface Mounted

7.2.2.1 Exposed pathways shall be installed with Panduit latching ducts of various sizes that will sufficiently accommodate the cables being routed. Panduit part # LDP5 or LDP10.
7.2.2.2 Care should be taken to ensure that cables are not exposed anywhere along the pathway. This means that proper fittings are required for all transition points.
7.2.2.3 Double-sided tape is not sufficient to hold the duct and should be used in conjunction with ¼" anchoring devices mounted a minimum of every 6'.
7.2.2.4 A minimum of (2) ¼" anchors shall also be used at every device and/or junction box.
7.2.2.5 A Panduit ceiling grid transition fitting will be used on all raceway installations.

7.2.3 Terminations

7.2.3.1 Jack colors shall be the following: voice will be white, data will be green, and the closet to closet connections will be red.

8. WORK AREA OUTLET (WAO)

8.1. Concealed: The WAO shall be a Panduit Brand Part # CFPSE41W with a Panduit Brand Part # CMBIW-X in the blank slot faceplate unless specified elsewhere.(Color is Office White)
8.2. Closed: The WAO shall be of (2) styles:
8.2.1 (4) port Mod-Com box
8.2.2 A deep (2) piece surface box with a standard (4) port executive style faceplate.
8.3. Typical Faceplate Configuration
8.4. WAO's that require more than a (4) port faceplate, jacks shall be placed in the faceplate to follow the sequential labeling from left to right.
8.5. Jack locations and terminal strips must be labeled per TIA/EIA-606.
8.5.1 The labeling method shall use the room number where the jack is located, as follows:
8.5.1.1 If there is only one jack location in a room it will be only the room number (i.e., 320).
8.5.1.2 If there are multiple jack locations in the room the 1st jack from left to right will be the room number plus "-1" (i.e., 320-1), the next jack location will be the room number plus "-2" (i.e., 320-2), etc.
8.5.2 The labeling of each outlet jack will be as follows:
8.5.2.1 The 1st jack of a jack location will be the voice jack (white) and will be labeled with the jack location number plus "-1" (i.e., 320-1-1).
8.5.2.2 The 2nd jack at a jack location will be the 1st data jack (green) and will be labeled with the jack location number plus "-2" (i.e., 320-1-2).
8.5.2.3 The 3rd jack at a jack location will be the 2nd data jack (green) and will be labeled with the jack location number plus "-3" (i.e., 320-1-3).
8.5.3 Labeling must be done with a label machine (KROY, Brothers, etc.) or equivalent approved by the UNT Project Manager.

8.6. Any unused faceplate positions shall be filled with Panduit Part # CMBIW-X.

9. TESTING

9.1. A Digital Fluke (DSP-4000) shall be used to perform certification test on any and all cabling cat 5E or above installed on this campus.
9.2. The Contractor shall prepare and submit all test procedures and data forms for the pre-installation, post installation and subsystem test to UNT. The test procedures shall have UNT approval before the tests.
9.3. The Contractor shall perform sample tests in the presence of UNT representatives.
9.4. The Contractor shall, at the Contractor's expense, furnish all testing, labor and materials for the testing. Testing shall not occur until after all construction work in the space has been completed. This includes, but is not limited to, completion of carpet installation, ceiling tile installation, painting, and "punch-list" work.
9.5. The Contractor shall test all wire and cable from end to end for continuity, length, anomalies, approximate attenuation and throughput of 10Mbps and 100Mbps for Category 3 and Category 5E cabling, respectively. All wire must be tested for compliance with TIA/EIA TSB #67 standards. End to end is defined as the voice and data wire at the outlet to the associated IDF's RJ-45 patch panel jack or 110 termination block, respectively. If a subsystem fails a test because of any components in the subsystem,

the particular components shall be corrected or replaced with other components and the tests shall be repeated. If a component has been modified as a result of the subsystem test failure, a report shall be prepared and delivered to UNT prior to re-testing. The Contractor shall prepare and submit all test procedures and data forms for the pre-installation, post installation and subsystem test to UNT.

9.6. The test report shall contain the description of all tests performed, the results obtained, and any required adjustments or modifications necessary as a result of testing and installation. This report shall reflect the as-built cable plant. The test report shall be signed by an authorized representative of the Contractor. At least three copies of the test report shall be sent to UNT.

9.7. When any testing is done, either copper or fiber, there will be a UNT representative on site to view all test reports.

10. DOCUMENTATION AND LABELING

10.1. Documentation

10.1.1 The Contractor shall provide detailed documents showing the markings and wire termination plans for the MDFs and IDFs. These plans shall be reviewed for approval by UNT's Project Manager prior to cable installation.

10.1.2 For any product purchased by the Contractor, the Contractor shall provide three sets of documentation for each product utilized. The documentation shall include pamphlets, product materials, operation manuals, and technical specifications.

10.1.3 If changes occur prior to acceptance testing altering the documentation previously furnished, the Contractor shall formally update and reissue the relevant documentation to all parties designated including UNT's Project Manager.

10.1.4 Contractor shall submit final documentation as both hard copy and on a diskette in a file format agreed upon with the UNT Project Manager.

10.1.5 UNT and the Project Manager will review all documentation for accuracy and completeness and may reject substandard submittals.

10.2. Labeling

10.2.1 All identification and labeling schemes shall be approved by UNT, prior to installation.

10.2.2 The Contractor shall label all terminal blocks, cable and wiring pairs, at each IDF, MDF and workstation outlet. The Contractor will mark each cable, wiring and equipment with Panduit Brand Part # PLL-11-Y3-2.5 permanently attached markings that will not impair the cable, wiring, equipment or present a hazard to maintenance personnel.

10.2.3 The Contractor shall provide and install identification markers on all inside cables, wiring terminals and frames, so that they can readily be distinguished and referenced to the cable documentation.

10.2.4 Cables shall be identified at all cable termination points.

10.2.5 All terminal blocks shall be labeled at the IDF, MDF, and workstation outlet with the workstation interface number. Terminal blocks shall also be labeled on the top of the mounting cover with the connector number. This label shall be in type set and shall be affixed in indelible, non-smear ink.

10.2.6 Cable markings at the IDF and MDF shall be in ascending numerical order as specified in the section of this document on Work Area Outlets.

11. SAFETY

11.1. General Safety Practices:

11.1.1 The Contractor shall conform to all applicable federal, state and local regulations and/or standards pertaining to worker safety, including OSHA standards.

11.1.2 All workers will use proper safety in performing their installation tasks, i.e. wearing goggles around eye hazards, ladder safety, wearing dust masks under dusty conditions, etc. Injuries should be reported to the supervisors immediately.

11.1.3 All fire or accidents will be report to the UNT Police Department immediately.

11.1.4 All construction debris will be cleaned up nightly.

11.2. The Contractor shall notify the UNT Project Manager of any asbestos clearance issues.

11.3. Fire-stopping--The Contractor will properly fire-stop any empty core holes with intumescent fire pillows until they are needed.

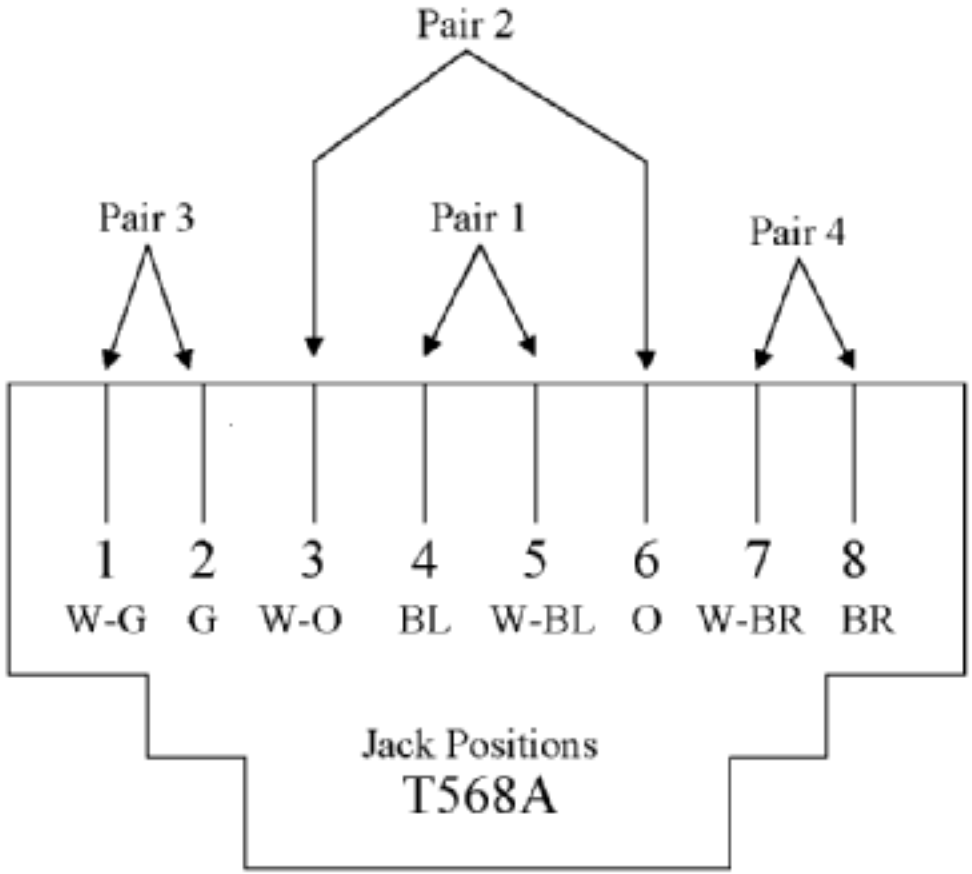
12. MISCELLANEOUS

12.1. Any coring of holes in floors should be scheduled through the UNT Project Manager at least a week in advance of when it is needed.

12.2. The normal operating hours of the Office of Telecommunications at the University of North Texas are 8am-5pm Monday through Friday, excluding holidays. Any work the Contractor desires to perform off hours should be scheduled at least a week in advance through the UNT Project Manager.

12.3. Important Campus Numbers:

12.3.1	Office of Telecommunications:	940/565-3388
12.3.2	Computing Center:	940/565-2324
12.3.3	Campus Police:	940/565-3000
12.3.4	Campus Information:	940/565-2000
12.3.5	Physical Plant:	940/565-2751



The University of North Texas terminates all jacks
to the 568A pinout standard, per TIA/EIA 568A and BICSI

Telecommunications Design Standards Summary **Revised 6-11-03**

- To all contractors,These wiring specifications are in our spec. sheets but this is a quick overview.
- CLOSETS: If you are pulling voice and data: there will be 3 19" racks and 2 vertical wire managers. There is 200 pr. voice feeder cable from the voice demarc in the bldg. to each closet. At the demarc point it is terminated on 110 blocks with d-rings, in the closet it is terminated in the voice rack on part # P110B100R4WJ. In the voice rack, a 400 pr. cable goes from part # P110B100R2 to part # DP24588110A. See attached closet rack layout sheet. You will be responsible for everything on this sheet.
- If you are only pulling data: there will be 2 19" racks and 2 vertical wire managers. You will leave off the voice rack on the closet rack layout sheet.
- There will be 2 Media Twist red cables from the main closet to each other closet. CJ688TRD will be used to terminate this closet to closet cabling. There will be a 6 strand single and 6 strand multimode fiber pulled from the fiber demarc in the bldg. to the main closet in the building.. There will be a 6 strand multimode fiber from the main closet to each other closet. All fibers will be in plenum 1'' ¼ innerduct. You will find the fiber part #'s on the attached fiber parts sheet. You will be responsible for everything on this sheet. For additional fiber pulls refer to matrix.
- Any cable or fiber which enters a communications closet or MDF or IDF it will be supported by ladder rack. If cables or fiber pass through, go through a room, or pass through a chase, they will also be supported by ladder rack. In communications closets velcro ty-raps will be used.
- If rewiring a bldg., or grounding and bonding is in the scope of work, grounding and bonding will be installed to TIA/EIA 607, the large systems. See attached grounding sheet from BICSI Manual. You will be responsible for everything on this sheet.
- Cores: 3 4" core holes are required for each communications closet. 1 will be used and the other 2 will be for future use. If cores are needed to pass through a room or to get into a ceiling of a room then 3 will be cored. All cores will be sleeved with a connector and be fire stopped.
- Service loops will be installed. There will be a 10ft at closets and 4-6ft. at the station end. At the closet the service loop will be one big loop not several little loops. All cable will be dressed out not back and hidden.
- CABLE PATHWAYS: The cable path will be in hallways. All cable will be supported every 48"s. In new construction the electric contractors will provide a cable tray. In the renovation of an existing bldg. the cabling contractor will install J-hooks every 48"s. The cabling contractor will install their own grid wires; existing grid wires will not be used. If cables pass through or go in-between a room they will be supported by ladder rack. All cable even a single drop will be supported until it is dropped down a wall or when it hits ladder rack. Cables will be pulled in-groups and turn at 90degree angles and installed to Beldens specifications. When a single cable or groups of cable leaves a cable tray or leaves a pathway it will be supported every 48" .
- If cores are needed to for pathways, 3- 4" cores are installed. 1 for use and 2 for future use. All cores will be sleeved and connectors on each side and fire stopped.
- If a wall is penetrated for any reason it will be sleeved and a connector on each side and fire stopped.
- PARTS: Fiber---fiber parts list is attached. You are responsible for every part on this sheet.
- Copper---copper parts list is attached. You are responsible for every part on this sheet. It is called Article 10 Items. The station cable used is BELDEN 1701A, blue in color. The closet to closet cable used is BELDEN 1874A, red in color. UNT's project manager must approve any item or part if not on any of these attached sheets.
- The station end uses Panduit jacks and a Panduit faceplate. A sheetrock blue box will be installed in the wall if you are rewiring a bldg.. The voice jack will be white, the data jack will be green, the closet to closet jack will be red
- If surface wiremold is required or needed it will be office white. The part # are LDP 5 and LDP 10. If an exposed box is needed it will be Panduit part # CBX4 office white.
- Again all parts that will be used are on one of our attached sheets. UNT's project manager must approve any item or part if not on any of these attached sheets.
- TESTING AND EMPLOYEE CERTIFICATIONS: The # of employees per bldg. is 6. At all times there shall be 6 workmen in each bldg.. The project foreman and at least 2 of the installers will be BELDEN/PANDUIT Certified. At all times there will be 3 BELDEN/PANDUIT installers in the bldg.. The same installers that start the bldg. finish the bldg.. The certifications will be turned in with the bid proposal. If any of the project is subbed out, at least half of the subbed out crew will be BELDEN/PANDUIT Certified. The vendor that gets the project will have their own project foreman. This position cannot be subbed out.
- All copper testing will be done with a FLUKE DSP 4000 to CAT 5E standards. When a cable is tested and it passes it is then labeled immediately, not afterwards. There will be an UNT representative present when any testing is being performed. All fibers testing will be done with a CORNING optical tester OTS-200 meter and tester. There will be an UNT representative present when any testing is being performed.

Telecommunications Building Elements

The following are elements that compose a telecommunications stems. See the following illustration the depicts how these elements fit together.

A. Horizontal Pathways:
These facilities provide pathways for installation of media from the telecommunications closet destined for the work area telecommunications outlet/connector. A horizontal pathway facility can be composed of several components including cable tray, conduits, underfloor access floor, ceiling, and perimeter systems.

B. Horizontal pathways:
These facilities provide pathways for installation of media from the telecommunications closet destined for the work area telecommunications outlet/connector. A horizontal pathway facility can be composed of several components including cable tray, conduit, underfloor, access floor, ceiling, and perimeter systems.

C. Intrabuilding backbone pathways and related spaces.
One or more backbone facilities may exist within a building. A backbone facility is generally formed by vertically stacking telecommunications closets with floor openings between them. Tie pathways may also exist to install backbone media between telecommunications closets on the same floor.

D. Work area
A work area is a building space where the occupant normally interacts with telecommunications equipment. The telecommunications outlet/connector in the work area is the point at which end-user equipment "plugs into" the building telecommunications utility formed by the pathway, space, and building cabling system.

E. An equipment room
Serves the space needs for larger telecommunications equipment. These are often special-purpose rooms. Equipment rooms are connected to the backbone facility.

F. Entrance facilities:
E.1. Interbuilding backbone
Pathway facilities to the entrance room or space provided for interconnection to other buildings, as in a campus environment.
E.2 Service entrance pathway.
Pathway facilities to the entrance room or space provided at the entrance facility for the service providers.

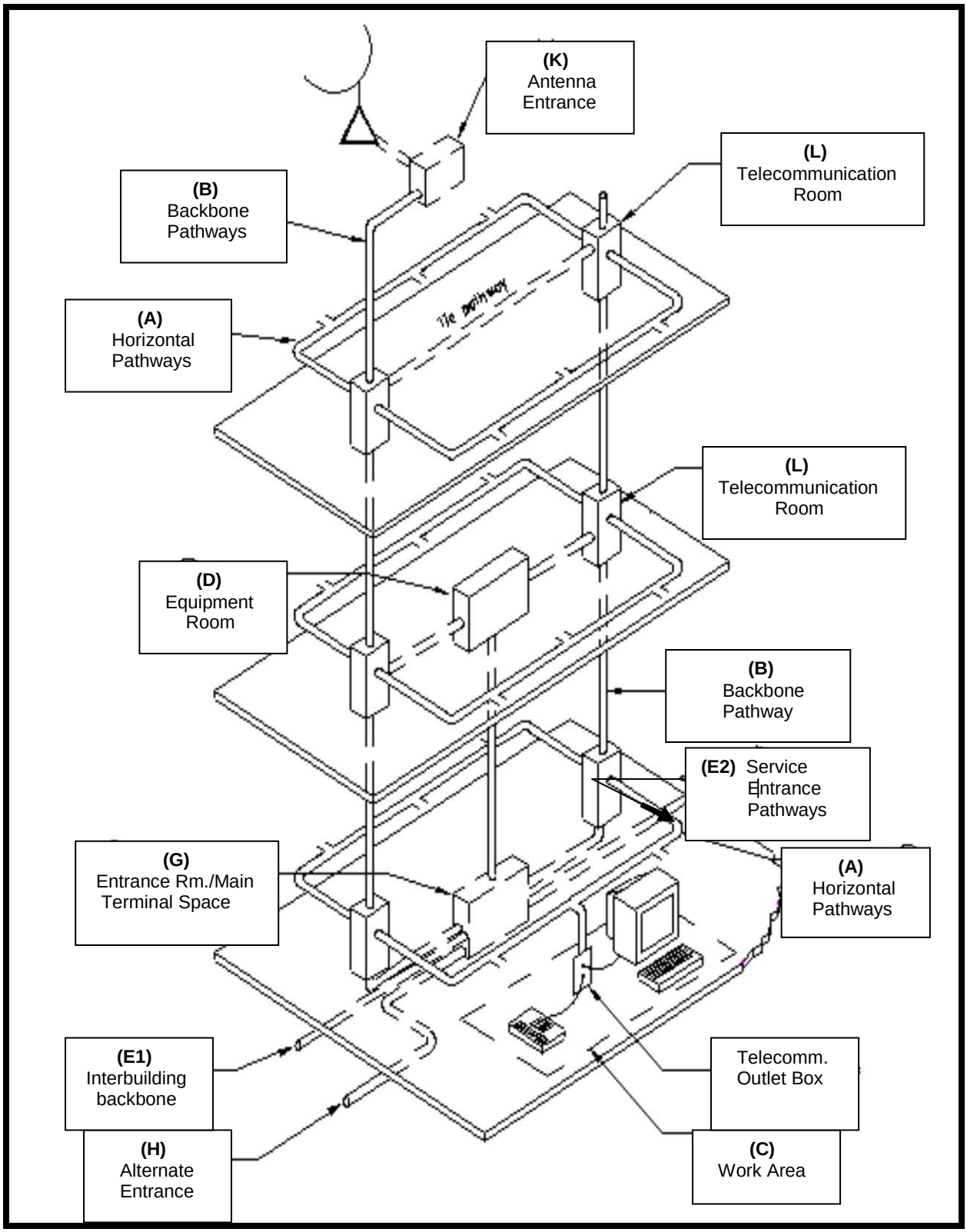
G. Entrance point
The point of emergence of telecommunications cabling into a building space.

H. Entrance room or space
This space, preferably a room, is the building serving facility in which the joining of inter- and intrabuilding backbone facilities takes place. The service entrance room may also house electronic equipment serving any telecommunications function.

I. Alternate entrance.
A pathway for the duplication or diversification of the service entrance and interbuilding pathways.

K. Antenna entrance.
A pathway facility to the associated entrance room.

L. Telecommunications room
A floor-serving facility for housing telecommunications equipment, cable terminations, and related cross-connections. The telecommunications closet is the recognized transition point between the backbone and horizontal pathway facilities



TELECOMMUNICATION BASIC BUILDING ELEMENTS ILLUSTRATION

Appendix C: Fire Alarm System Specifications **updated 11/2004**

1.1 WORK INCLUDED

This section specifies the design, furnishing, installation, and testing of a complete analog, electrically supervised, addressable fire alarm system as specified herein. The system shall include, but not limited to, all control equipment, power supplies, signal initiating devices, audible and visual alarm devices, conduit, wire, fittings, and all other accessories required to provide a complete operable fire alarm system. The system shall operate as a non-coded, continuous sounding system, which shall have addressable devices on signaling line circuits as specified herein.

1.2 REFERENCED STANDARDS

A. A NFPA 70 - National Electric Code
B. NFPA 72 – National Fire Alarm Code
C. NFPA 101 – Life Safety Code
D. Article 601B, Vernon's Texas Civil Statutes.
E. Article 5.43-2, Texas Insurance Code.
F. ADA – Americans With Disabilities Act.
G. UL 38 – Manually Activated Signaling Boxes.
H. UL 268 – Smoke Detectors for Fire Protective Signaling Systems.
I. UL 268A – Smoke Detectors for Duct Applications.
J. UL 464 – Audible Signaling Appliances.
K. UL 521 – Heat Detectors for Fire Protective Signaling Systems.
L. UL864 – Control Units for Fire Protective Signaling Systems.
M. UL 1481 – Power Supplies for Fire Protective Signaling Systems.
N. UL 1638 – Visual Signaling Appliances.
O. UL-1711 – Amplifiers for Fire Protective Signaling Systems**.**

1.3 CONTRACTOR QUALIFICATIONS

A. Installer Qualifications. An experienced installer who is an authorized representative of the Fire Alarm Control Panel manufacturer for both installation and maintenance of units required in this project. Installing company must have factory-trained technicians. A minimum of one licensed technician shall be on each installation site.

B. Manufactures Qualifications. A firm experienced in manufacturing systems similar to those indicated for this project and with a record of successful in-service performance.

C. Source Limitations. Obtain fire alarm system components through one source from a single manufacturer.

D. State Fire Marshal's Licensing. The Contractor shall be licensed by the State Fire Marshal to install fire alarm systems. The Contractor's installation superintendent shall be licensed by the State Fire Marshal to supervise the installation of the fire alarm system.

E. Compliance with Local Requirements; Comply with applicable building code, local ordinances and regulations, requirements of Authorities Having Jurisdiction and any specific building "DO's and DON'T's" list.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70, Article 601B, Article 5.43-2, ADA, and State/Local ordinances.

B. Meet the requirements of design, fabrication, installation and testing established by NFPA 72.

C. Furnish products listed and classified by Underwriter's Laboratory, Inc. as suitable for purpose as specified herein.

1.5 DESIGN REQUIREMENTS

A. Provide complete fire alarm system design as outlined in this specification.

B. Provide three (3) sets of plans to the University of North Texas Fire Marshal for approval.

C. Locate fire alarm control panel in a surface mounted enclosure as shown on the drawings.

D. Provide minimum zoning as specified.

E. Provide manual pull station adjacent to fire alarm control panel

F. Provide no smoke sensing detectors unless specified otherwise or required by code.

G. Provide duct-type smoke sensing detectors for HVAC equipment in accordance with NFPA 90A.

H. Use ionization type smoke sensing detectors for areas susceptible to flaming fires. Use photoelectric type smoke sensing detectors for areas susceptible to smoldering fires and in HVAC ductwork and equipment.

I. Provide audible and visual notification in accordance with NFPA 72 and ADA.

J. Provide elevator lobby, elevator hoistway and machine room detectors and connect to the elevator controls in accordance with NFPA 72.

K. Provide one PRN-5 printer or equivalent.

1.6 EXTRA MATERIALS

Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

A. Strobe Units: Quantity equal to 10 per cent of amount installed, but not less than one unit.

B. Smoke Detectors. Fire Detectors, and Flame Detectors: Quantity equal to 10 per cent of each type installed, but not les than one unit of each type installed.

C. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than one unit of each type.

D. Printer Ribbons: Six spares

E. Keys and Tools: Two extra sets for access to locked and tamperproof components.

PRODUCTS

2.1 SYSTEM OPERATION

A. Device Actuation. The actuation of any manual or automatic alarm-initiating device shall indicate, at the main alarm panel, the device from which the alarm was initiated and sound all trouble devices and cause the system to operate as specified herein.

B. Devise Silencing. All audible signaling appliances shall continue to sound and all visual signaling appliances shall flash until the alarm condition has been silenced, at which time the audible signaling appliances shall stop and all visual signaling appliances shall remain flashing until the system has been cleared and reset. Silencing of any system signal shall not interfere with subsequent alarms for other zones.

C. Air Handler Deactivation. The activation of any automatic smoke detector shall automatically deactivate its respective air handler. Duct smoke detectors shall transmit a supervisory signal only to the fire alarm control panel.

D. Wiring Classification. The signaling line circuits shall be Class B, Style 4, 2-wire, and the alarm signaling circuits shall be Class B, 2-wire supervised circuits.

E. Alarm Signals. The audio-visual alarms shall be activated on the floor level in which the alarm occurred as well as on the adjacent floors above and below the alarm floor level.

F. Alarm Operations. The actuation of any manual or automatic alarm-initiating device shall immediately sound the evacuation tone as described in 1.7 H.

G. Control Operation. The alarm signals shall deactivate HVAC systems, close smoke dampers, and initiate elevator recall. Controls shall automatically operate in the fail-safe mode upon loss of power.

H. Evacuation Tone. When an alarm condition occurs, an evacuation tone shall be transmitted. This tone shall be the ANSI S3.41 – American National Standard Audible Emergency Evacuation Signal. The evacuation tone shall be followed by an approved digital recorded voice announcement on voice evacuation systems.

I. Elevator Controls. Elevator lobbies shall be provided with smoke sensing detectors at every elevator lobby. The activation of an elevator lobby smoke detector shall automatically lock out the elevator doors for its respective floor and return elevators to the primary designated level. In the event of a fire on the primary designated level, elevator cars shall return to the floor immediately to the secondary designated level. Verify designated levels with the Authority Having Jurisdiction.

J. Notification. If an alarm or trouble condition exists, the system shall transmit a digital signal through telephone communications to an approved alarm monitoring company and by a Uninet 2000 Onyx Network System connected to the UNT Ethernet backbone as designated by the Owner.

2.2 ZONING

A. General. All initiating devices shall be of the addressable analog type or connected to the signal circuits via addressable module. Although each individual device point number and message shall be displayed on the Master Controller's LCD, the initiating devices shall be zoned to provide the appropriate indication on the remote annunciator panel.

B. Minimum Zoning. Minimum zoning shall be as follows:
   1. Each floor shall constitute a separate initiating zone.
   2. The main mechanical and electrical equipment rooms shall constitute separate initiating zones.
   3. Penthouses shall constitute separate initiating zones.
   4. Manual pull stations and automatic detectors shall be on respective floor zones and shall initiate an alarm signal as specified herein.

2.3 MASTER FIRE ALARM PANEL

A. Construction. Provide a control panel constructed of heavy gauge steel in compliance with UL864, UL 1481 and UL 1711. The cabinet shall be suitable for surface mounting. The control panel shall be of a dead-front construction and modular in design.

B. Control Module. The control module shall operate without error for dates in the year 2000 and beyond. Provide a control module that uses state-of-the-art electronics and liquid crystal display (LCD). The unit shall contain a real time clock, tactile feel keypad (16 keys), (2) buttons for scrolling data on the LCD, (4) front panel switches for Reset, Alarm and Trouble Silence, and Drill / All Call and (5) LED's for Normal, Alarm, Supervisory, Trouble, and Test/Program. The common control module shall provide power and the main core functions for monitoring, interpreting and automatically controlling the fire alarm system. The control module shall support and control additional true network slave control modules, audio control modules, serial annunciators and switches over RS 485, RS 232, Fiber Optics or 20 MA loop as required. The control module shall contain RS 232 printer / programming port for programming locally via an IBM PCC or down loading through modems from a remote PC. When operational each controller shall support a printer through the RS 232 port and be capable of message routing. The control module shall support addressable loop cards. Each sensor shall respond to a panel poll for information with an analog representation of measured fire related phenomena (smoke density, particles of combustion, temperature). Such response proves end-to-end sensor response including the operation of the sensor electronics. Systems, which only monitor the presence of a conventional detector in an addressable base, shall not be acceptable. The control module shall have the following additional features without any changes in hardware or firmware:

   1. Logic Statement.
   2. Time Controls.

3. Sequences.
4. Actions.
5. Weekday / Holiday Schedules.
6. Guard Patrols
7. Analog Value Reporting of all analog sensors and traditional zones.
8. Maintenance Reporting by Intelligent Sensor.
9. Sensitivity Setting by Sensor (Within UL Limits)
10. Sensitivity Setting Changed by Time (Day / Night Mode).
11. Alarm Verification by Point or Zone.
12. Print a History of Sensors Activating the Verification Cycle.
13. On Demand System Condition Printouts (Status).
14. Up to 99 Priorities for any Event Driven Relay / Output.
15. Enabling and Disabling of any System Device or Function.
16. Ground Fault Detection on all System Devices and Inputs.
17. Three Types of One-Man Walk Tests.
18. Normal and Silent Walk Tests.
19. Field Programmable Walk Tests.

C. Auxiliary Relays. An adequate quantity of zoned auxiliary relay contacts shall be provided for proper interface with the HVAC, elevator and door controls as required per the drawings and specifications.

D. Supervision. Each alarm initiating circuit, speaker, alarm signal circuit and fire department interfacing circuit shall be supervised. Any loss of power, open or ground in the circuit shall initiate the audiovisual trouble indicator. The trouble lamp illumination shall be non-canceling except by an actual clearing of the trouble condition. The audible trouble signal may be silenced by use of a trouble silence switch, which incorporates the ring-back feature, or by use of a self-restoring trouble silence switch.

E. Operating Power. Power for the operating D-C alarm initiating devices and audio-visual alarm devices shall be obtained from a supervised power supply within the main fire alarm control panel.

F. Primary Power Supply. The control panel shall receive its primary operating power from a dedicated 120 volt A-C, single phase, 60-hertz supply.

G. Auxiliary Power Supply. The auxiliary power supplies shall provide operating and supervisory power for 24 hours. Provide low maintenance gel cell type batteries to meet the above requirement and to operate all alarm signals for a minimum duration of 5 minutes.

H. Battery Charger. Provide battery chargers that are self-adjusting for high, medium, or low charge rates. The battery charger shall be capable of charging gel cells, wet cells or Nicad batteries. The battery charger shall have a low battery LED indicator, and a charger trouble LED indicator. Should the charge voltage become too high, the charger shall automatically shut down until reset to prevent damaging the batteries. The common trouble indicators will be activated and the separate over-voltage LED will be activated. Switches shall be provided for lamp test and charger reset.

I. Remote Transmission. Provide transfer of alarm to an approved central station monitoring company. This shall be by a DACT (Digital Alarm Communicator/Transmitter) and by a Uninet 2000 Onyx Network System connected to the UNT Ethernet backbone. A switch shall be provided to prevent an alarm from being transmitted during a fire drill. Activation of this switch will cause the system trouble LED and audible device to be activated.

2.4 MANUAL FIRE ALARM STATION

A. Manual fire alarm station shall conform to UL 38, be non-coded, non-break-glass type with a key operated test-reset lock so that they may be tested, and so designed that after actual emergency operation, they cannot be restored to normal except by use of a key. An operated station shall automatically condition itself so as to be visually detected at a minimum distance of 100 feet, front or side. The word FIRE shall appear on each side of the stations in depressed letters, ½ inch in size or larger. Stations shall be suitable for surface mounting on matching back box or semi-flush mounting on a standard single gang box and shall be installed 48 inches above finished floor. The manual fire alarm station shall be used with a remote monitor module for point addressability.

2.5 AUTOMATIC FIRE DETECTOTORS

A. General. Automatic fire detectors shall conform to UL 268 for smoke sensing detectors, UL 268A for duct-type smoke sensing detectors and UL 521 for heat sensing detectors. Automatic fire detectors shall operate in accordance with NFPA 72. Automatic fire detectors shall be specifically listed for the application and with the control panel. In dormitories, the smoke detectors in the sleeping rooms shall be connected into the fire alarm panel.

B. Ionization-type Smoke Sensing Detectors. The detector shall incorporate a built in type identification so the system can identify the type of detector. The detector shall be continually monitored to measure any change in their sensitivity because of the environment (dirt, smoke, temperature, humidity, etc.). The detector shall use the ionization principle to measure products of combustion. The detector shall provide advanced indication of the analog value of the products of combustion to the control panel that maintenance is required thus reducing the maintenance required to inspect routinely all sensors, in order to insure normal operation. The sensor sensitivity shall be adjustable per device (within UL limits). The detector shall operate on signaling line circuit with the wiring monitored for trouble conditions resulting from a loss of power to the detectors. A lamp on the unit shall be continuously lit when the detector is in an alarm condition. Ceiling mounted detectors shall be semi-flush mounted with a hard-wire base and removable detector head. A trouble signal shall be lit at the control panel if the detector head is removed. Provide relay base with SPDT auxiliary alarm contacts for additional switching capabilities, where needed.

C. Photoelectric-type Smoke Sensing Detectors. The detector shall incorporate a built in type identification so the system can identify the type of detector. The detector shall be continually monitored to measure any change in their sensitivity because of the environment (dirt, smoke, temperature, humidity, etc.). The detector shall use the photoelectric principle to measure smoke density and shall on command from the control panel send data to the panel representing the analog value of the smoke density. The detector shall provide advanced indication of the analog value of the level of smoke density to the panel that maintenance is required, reducing the maintenance required to inspect routinely all detectors in order to insure normal operation. The detector sensitivity shall be adjustable by device. The detector shall operate on signaling line circuit with the wiring monitored for trouble conditions resulting from a loss of power to the detectors. A lamp on the unit shall be continuously lit when the detector is in an alarm condition. Ceiling-mounted detectors shall be semi-flush mounted with a hard-wired base and a removable detector head. A trouble signal shall be lit at the control panel if the detector head is removed. Provide relay base with SPDT auxiliary alarm contacts for additional switching capabilities, where needed.

D. Duct-type Smoke Sensing Detectors. The detector shall incorporate a built in type identification so the system can identify the type of detector. The detector shall be continually monitored to measure any change in their sensitivity because of the environment (dirt, smoke, temperature, humidity, etc.). The detector shall use the photoelectric principle to measure smoke density and shall on command from the control panel send data to the panel representing the analog value of the smoke density. The detector shall provide advanced indication of the analog value of the level of smoke density to the panel that maintenance is required, reducing the maintenance required to inspect routinely all detectors in order to insure normal operation. The detector sensitivity shall be adjustable by device. The detector shall operate on signaling line circuit with the wiring monitored for trouble resulting from a loss of power to the detectors. A lamp on the unit shall be continuously lit when the detector is in an alarm condition. A trouble signal shall be lit at the control panel if the detector head is removed. Provide Remote Test Switch for any duct detector installed above eight foot in height. Provide relay base with SPDT auxiliary alarm contacts for additional switching capability. A sampling tube shall extend into the duct (7/8-duct width minimum) allowing a sample of air through the detector and back into the duct via the return air tube.

E. Heat Sensing Detectors. The detector shall incorporate a built in type identification so the system can identify the type of detector. The detector shall be continually monitored to measure any change in their sensitivity because of environment (dirt, temperature, humidity, etc.). T he detector shall use dual solid-state thermistors and shall monitor the ambient temperature from –10 degrees C, to +60 degrees Cand provide a fast response to rapid increase in temperature. The detector on command from the control panel shall send data to the panel representing the analog value of the ambient temperature.

2.6 REMOTE MONITOR MODULE

A. The remote monitor module shall be used to connect supervised conventional initiating devices such as water-flow switches and tamper switches to the signaling line circuits and shall mount in a 4 square, 2 1/8 inch deep electrical box. The remote monitor module shall provide address-setting means using rotary decimal switches

and also store an internal identifying code, which the control panel shall use to identify the type of device. The remote monitor module shall contain an integral LED that flashes each time the monitored is polled.

2.7 REMOTE CONTROL MODULE

A. The remote control module shall be used to connect and supervise, conventional indicating device or zone of indicating devices that require an external power supply, such as horns, strobes, bells, speakers or telephones to the signaling line circuit. The remote control module shall be capable of operating as a relay (dry contact form C), to control door holders, HVAC equipment, and elevator equipment. The remote control module shall mount in a 4 square, 2 1/8-inch deep electrical box. The remote control module shall contain an integral LED that shall flash each time the module is polled. The remote control module shall provide address-setting means using rotary decimal switches and also store an internal identifying code, which the control panel shall use to identify the type of device.

2.8 NOTIFICATION APPLIANCES

A. General. Audible signaling appliances shall conform to UL 464. Visual signaling appliances shall conform to UL 1638. Provide combination audible and visual-signaling appliances manufactured as a single unit with the capability for terminating separate audible and visual circuits. The unit shall be surfaced mounted on a special surface back box or flush mounted on a special flush back box.

B. Audible Signaling Appliances. Horns shall be designed for 24 volts d-c operation. The horn circuit shall be supervised.

C. Visual Signaling Appliances. Visual alarms shall be of the strobe type designed for operation on 24 volts d-c. The lamp circuit shall be supervised and the lamp shall remain on after the audible device has been silenced. Provide strobe intensity as indicated on the drawings.

2.9 REMOTE ANNUNCIATOR

A. Provide a remote annunciator panel, which shall include audible and visual indication of alarm and supervisory zones, and audible and visual indication of system trouble.

2.10 WIRE

A. Conductors shall be of the type, size and quantity as recommended by the manufacturer of the equipment to be installed. All wiring shall be installed in conduit; however, at the Owner's option and with approval from the UNT Fire Marshal, wire that is UL classified for use in air plenums may be used without conduit.

B. Conductors shall be concealed in conduit or wire mold in finished areas and equipment rooms. Conductor wire that is UL classified for use in air plenums may be used without conduit and may be exposed in air plenums.

2.11 ACCEPTABLE MANUFACTURERS

A. The complete and operable addressable fire alarm and communication system shall be manufactured by Notifier, a division of Pittway Company.

EXECUTION

3.0 INSTALLATION

A. Work. The work shall be accomplished by personnel experienced in the installation of the specific type of system. The services of a qualified technician shall be provided to supervise the installation, testing and adjustment.

B. Color Coding. Appropriate color-coding shall be provided for the conductors of the system.

C. Final Connections. Final connections of the system equipment shall be under the supervision of the manufacturer's representative.

D. Audible Levels. The manufacturer's technical representatives shall supervise the final balancing of the audible levels controlled by the fire alarm system.

E. Interconnections. Provide intercommunications to other systems and devices.

F. Labels. Label wiring at terminations, pull, junction and outlet boxes.

G. Zones. Zone system in accordance with the Contract Documents. Provide grounding.

H. Terminations. Fire alarm conductor terminations in control panel and annunciator panels to be made on terminal strips with separate point for each conductor. All such strips to be number identified as shown in wiring diagram attached to inside door of control panel. Connect wiring neatly to terminal strips. Connect clip with nylon cable straps or lace with jute cord. Set up termination of cabling so that sections of the system may be isolated or shorted out for servicing.

I. Elevator Controllers. Provide signal connection to each elevator controller.

J. Identification. Identify primary power disconnecting means in red marking as "Fire Alarm Control Circuit". Identify location of the primary power disconnecting means at the fire alarm control panel.

K. Detector Installation. Install automatic fire detectors only after final clean up has been completed. Replace detectors installed prior to final clean up with new detectors.

L. Fire Alarm Panels: Not to be installed in Communications Rooms. Only telecommunications and datacom equipment are permitted in Communication Rooms.

M. Walls and Ceilings. Fire Alarm contractor responsible for patching and repairing walls or ceilings where exiting devices are not replaced. All ceiling tiles are to be in place at the conclusion of the contract.

3.1 INSPECTION AND TESTING

A. Testing Equipment. The Contractor shall furnish all instruments, labor, and materials required for the tests and a qualified technician to conduct the tests.

B. System Testing. Upon completion of the installation, the system shall be subjected to operational tests. Any deficiencies found shall be corrected by the Contractor and the system shall be re-tested as necessary, prior to final acceptance. Testing shall be in accordance with NFPA 72, Chapter 7.

C. Documentation. On completion of the system testing, submit completed NFPA 72, Figure 7-5.1 Inspection and Testing form and NFPA 72, Figure 1-7.2.1 Certificate of Completion form to the owner.

3.2 QUALIFICATIONS

A. Personnel Qualification. The Contractor shall submit two copies of a statement showing the experience of the installing personnel. Installation personnel must have a minimum of 3 years of experience in installing systems of this magnitude.

B. Service. The equipment supplier must maintain a 24-hour service department with a guarantee of service within 8 hours of being called any time 7 days a week. The service department shall have service technicians, factory trained in the care and maintenance and troubleshooting of the equipment supplied.

3.3 CERTIFICATION

A. Upon completion of system testing, submit completed NFPA 72, Figure 1-7.2.1 Certificate of Completion form to the Owner along with a letter of certification attesting to the fact that he has tested and adjusted the system, that all components are properly installed and free of defects, and that the system is in compliance with this specification.

3.4 OPERATING AND MAINTENANCE MANUALS

A. Submit operating and maintenance manuals in accordance with NFPA 72.

B. Provide “As Built” set of plans (one full size and one half size) in accordance with NFPA 72.

3.5 GUARANTEE

A. The system shall be guaranteed to be free from all defects of materials and workmanship for a period of 1 year effective upon date of acceptance. Equipment or components showing inherent defects of a mechanical or electrical nature shall be replaced promptly at no expense to the Owner.

3.6 INSTRUCTIONS

A. The equipment manufacturer shall make available the services of a qualified manufacturer’s trained representative to instruct the Owner’s operating personnel as to the operation and maintenance of the entire system for a period of four (4) hours.

3.7 INSPECTIONS

A. Two periodic inspections, at no expense to the Owner, shall be made within the first year’s guarantee period to ensure satisfactory operation of the system.

Appendix D: Distributed Learning Videoconference Room Design Consideration

Center for Distributed Learning **(**CDL) provides room based videoconferencing design services to all UNT organizations in two functional areas - facilities and systems.

Facilities Design

CDL will work with the project architect to specify the layout and design of a physical space to be used with conferencing equipment. CDL will also evaluate an existing space which is being considered for use as a conferencing room. Our evaluation of an existing space will result in either a qualification of the room as "functional", with a list of necessary modifications, or we will eliminate the room as a viable candidate for a system.

Systems Design

CDL will specify components which will work in a qualified room and will also specify in the design any desired peripheral equipment. CDL will also oversee installation and maintain the physical system equipment.

Maintenance

CDL offers maintenance for room-based videoconferencing systems that have been designed by CDL. Annual warranty contracts are also available from the manufacturer and cover the cost of replacement parts and software upgrades. The cost of warranty service is typically provided by the department whose inventory the equipment is on.

Requirements for Videoconferencing Rooms

The following should provide assistance with the identification of potential videoconference rooms by providing physical specifications in several key areas:

Seminar Style Videoconference Room

A facility used to accommodate meetings between geographically dispersed locations. It is meant to emulate the traditional conference room model where all individuals sit around a common table and have equal access and view to all participants. The format of the meeting is based on a discussion paradigm, not a formal instructor/student model for ongoing classes, and includes no more than 20 people at each site

Traditional Classroom Style Videoconference Facility

Similar to the seminar style of videoconference room, except that the instructor faces both local and remote students at the same time. The instructor is allowed slightly greater access to expressive movement. Formats of these meetings are based on a formal instructor/student model and include no more than 50 students at each site.

Lighting

The best lighting for videoconferencing is diffuse fluorescent. It is important to minimize shadows and to create an evenly lit environment. A diffuser with a parabolic egg crate screen containing 4-inch square openings is recommended for attachment to the fluorescent fixtures. To maximize the appearance of skin tones and to minimize shadows, lights with between 500 and 700 lux (vertical) are recommended. Additionally, the use of low energy fluorescent lights that operate between 30 and 50 kHz is discouraged. These lights can interfere with the proper functioning of wireless

computer system operations. Ideally, the room should not have any exterior windows. If it does, they need to be covered with room darkening drapery/blinds.

Decor

The best decor is plain and simple. Keep the area within the camera's view uncluttered. Extraneous objects such as mirrors, artwork, plants, and fans cause the video compression algorithms to expend large amounts of processing resulting reduced video quality. The best wall color is a neutral non-white color, such as medium gray. Avoid wall treatments with patterns. These also can cause undo strain on the video compression system.

Acoustics

Audio quality is one of the most important contributing factors to a favorable videoconference experience, therefore good acoustics are important. Of particular concern is reverberation - the effect of sound reflecting off of hard surfaces. One of the best ways to minimize the harmful effects of reverberation is to coat floors, ceilings, and walls with sound absorbing materials. In addition to minimizing reverberation it is also important to isolate the room from external noise sources such as fans and duct work from heating and cooling systems, water pipes, office machines, telephones, and street noise.

Room Type/Furniture Layout (Seminar Style)

The conference table should be "U" or "V" shaped to ensure equal access to the camera for each participant. The table cannot be wider than 12 feet or longer than 24 feet in order to accommodate the requirements of the microphones. There should not be more than 25 feet from the lens of the camera to the farthest participant to ensure visibility and correct functioning auto focus. The rear wall of the room cannot be more than 40 feet from the lens of the camera. The seating must be laid out so that all participants can be seen in the camera's room view.

Room System Overview and Accessory Hardware

UNT’s videoconferencing room systems are generally built around a common set of equipment that meet our minimum technical requirements. These standards were designed for a range of applications, levels of service and quality dependent upon their purpose. CDL has set the minimum acceptable technical level for equipment University rooms and requires this equipment, e.g. computers, codecs, mics, cameras, to be downward compatible for connection to systems outside of UNT which meet industry standards, but may be of less quality, sophistication, or complexity.

Cost Variable Accessories

Rooms are designed around technical requirements, and most cost variations are due to accessories and room renovations. The accessories include:

- Number of cameras
- Number of video display units
- Size of display equipment
- Quality of audio speakers
- Number of microphones
- Document camera
- Computer
- VCR/DVD (video recorder/player)
- Auxiliary video and audio sources
- 30 frames per second (fps) hardware

Videoconference System Hardware Cost *Estimates*

Small Room System

Participants: 1-10
Cost range: $15,000 - $25,000

Typical Equipment:

- CODEC
- Network
- Two 35-inch monitors or one projector
- One camera
- Single microphone
- Accessories

Medium – Large Room System

Participants: 15-50
Cost range: $35,000 - $70,000

Typical Equipment:

- CODEC
- Network
- Three 35-inch monitors or three projectors/screens
- One-Two cameras
- Two-Five microphones
- Document camera
- Computer
- VCR
- DVD Player

Physical Room Characteristics & Other Considerations

It is always easiest to start with new constructions which will afford the greatest degree of flexibility in creating an ideal videoconference room. There are a number of unique considerations to keep in mind when considering a room for a videoconference installation.

Sight Lines – The goal is to provide the best view of the display units to all videoconference participants. The widest viewing angle for any participant should be 45 degrees off center of the display units. No columns or other physical obstructions should be located between the participants and the display units.

Location of Data/Telecommunication Jacks & Electricity – The videoconference equipment is typically housed in an instructor podium which must be connected to the data network, the phone network and electricity. These jacks should be located adjacent to the instructor podium to minimize cabling lengths and ensure safety.

Location of Doors – The orientation of equipment in the room is such that the instructor station is placed in one corner and a fixed projection screen is placed in the opposite corner. The front wall adjacent to the instructor has two

large projections screens attached. The location of the doors should accommodate the placement of this equipment and ensure that participants entering the room do not interfere with videoconferences which may be in progress.

Carpeting – As mentioned in the sections regarding Acoustics, covering the floor with carpeting helps to decrease ambient sound in the room and eliminate such distractions as chairs being moved across the floor. In modern room design, mats are placed under the carpet that are used to locate the instructor and move the camera automatically. It is ideal to place the mats and wiring on the bare floor prior to carpeting as this eliminates the need to remove and replace carpeting associated with installation.

Security – Many components of a videoconference installation are portable and have consumer appeal for non-videoconference applications. To ensure reliability of the system, it is necessary to secure the components by using some proprietary fasteners, locking mounts and other security techniques. However, a monitored alarm system with unique codes for all users is also highly recommended to prevent theft.

Size:

- Ideal dimensions are 1.25:1 (depth:width); maximum dimensions are 1.5:1 (depth:width).
- Minimum ceiling height is dictated by screen height (see also "Screen" below).

Seating:

- ADA-compliant aisle widths.
- Tables and chairs are preferred.
- All seats within 90 degrees of screen center (no more than 45 degrees to right or left).
- Front row of seats should be no closer than 1.5 X screen width.

Screen:

- Screen dimensions must accommodate format as wide as 4:3 (width:height).
- Screen height = range of 1/5 to 1/7 distance from screen to last seat.
- Screen bottom = 4' above floor.
- Offset as needed.

Data projector installation:

- Clear path from projector mount point to both sides of screen (no protruding sprinkler heads, exit signs, air ducts, lights).
- No lights shining right in front of projector, directly at projector, or immediately behind projector.
- One 110-volt electrical circuit with four outlets installed above ceiling tiles for projectors and camera. Projector mount point varies by projector model.
- No air ducts, conduits or lights at or above projector mount points.
- No air blowing onto projection screens.

Teaching area:

- One 110-volt electrical circuit within 3’ of instructor podium.
- Instructor podium containing videoconference codec and AV equipment is to be located next to sidewall near front and outside of front screen viewing angle with minimum 3’ egress on 3 sides. Clear path for wiring from podium to jacks/outlets.

Lighting/Electrical:

- All electrical circuits need to be dedicated and on the same isolated ground.
- Lighting near the screens should have separate on-off switch. No light should fall directly on the projections screens. Instructor area should be well-lit with sources in front of and overhead. Low-voltage fluorescent light fixtures should be avoided because of potential for interference with wireless devices.

- Three data network jacks and two phone network jacks with 3' of instructor podium. One 110-volt electrical outlet within 3' of instructor podium. One 110-volt electrical outlet within 3' of mid-point between front projectors.

Doors:

- Solid door - NO window portal.
- Signage.
- Device on door (e.g. kickstand) to facilitate propping open (rather than using a trashcan or chair), EXCEPT in fire-rated walls where not permitted.

Writing surfaces:

- Document Camera is used in lieu of marker boards

Sound:

- Speakers, microphone and sound system are integrated with videoconference system.
- Quiet-closing doors.
- Quiet air-handlers.
- Room insulated from outside and building/mechanical noise.
- Acoustic wall and floor treatments as required to minimize sound reflection.

Miscellaneous:

- No windows.
- Trash cans.
- Chair rails.

Appendix E: Guide For The Standardization Of The Campus Automation System

1. Each VAV air-handling unit will have a PCU-7716 and 8UI8DO expander board.
Only points associated with that unit will be terminated in the PCU.

2. Each VAV air handling unit will have an MRI which will control only the VAV terminals associated with that unit. If an air handler serves more than one floor, it will have an MRI on each floor with only that floors VAV terminals connected to it. No other devices will be connected to the sub LAN. An MR-VAV-AX will be used if there are 2 or less heating outputs per VAV terminal.

3. Each single zone, double duct, and multi zone air-handling unit will have their own PCU-7716. Only points associated with that unit will be terminated in the PCU.

4. Each single zone cav, vav or face and bypass unit will have a supply air sensor.

5. Each air-handling unit will have a return air, mixed air, cold deck and hot deck sensor.

6. If safety device feedback is specified, the different devices (i.e.: smoke detector, freeze stat, high pressure cutout, etc) will be a separate input to the PCU. When a safety goes into alarm, **only** that safety's feedback will be in alarm in the PCU (safeties will not be wired in series to pull in a relay for status to the PCU).

7. All points that have an input associated with an output will be opposite each other other on the PCU (i.e. status opposite control, feedback opposite speed control, temperature opposite damper or valve control). Opposite meaning: input 0000 is opposite output 0007 …… input 0004 is opposite output 0003, etc.

8. Every VFD will have the following points:
   a. Start/Stop control point.
   b. Status.
   c. VFD speed control output.
   d. VFD speed feed back.

9. Each chiller, boiler plant, heating system and condenser water system will have it's own PCU-7716. 8UI8DO expander boards will be used where necessary. The Chiller and heating system PCU's will have a cooling or heating required LED and a plant reset pushbutton mounted on the cabinet door.

10. Each secondary pumping system will have it's own PCU.

11. All PCU's and MRI's will be loaded with the campus standard software template for that type of equipment.

12. Any miscellaneous points associated with the equipment, such as exhaust fans, freeze/fire stats, high-pressure cutouts, flow monitoring stations, and etc. will be terminated on an expander board.

13. The individual points that are terminated in the PCU's will be installed so the software template will work for that unit without altering the software to accommodate for the termination location.

14. A PCU-7716 will be installed for the Zone Override pushbutton station.

15. An override momentary pushbutton will be installed on the front of the panel for each major zone.

16. The PCU addressing will be as follows:
    PCU-1&2 Chillers
    PCU-3 Condenser water system
    PCU-4 Heating plant
    PCU-9 Override pushbutton panel
    PCU10-29 AHU's
    PCU30&up MCI's
If there more than 20 AHU's, then PCU35 or 40 etc. & up will be MCI's.
If there are 3 chillers then use PCU1-3. PCU-4 will then be for condenser water control, and PCU-5 will be for the heating system.

17. The university standard sequence of operations (attached) will be followed.

18. The university standard wiring termination (attached) will be followed.

19. The university standard software will be used for each PCU and MCI.

20. Keep calculations to a minimum (**do not use event sequences**). They cannot be viewed on a graphics page. DDC Graphics pages are used to trouble shoot problems with the units. DDC Modules with line numbers is the preferred way to write software.

21. Point names in the software will include the equipment name.
AHU 1-1: AHU1-1 S/A Temp
AHU1-1 Fan Ctrl
AHU1-1 Fan Status
AHU1-1 VFD FdBk
AHU1-1 Speed Ctrl
AHU1-1 CHW Valve
Etc.

22. Each PCU will be labeled (PCU# and equipment name) on the front of the panel door.

23. Each PCU will have a graphic printout showing wire termination by point name and wire number. The power source location will also be shown on the drawing (panel and breaker number). The drawing will be mounted inside the panel door in a clear plastic sleeve.

24. All relays, transducers and other controls which are separated from the controlled device will be mounted in a control cabinet that is accessible without a ladder.
This does not include sensors or transmitters which must be installed in a pipe.

25. Each PCU/MRI panel will have a light switch/110v outlet combination installed. The switch will power down all the equipment in the panel. The 110v outlet will remain powered up with the switch off.

26. The following wire types will be used for the shown functions:

Cable Function	CSI Part #	Jacket Color	Description--
LAN	CSI 24G/2C+S	Orange	24-2 Str Shld Mid Cap
Sub LAN	CSI 24G/2C+S	Orange/Blk Stripe	24-2 Str Shld Mid Cap
Analog Input	CSI 22G/3C+S	White	22-3 Str Shld CL2P
DI type Input	CSI 22G/2C	White	22-2 Str N/S CL2P
Output/Power	CSI 18G/2C	White	18-2 Str N/S CL2P
Output	CSI 18G/3C	White	18-4 Str N/S CL2P
Output	CSI 18G/4C	White	18-4 Str N/S CL2P

27. All wiring in control panels will be installed in open slot wiring duct with snap on covers (Panduit or equal). The panels will be large enough to accommodate all of the hardware without over crowding.

28. Each PCU will have separate control power and output power transformers.

Appendix F: Interior Signage Standards

Table of Contents

Interior Signage Standards

References
National Fire Protection Association
Building Code
American National Standards Institute (ANSI)

American Society of Mechanical Engineers (ASME)
Uniform Federal Access Standards (UFAS)
Americans with Disabilities Act of 1990
Texas Accessibility Standards

These standards shall be used as a reference and adhered to when designing, ordering, and installing permanent interior signs in University buildings.

1 General

1.1 Application of Sign Standards

The standards included in this document are guidelines to facilitate a more clear and effective means of understanding and using the campus at The University of North Texas. The campus has many diverse needs and circumstances and an absolute set of standards is impractical in application. These standards represent a means of addressing the most prevalent conditions, which will be encountered on campus both in retrofitting existing buildings and in new construction. The primary needs of information, direction and identification are described and recommendations are made as to the application of these standards. Realizing that many conditions will occur that do not neatly fit into the applications described herein, these standards represent an approach, which can be extended to the many exceptions, which are inevitable in an organization as diverse and complex as UNT. Custom signage costs more to install. Past experience has shown, modifications or additional custom signs, if available, are expensive.

An overriding general recommendation is to limit signs to the essential types, which are identified in this manual. Fewer, more consistent signs will deliver more effective communication to the users.

The interior sign system shall be designed to comply with all applicable local, state and federal codes and regulations including the Texas Accessibility Standards (TAS). It shall be the primary objective of the interior sign system to provide people with the necessary information to assist them to find their way to the destinations along their chosen routes through buildings. The information provided may be verbal (typographic) or non-verbal (pictographic). The interior sign system shall be designed with a way-finding approach and it shall be congruent with the following building characteristics: layout, spatial content, form, organization and circulation. The interior sign system shall provide for uniformity throughout all building on campus. All signage required by should be included in the proposed sign system and all signage shall meet TAS technical requirements.

Interior warning or hazard signs such as radiation, electrical hazard, microwave, poisonous gases, compressed gases, exit signs, etc. are specifically excluded from provisions of this standard and shall be provided for and maintained under terms of applicable code, regulation, ordinance, or other governing authority.

1.2 System Components

The system shall include the following three components:

- Way-finding Signs
  Way-finding signs provide people with and overview of the shape of the building and the organization of rooms. They guide people along their chosen routes to their destination.

- Identification Signs
  Identification signs identify destinations and provide the user with information about the destination.

- Regulatory Signs
  Regulatory signs inform people of both prohibitions and obligations about a destination or a space. Where applicable, these signs serve as a warning to the user of both eminent and potential hazards in the space.

1.3 System Design Criteria

The system should provide uniformity throughout all buildings in campus. The sign types are modular to provide consistency and to aid in the recognition of sign information. The sign types indicated in this document describe the modules and information included on each sign module.

Message design, nomenclature and application shall be standardized per the sign type e in this document. Message legibility should be considered from the perspective for variety of users: visitors, university community, vendors and service people, vision and mobility impaired people, and other users. Room numbering sign system shall comply with university room numbering system. The university will assign room numbers.

1.4 System Manufacture, Installation and Maintenance Criteria

Mounting hardware for multiple line Door Signs (Refer to Sign Type 2, Appendix G, Figure 37-39) will be Euro Sign System Model 218D11/21 Square with two inches header and ¾ inch by 8 inches slots or equivalent.

1.5 Submittals

The contractor/installer will prepare and submit to the Owner one sample of each type of sign to be made in the contract for approval. Only after receiving written notice of Owner approval will the contractor/installer prepare and install the signs.

The contractor/installer will submit a schedule to the Owner of all text to be engraved on signs and get Owner's written approval prior to making and installing the signs.

2.0 System Components

2.1 Wayfinding Signs

The purpose of way-finding signs is to provide orientations and general information about the building setting and to guide people along a route to destinations. Way-finding signs constitute the foundation of the interior sign system. Way-finding signs shall be uniform throughout buildings in campus. Each building must be carefully evaluated to determine specific way-finding elements appropriate for the building setting. Way finding signs may include:

- Campus Orientation Maps
  Map showing building as related to a campus map and other buildings in college or department

- Building Orientation Maps
  Maps and building floor plans showing location of college and department destinations, handicapped accessible building elements, and restrooms

- Building Directory
  Directory of room numbers, room occupants and room functions within buildings used by college or department.

- Directional Information
  Signs indicating direction to follow to a particular destination, i.e., departmental office, elevator location, and reception/information areas. This type of sign includes overhead signs.

2.2 Identification Signs

The purpose of this type of sign is to identify destinations and to provide information about destinations. Identification signs shall be uniform throughout buildings on campus. Each building must be carefully evaluated to determine specific identification sign elements appropriate for the building setting. Identification signs include the following type of signs:

- Permanent Room Identification
  This may include: Building room numbers, restrooms, exits, stairs, mechanical, electrical, and custodial rooms.

- Room Function Identification
  This may include: Departmental offices, conference rooms, information center, vending areas, lounge, and other building functions.

- Room Occupant Identification
  This may include: Faculty and staff names and student associations

- Informational
  This may include: Office hours, handicapped accessible workspace, telephone device for the deaf directional signage, and assistive listening systems in assembly areas

2.3 Regulatory Signs

The purpose of this type of sign is to inform the user of both prohibitions and obligations about activities in a destination or space. Regulatory signs shall be uniform throughout buildings in campus. Each building must be carefully evaluated to determine specific regulatory signs elements appropriate for the building setting. Regulatory signs may be related to eating, smoking, environmental health, and areas of rescue assistance, handicapped accessible exits directional signs, National Electrical Code, National Fire Protection Association, or emergency procedures.

3 Graphic Signs

Signs shall comply with section 703 of the 2004 Revised ADA-ABA Accessibilities Guidelines.

3.1 Character Font

The type font shall be Sans Serif. Raised lettering for the visually impaired shall be upper case. Where raised lettering is not required, messages should be displayed using upper and lower case letters. The typeface for interior signs systems shall be Sans Serif.

3.2 Character Height

The minimum height is measured using an upper case X.

Lettering for signage suspended or projected overhead should be three inches minimum cap-height. The intended viewing distance for this character height is over 150 feet (i.e., stadium, conference enter, or arena).

Other lettering should be sized according to the viewing distance from which they are to read. The guideline of one-inch cap height for 50 feet viewing distance is recommended.

If possible, lettering for maps should have a minimum height of 0.625 inches.

3.3 Character Proportion

Letters and numbers on visual signs shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10 using and upper case “X” for measurement. Condensed, expanded, extra bold or expanded typefaces are not acceptable. Different fabrication techniques may require adjusting the weight of the characters to compensate for errors incurred in fabrication. The final sign characters must comply with the above stated proportions and should match the “normal” San Serif typeface.

The size of characters should be tested based upon the intended viewing distance.

3.4 Raised and Braille Characters

Raised lettering and numerals shall be raised 1/32 inch, upper case, Sans Serif and shall be accompanied with Grade 2 Braille. Raised characters shall be at least 5/8 inches height, but no higher than two inches.

Additionally, stroke thickness will be based upon the upper case; letter “I” and shall be 15 percent maximum of the height of the character. Character spacing shall be measured between the two closest points of adjacent raised characters, excluding word spaces. Spacing between individual raised characters shall be 1/8-inch minimum and 4 times the stroke width maximum.

Braille dots shall have a domed or rounded shape. The indication of an uppercase letter or letters shall only be used before the first word of a sentence, proper nouns and names, individual letters of the alphabet, initials, and acronyms. The standard dimensions for literary Braille are as follows:

Measurement Range	Minimum	Maximum
Dot Diameter	0.059 in.	0.063 in.
Inter-dot spacing	0.090 in	0.100 in.
Horizontal separation between cells	0.241 in	0.300 in.
Dot Height	0.025 in.	0.037 in.
Vertical separation between cells	0.395 in	0.400 in.

Braille shall be positioned below the corresponding text. If text is multi-lined, Braille shall be placed below the entire text. Braille shall be separated 3/8-inch minimum from any other tactile characters and 3/8-inch minimum from raised borders and decorative elements.

3.5 Finish

The characters and background of signs shall be eggshell, matte, or other non-glare finish.

3.6 Color and Contrast

Characters and symbols are to be a light color shown against a dark background. The New Hermes colors #200 White and #277 Slate comply with the established minimum contrast of 70 percent (ADA requirement).

3.7 Nomenclature

Sign messages should be proposed by the designer and approved by Owner prior to fabrication and installation. Message units should use plain and consistent language to describe locations and routes. The information hierarchy is established by the sign types for identification and regulatory signs. With the exception of directories and specified regulatory information, messages on individual signs should not exceed three lines of text with appropriate line spacing for optimum legibility. Sign messages should be flush left, ragged right aligned. The designer is responsible for specifying line breaks to fabricators on all signs.

3.8 Word Spacing

Space between words will be based on the width of a lower case “r”.

3.9 Line Spacing

Spacing between baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.

3.10 Pictorial Symbol Signs (Pictograms) and directional Arrows

Pictograms are to be raised 1/32"above surrounding surfaces. Where required, pictograms will be placed within an area 6" in height in which no other information will be displayed. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. When pictograms are used to identify permanent rooms, like restrooms, verbal descriptions must be raised letters and in Braille. All symbols and pictograms shown in drawings are for reference only and shall be reproduced from AIGA/DOT Symbols Signs book or electronic file published by *AIGA* [1059 Third Avenue; New York NY 10021; 1-(800)-548-1634] or *SEGD* [401 F Street, Suite 333; Washington DC 20001; 1-(202)-638-5555]. All directional arrows should be on the left on directional signage and text should be flush left. Where several messages are involved, it is recommended to dedicate a complete blade of a sign to the directional function, arrow or plain language description. For more information refer to figure 34 & 35 in Appendix G.

Facilities and elements required to be identified as accessible by ADA, Title III Accessibility Guidelines, section 4.1, shall use the international symbol of accessibility. Pictograms required for Volume Control Telephones, Text Telephones, and Assistive Listening Systems shall comply with the section.

3.11 Message Breaks

Messages are to be laid out on the sign panels so the words break onto the next line of type in a way that communicates most easily.

An example of an inappropriate message break, which can miscommunicate, is as follows:

Department of Pest
Control

3.12 Mounting location and Hierarchy

A clear informational hierarchy shall be followed for identification and regulatory signs. The hierarchy is as follows:

Room Numbers
Department Name
Room Function
Room Information (i.e., office hours)
Room Occupant
Room Regulation

Permanent room identification will occur at every room. An individual's name will occur at main building directories and may be added to the door sign to their office (refer to Sign Type 2, Appendix G, Figure 37-39). Where several rooms are accessed off of a common room, there should be a sign at the door or entrance to the shared space indicating room numbers within the common space. Note the individuals within the common space are not indicated.

In general, private staff offices will include the permanent room number, the department and the occupant's name per Sign Type 3 in Appendix G, Figure 40-42. The College in which the department resides is not to be indicated except at the administrative office for the College.

Departmental names are to be included where more than one department resides within a building or where departmental identification will aid clarity.

Movable office partitions will identify the occupant per Sign Type. An insert panel will be produced to fit into a hanging plastic fixture, which mounts to the top of the panel. The mounting fixture may be purchased through the panel manufacturer. The dimensions and profiles will vary with different manufacturers. Desk signs will be per Sign Type 8 in Appendix G, Figure 46. When provided by the University, however individuals may use personal sign for desk signs.

Permanent identification signs shall be installed on the wall adjacent to the latch side of the door. Where there is no wall space to the latch side of the door, including at double leaf doors, signs shall be placed on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position. Mounting height shall be 60 inches from the finished floor measured to the baseline of the highest tactile character. When there are multiple lines of tactile characters the baseline of the lowest line shall be minimum of 48 inches from the finished floor.

3.13 Mounting location of door signs

Mounting location for such signs shall be such that a person may approach within three inches of the sign without encountering protruding objects or standing within the swing of a door. These signs are considered the most important element of the sign system hierarchy.

3.14 Mounting locations for tack boards

Tack boards, where required or requested, are to be mounted directly under room signage aligned flush with the side adjacent to the door. Also see section 5.0 for tack board product information.

3.15 Methods of attachment of Interior signs

The primary means of attaching interior signs will be double stick back tape as supplied by New Hermes. The tape will form a complete perimeter band on the back of each sign. Signs that are placed on glass will have a blank sign of the same size placed on the backside of the glass to hide the adhesive. This adhesive is appropriate attachment for substrates as follows:

Painted gypsum board
Painted concrete masonry units
Concrete masonry units
Brick, painted and unpainted
Wood
Glass

4.0 Interior Sign Types

The following Sign Types (which can be found in Appendix G - figure 36 to 46) are representative examples of some of the most commonly encountered conditions on the University campus. They provide explicit guidance for the many unique conditions, which will be encountered in designing signs for university facilities:

Sign Type 1	Door sign with permanent room identification
Sign Type 2	Door sign with permanent room identification and secondary information including: room occupant
Sign Type 2A	Door sign with permanent room identification and secondary information including: room function
Sign Type 2B	Door sign with permanent room identification and secondary information including: direction information
Sign Type 3	Door sign with permanent room identification, university department and room occupant or other additional information
Sign Type 3A	Door sign with permanent room identification, university department with seal and room occupant
Sign Type 3B	Sign with university department and additional information
Sign Type 4	Regulatory sign. No Smoking
Sign Type 6	Accessible restroom door sign
Sign Type 6A	Non-accessible restroom door sign
Sign Type 8	Partition sign or desk sign with occupant name

When the above signs are used on a particular project they should be detailed and referenced in the appropriate architectural drawing and specification section. Also, their type, location, and wording should be shown on signage schedule, which can be either inserted in the specification or shown on the sign drawing (refer to Appendix G, Figure 47)

5.0 Visual Display Boards

This section includes the specifications for Natural cork tack boards.

5.1 Submittals

Submit the following in accordance with Conditions of the Contract and Division 1 Specification Sections.

Include manufacturer's data substantiating the tack board material comply with requirement indicated.

Provide shop drawings for each type tack board required. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcements, accessories, layout, and installation details.

5.2 Products

5.2.1 Manufacturers
Subject to approval by UNT.

5.2.2 Materials
Provide single layer, ¼" thick, seamless, compressed fine grain bulletin board quality natural cork sheets, face sanded for natural finish, complying with MS MIL-C-155116, Type II.

Make backing panels rigid by factory laminating cork face sheet under pressure to ¼" thick hardboard backing.

5.2.3 Accessories
Fabricate frames and trim of not less than 0.062-inch thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units wherever possible; keep joints to a minimum. Miter corners to a neat hairline closure.

5.2.4 Finishes
Comply with NAAMM "Metal Finishes Manual" for recommendations relative to application and designations of finishes.

Finish designations prefixed by "AA" conform to the system established by the Aluminum Association for designating aluminum finishes.

Class II Anodized Bronze Finish shall be nonspecular, chemical finish; etched, medium matte; Anodic Coating shall have a film thicker than 0.4 mil.

5.3 Execution

5.3.1 Installation
Deliver factory-built tack board units completely assembled in one piece without joints, wherever possible.

Install units in locations and at mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for a complete installation.

Coordinate job-site assembled units with grounds, trim, and accessories, Join parts with a neat, precision fit.

5.3.2 Adjust and Clean
Verify that accessories required for each unit have been properly installed and that operating units function properly.

Clean units in accordance with the manufacturer's instructions. Break in chalkboards only as recommended by manufacturer.

6.0 Directories

This section includes the specification for nonilluminated directories

6.1 Submittals
Submit the following in accordance with Conditions of the Contract and Division 1 Specifications Sections

Include manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes.

Provide dimensioned elevations for each type of directory required. Include large-scale sections of typical members and other components. Show anchors, grounds, reinforcements and layout, and indicate finishes. Include setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed.

Provide the following samples of each exposed material including message strips, letters, and other graphics, for confirmation of colors, patterns, and textures, as required, and for verification of compliance with requirements indicated.
Aluminum Trim and Accessories: Samples of each finish type and color, on 6 inch long sections of extrusions and not less and 4 inch squares of sheet of plate, showing the full range of colors available.

6.2 Products

6.2.1 Manufacturers
Subject to approval by UNT.

6.2.2 Materials
Provide manufacturer's standard extruded aluminum sections with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5 alloys.

Provide clear float glass, thickness as indicated, complying with the requirements of ASTM C 1036, Type I, Quality q3.

6.2.3 Non illuminated Directories
Provide standard recessed non illuminated directory. Directories size may varies and it should be coordinated with UNT Project Manager. The assembly shall consist of perimeter frame and back, a header panel, a letterboard or removable message strips in a retainer, and an operable cover or covers. Provide graphic for message strips, header panels, and other designs in the letter style, size, spacing, and arrangement indicated.
Provide individual modular units containing three columns of message strips with a separate header panel as indicated.

- Modular Frame and Color Design: Provide two-ply, two-color, laminated acrylic sheet engraving strips of size indicated.

6.2.4 Accessories
- Fasteners: Provide screws, bolts, and other exposed fastening devices of the same material as the items being fastened. Fasteners for applications on the exteriors and exposed to the weather may be hot-dip galvanized, stainless steel, or aluminum. Provide types, gages, and lengths to suit installation conditions. Use theft-proof fasteners where exposed top view.

- Hardware: Provide with the following hardware:
  - Hinges to be continuous-type piano hinges
  - Furnish each cover with the manufacturer's standard lock; key all locks alike. Furnish 2 keys per lock.

6.2.5 Fabrication
Fabricate directories and bulletin boards to requirements indicated including dimensions, design, and thickness and finish of materials. Use metals and shapes of thickness, with reinforcing, if needed, to produce flatness, free of " oil canning," and to impart strength for size, design, and application indicated.

Fabricate perimeter and cover frames with reinforced corners, mitered to a hairline fit, with no exposed fasteners.

Equip covers with the manufacturer's standard hardware of the type indicated.

6.2.6 Finishes
- Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations.

- Finish designations prefixed by "AA" conform to system established by the Aluminum Association for designating aluminum finishes.

- Class II Anodized Bronze Finish shall be nonspecular, chemical finish; etched, medium matte; Anodic Coating shall have a film thicker than 0.4 mil.

6.3 Execution

6.3.1 Installation:
Install units plumb and level, in locations and with mountings shown. Securely attach to the supporting structure with concealed fasteners, in accordance with the manufacturer's installation instructions.

6.3.2 Cleaning

At completion of the installation, clean surfaces in accordance with the manufacturer's instructions

6.3.3 Protection

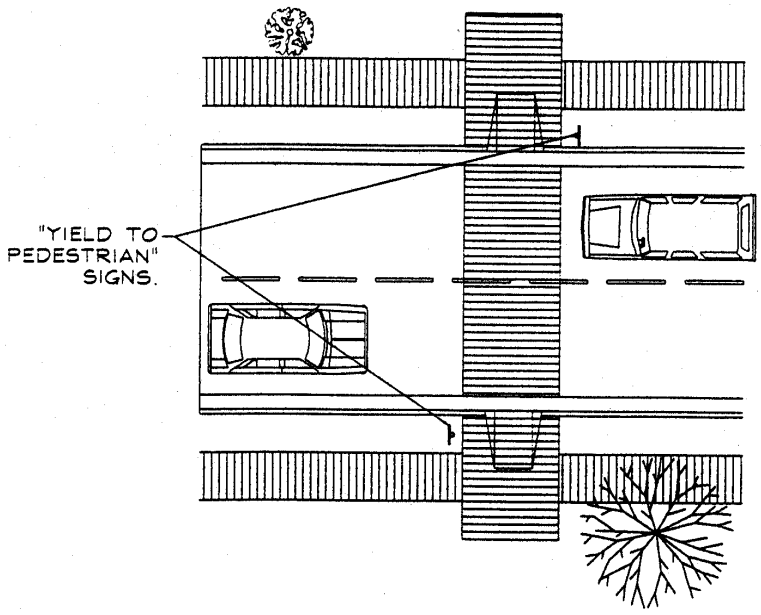
Protect installed directories and bulletin boards from damage until acceptance by Owner.

Appendix G: Illustrations, Diagrams, and Standard Details

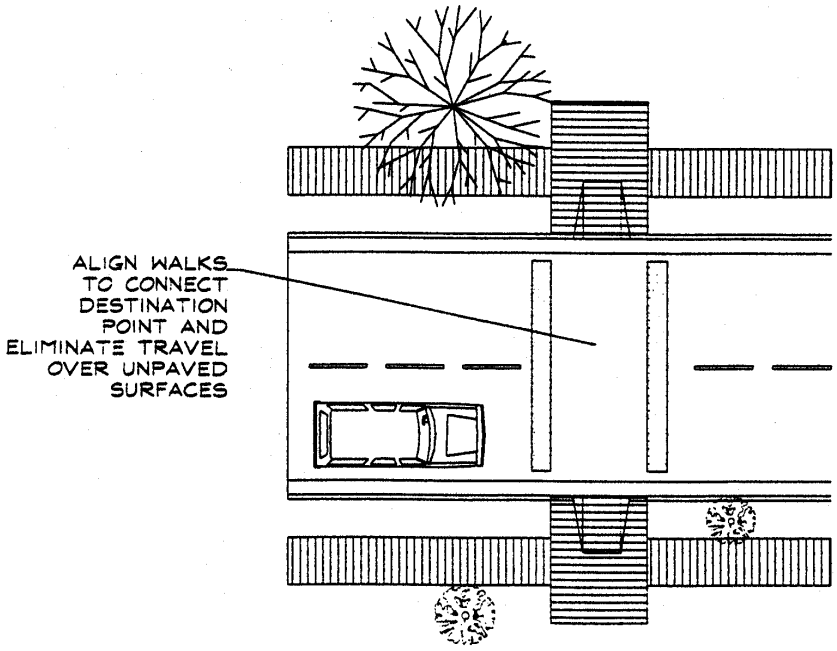
Table of Contents

Figure 1

Figure 2



WHERE PEDESTRIAN TRAFFIC DOMINATES

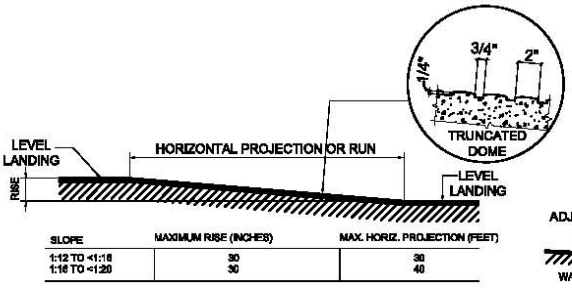


WHERE VEHICULAR TRAFFIC DOMINATES

CROSSWALKS

STANDARD DETAILS

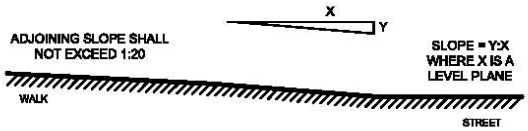
Figure 3



SLOPE	MAXIMUM RISE (INCHES)	MAX. HORIZ. PROJECTION (FEET)
1:12 TO <1:16	30	30
1:16 TO <1:20	30	40

SAMPLE RAMP DIMENSIONS

FIGURE A



MEASUREMENT OF CURB RAMP SLOPE

FIGURE B

NOTES:

1. THE MAXIMUM SLOPE OF A RAMP IN NEW CONSTRUCTION SHALL BE 1:12. THE MAXIMIUM RISE FOR ANY RUN SHALL BE 30" (SEE FIGURE A).

2. THE SLOPE OF CURB RAMP SHALL BE MEASURED AS SHOWN IN FIGURE B. TRANSITIONS FROM RAMPS TO WALKS, GUTTER, OR STREET SHALL BE FLUSH AND FREE OF ABRUPT CHANGES.

3. THE DETECTABLE WARNING SURFACE TO BE MIN. 24" IN DEPTH (IN DIRECTION OF PEDESTRIAN TRAVEL) IN LIEU OF THE FULL DEPTH OF THE CURB RAMP. THE TRUNCATED DOMES MUST STILL EXTEND THE FULL WIDTH OF THE CURB RAMP (SEE FIGURE C & D).

4. IF THE CURB RAMP IS LOCATED WHERE PEDESTRIANS MUST WALK ACROSS THE RAMP (X< 48" ON FIGURE 3), IT SHALL HAVE FLARED SIDES. CURB RAMPS WITH RETURNED CURBS MAY BE USED WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP (SEE FIGURE D).

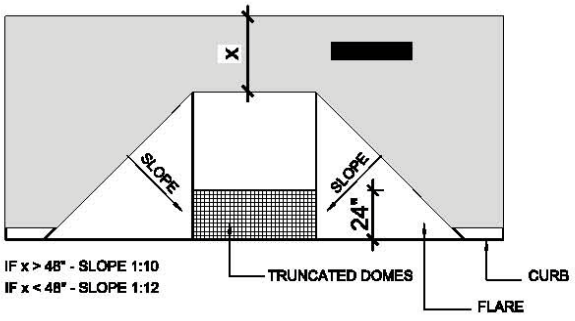


FIGURE C

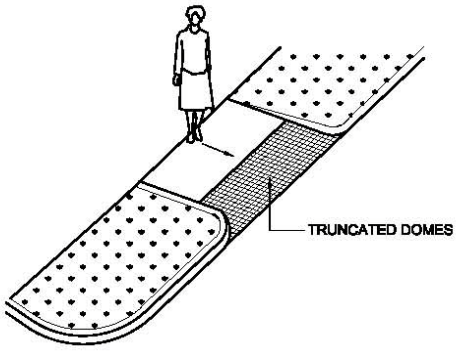


FIGURE D

SHEET	TITLE:				REV #	DESCRIPTION	DATE	BY
1	TAS CURB RAMPS				1			
OF 1	SCALE: N.T.S.	DATE: 09-02-09	BY: K.A.S.					

FACILITIES MANAGEMENT AND CONSTRUCTION
1155 UNION CIRCLE #311040, DENTON, TX 76203-5017
940-565-2751

Figure 4

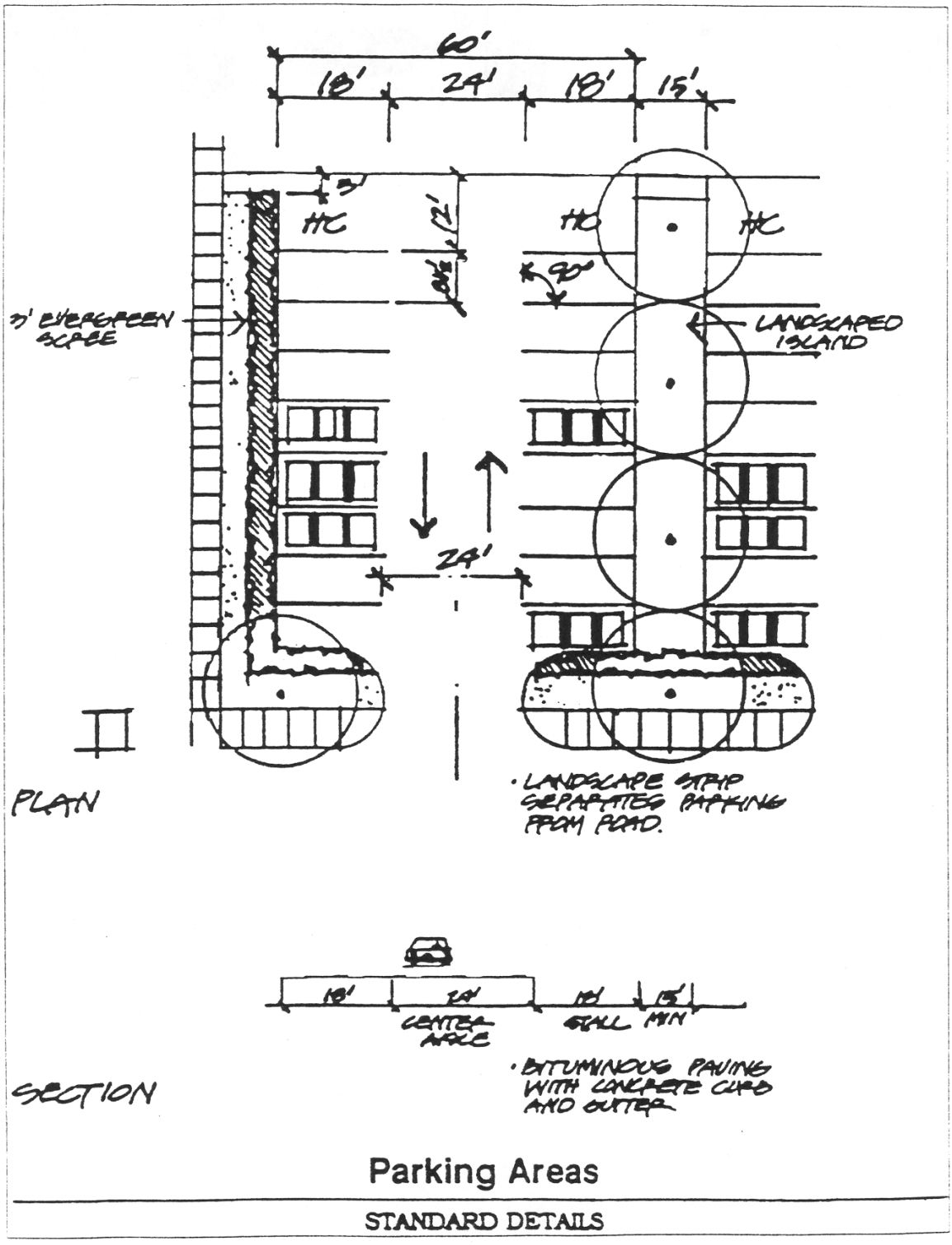

60'
18'
24'
18'
15'
3'
HC
12'
HC
HC
90°
3' EVERGREEN SCREE
LANDSCAPED ISLAND
24'
PLAN
• LANDSCAPE STRIP SEPARATING PARKING FROM ROAD.
18'
24'
CENTER AXLE
18'
15'
6" ALL MIN
• BITUMINOUS PAVING WITH CONCRETE CURB AND GUTTER
SECTION
Parking Areas
STANDARD DETAILS

Figure 5

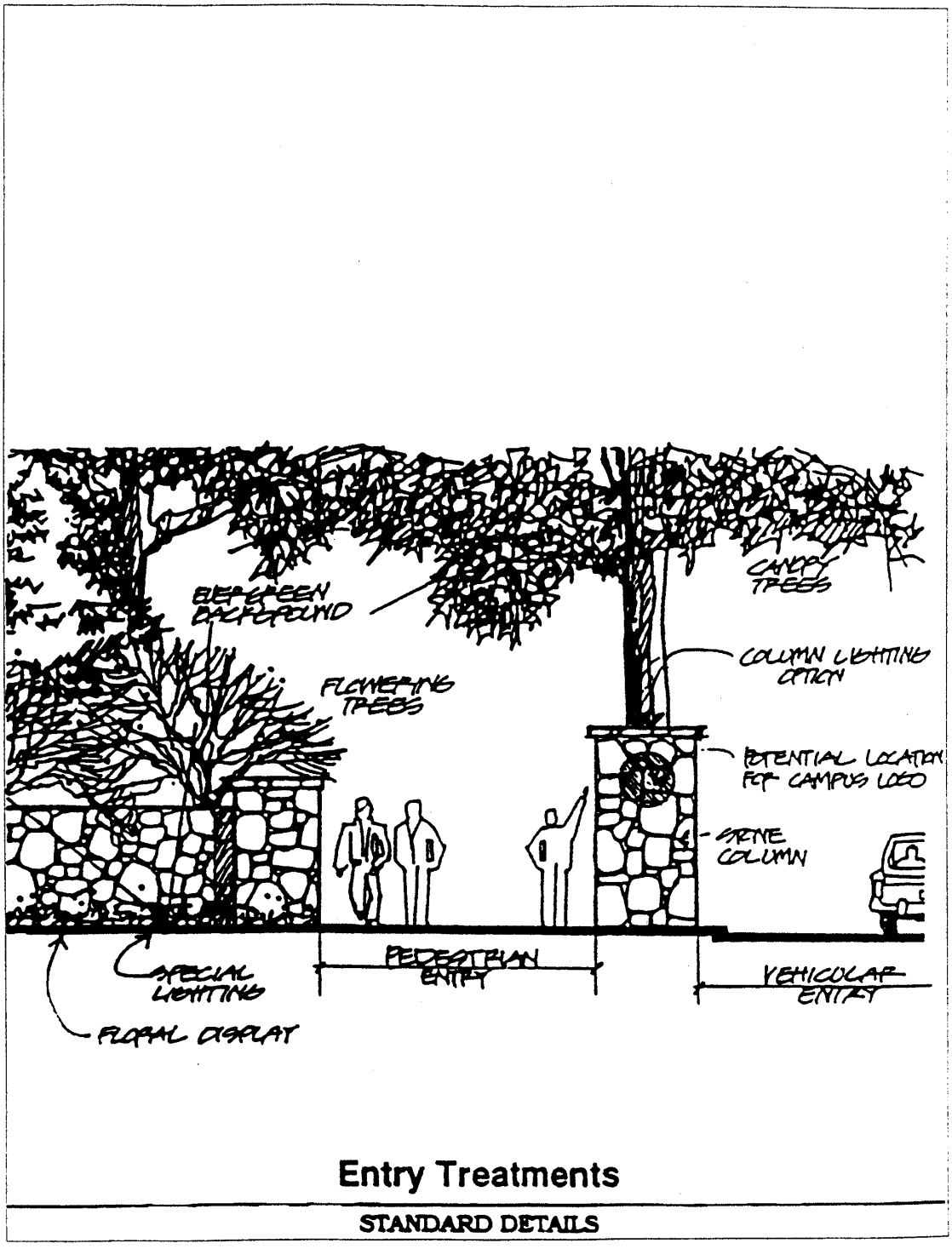

EVERGREEN BACKGROUND
CANOPY TREES
FLOWERING TREES
COLUMN LIGHTING OPTION
POTENTIAL LOCATION FOR CAMPUS LOGO
STONE COLUMN
SPECIAL LIGHTING
FLORAL DISPLAY
PEDESTRIAN ENTRY
VEHICULAR ENTRY
Entry Treatments
STANDARD DETAILS

Figure 6

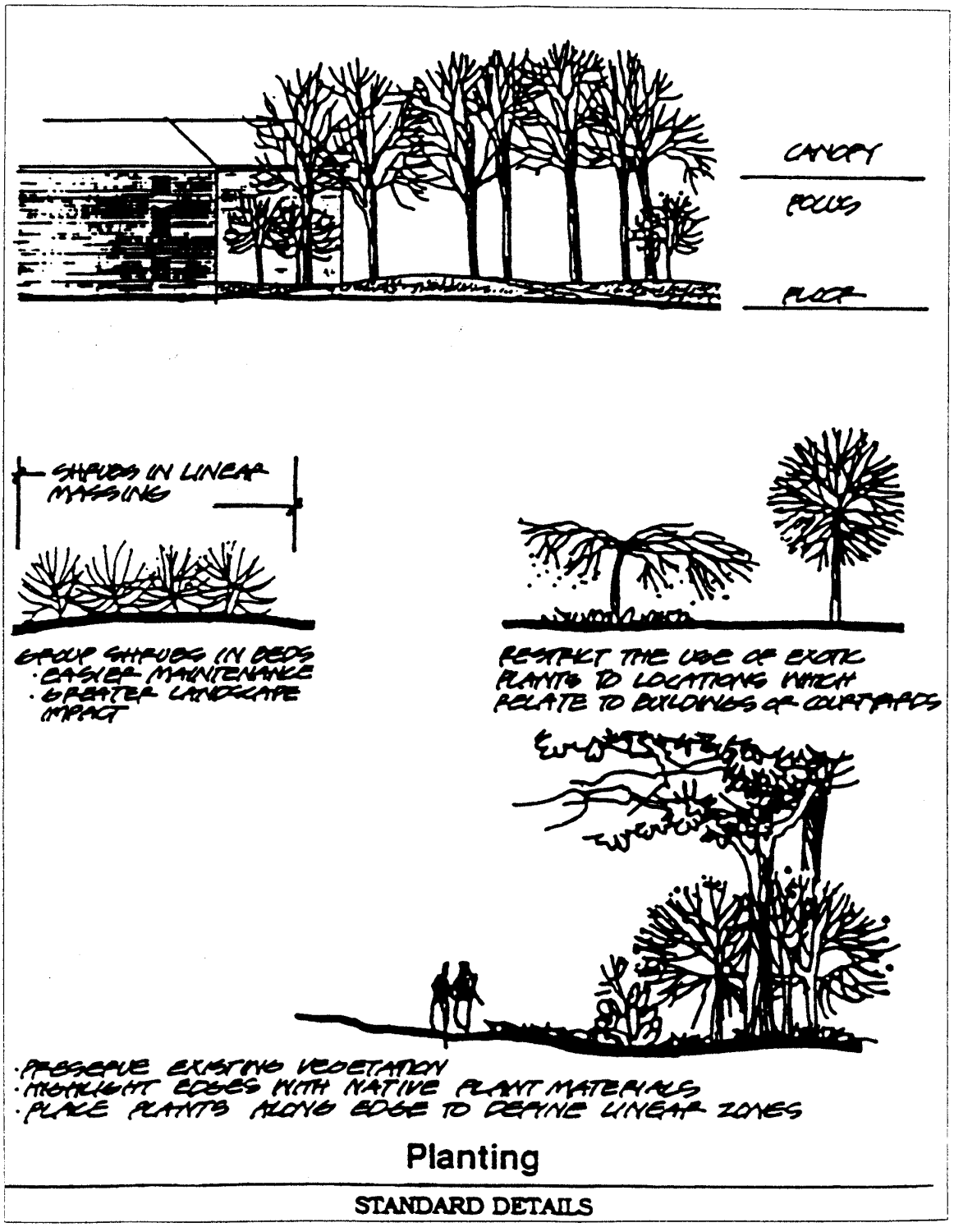
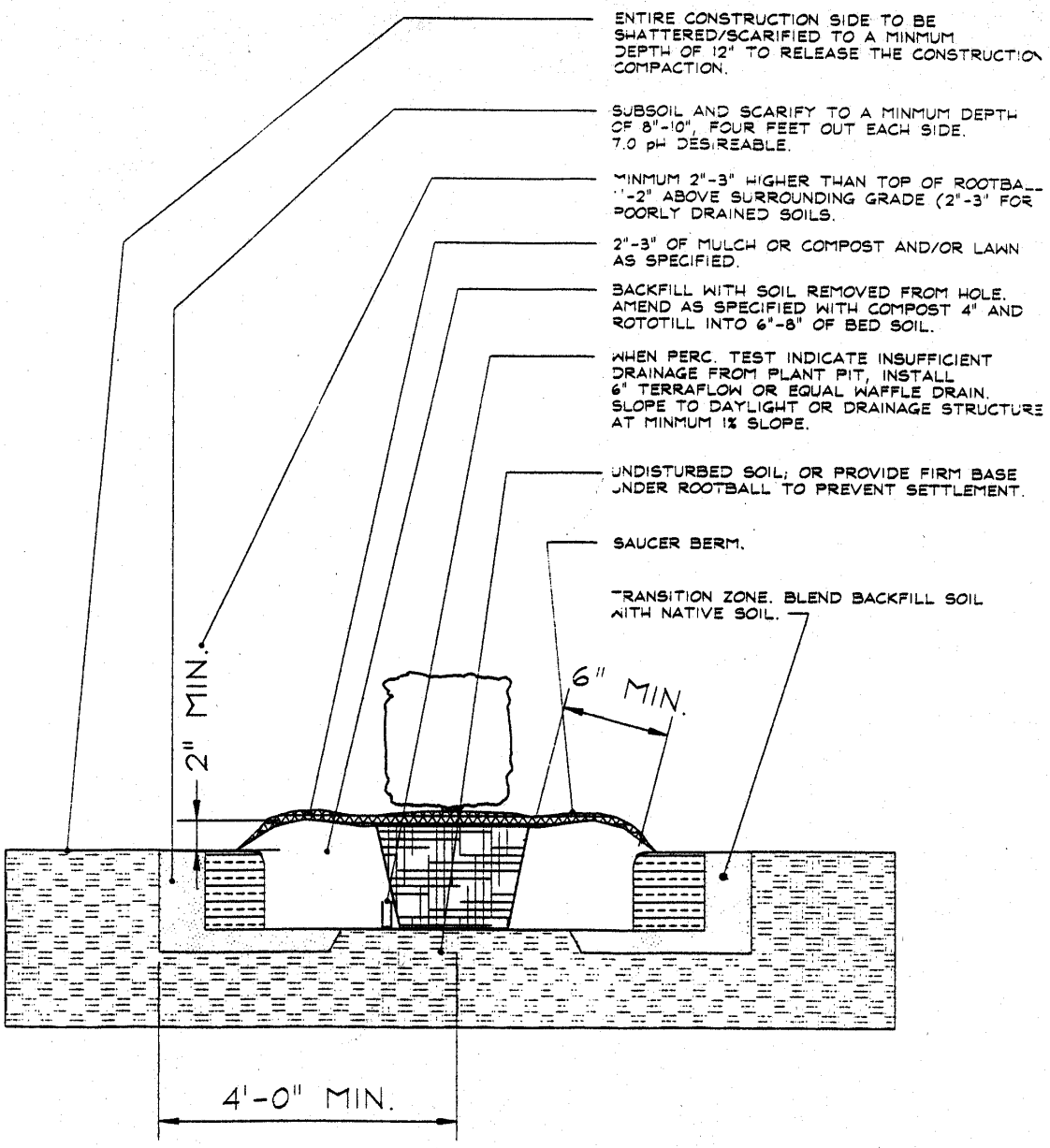

CANOPY
FOCUS
FLOOR
SHRUBS IN LINEAR MASSING
GROUP SHRUBS IN BEDS
· EASIER MAINTENANCE
· GREATER LANDSCAPE IMPACT
RESTRICT THE USE OF EXOTIC PLANTS TO LOCATIONS WHICH RELATE TO BUILDINGS OR COURTYARDS
· PRESERVE EXISTING VEGETATION
· HIGHLIGHT EDGES WITH NATIVE PLANT MATERIALS
· PLACE PLANTS ALONG EDGE TO DEFINE LINEAR ZONES
Planting
STANDARD DETAILS

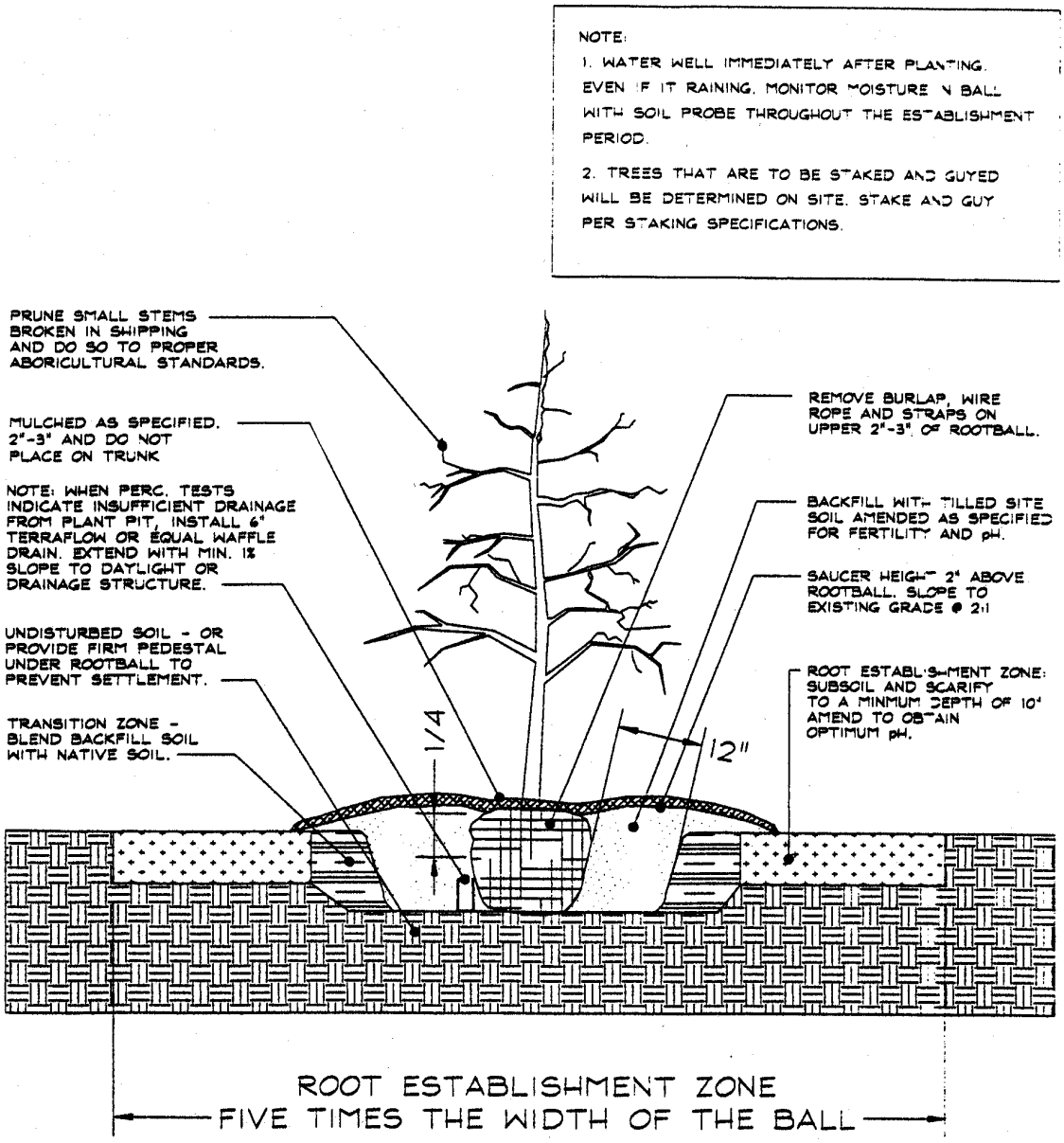
Figure 7



PLANTING DETAIL FOR HEDGES

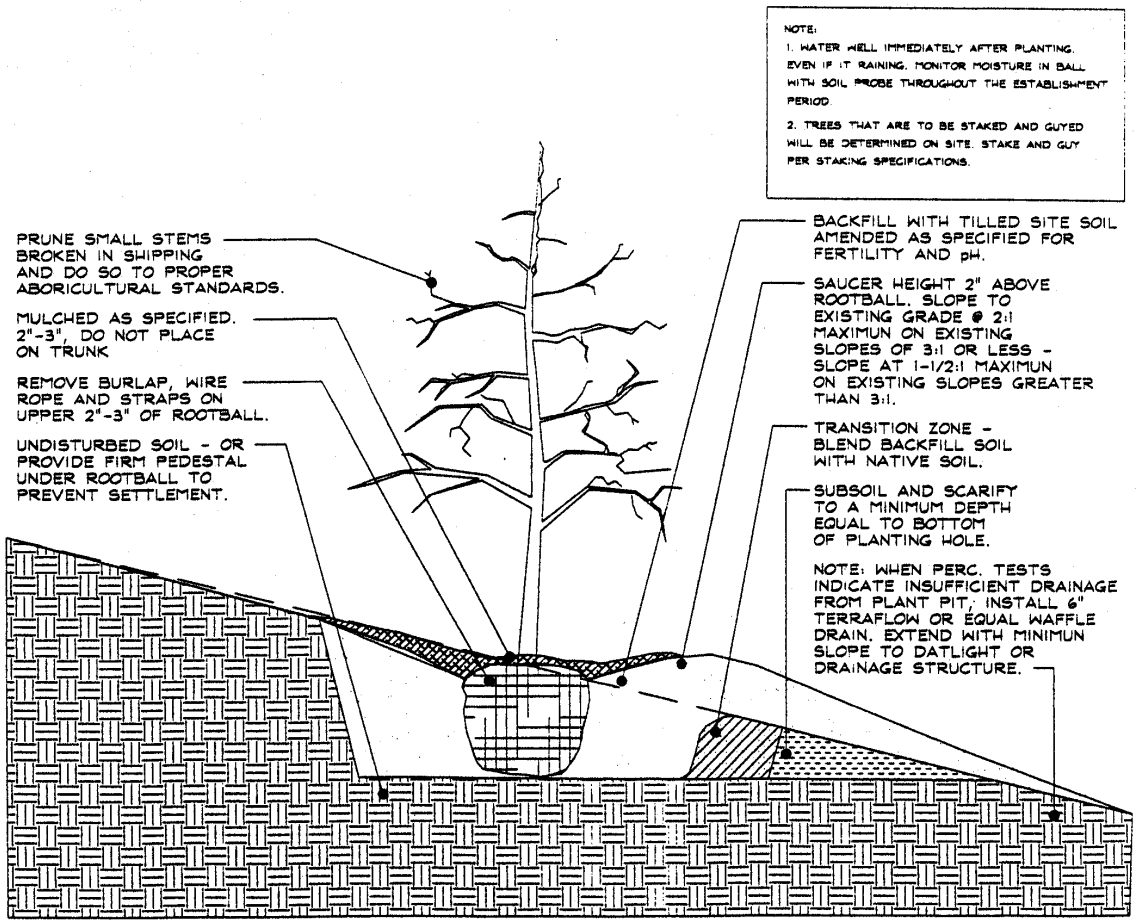
STANDARD DETAILS

Figure 8



PLANTING DETAIL FOR TREES
STANDARD DETAILS
[930902_1]

Figure 9



PLANTING DETAIL FOR TREES ON SLOPE

STANDARD DETAILS
[930903_1]

Figure 10

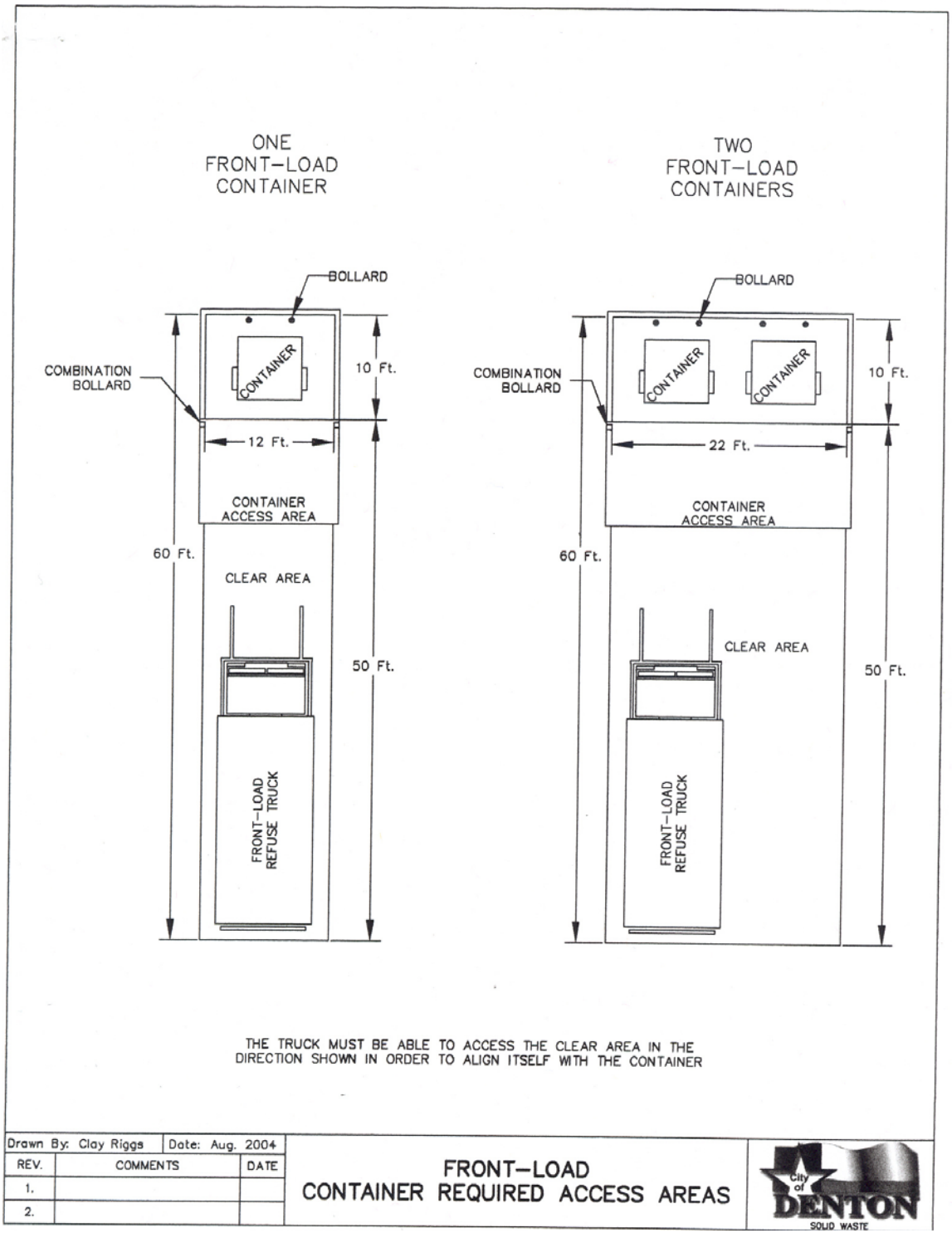

ONE
FRONT–LOAD
CONTAINER
TWO
FRONT–LOAD
CONTAINERS
BOLLARD
COMBINATION
BOLLARD
CONTAINER
10 Ft.
12 Ft.
CONTAINER
ACCESS AREA
60 Ft.
CLEAR AREA
50 Ft.
FRONT–LOAD
REFUSE TRUCK
BOLLARD
COMBINATION
BOLLARD
CONTAINER
CONTAINER
10 Ft.
22 Ft.
CONTAINER
ACCESS AREA
60 Ft.
CLEAR AREA
50 Ft.
FRONT–LOAD
REFUSE TRUCK
THE TRUCK MUST BE ABLE TO ACCESS THE CLEAR AREA IN THE
DIRECTION SHOWN IN ORDER TO ALIGN ITSELF WITH THE CONTAINER
Drawn By: Clay Riggs
Date: Aug. 2004
REV.
COMMENTS
DATE
1.
2.
FRONT–LOAD
CONTAINER REQUIRED ACCESS AREAS
City of
DENTON
SOLID WASTE

Figure 11

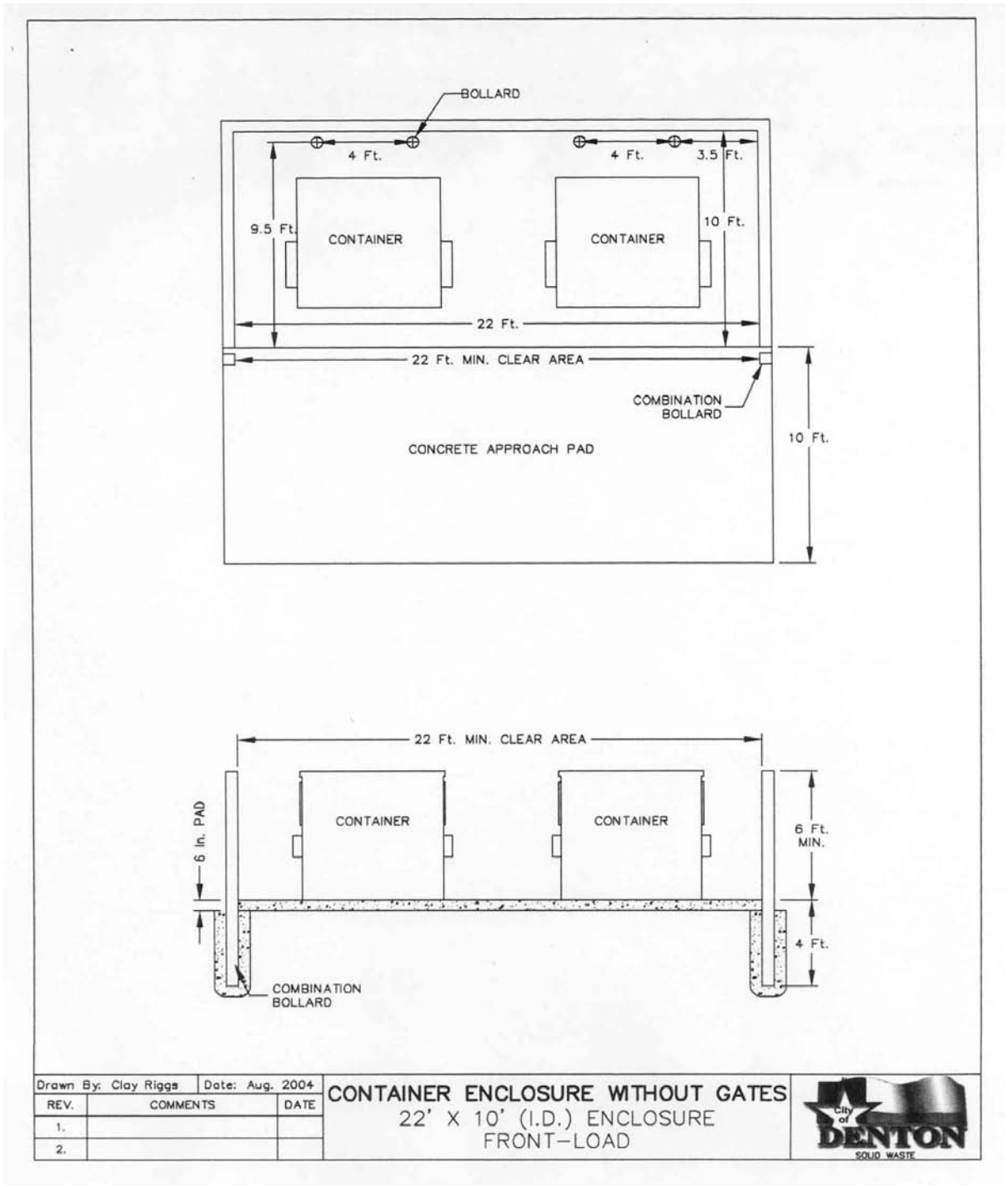

BOLLARD
4 Ft.
4 Ft.
3.5 Ft.
9.5 Ft.
CONTAINER
CONTAINER
10 Ft.
22 Ft.
22 Ft. MIN. CLEAR AREA
COMBINATION BOLLARD
CONCRETE APPROACH PAD
10 Ft.
22 Ft. MIN. CLEAR AREA
6 In. PAD
CONTAINER
CONTAINER
6 Ft. MIN.
4 Ft.
COMBINATION BOLLARD
Drawn By: Clay Riggs
Date: Aug. 2004
REV.
COMMENTS
DATE
1.
2.
CONTAINER ENCLOSURE WITHOUT GATES
22' X 10' (I.D.) ENCLOSURE
FRONT-LOAD
City of DENTON
SOLID WASTE

Figure 12

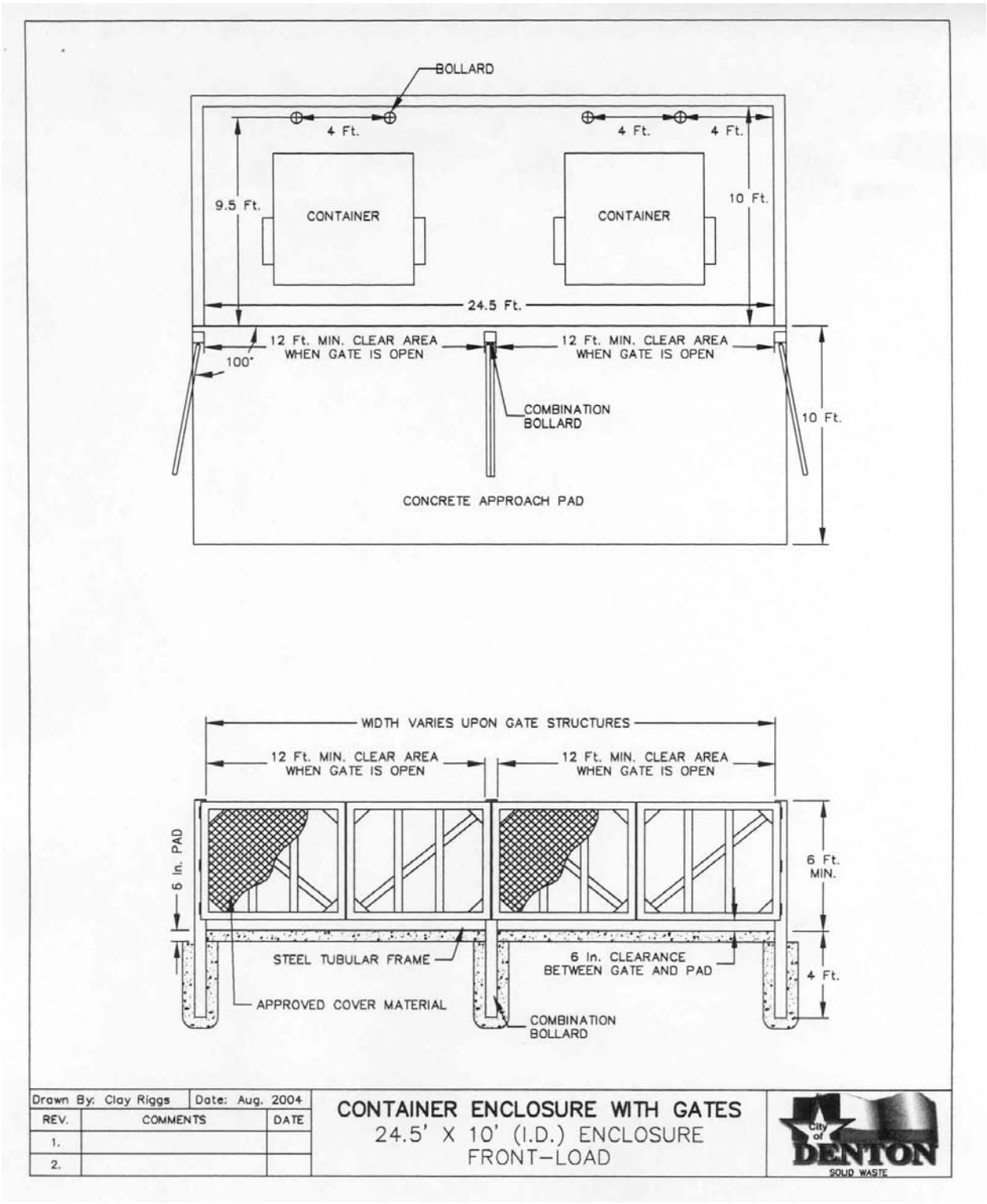

BOLLARD
4 Ft.
4 Ft.
4 Ft.
9.5 Ft.
CONTAINER
CONTAINER
10 Ft.
24.5 Ft.
12 Ft. MIN. CLEAR AREA WHEN GATE IS OPEN
12 Ft. MIN. CLEAR AREA WHEN GATE IS OPEN
100°
COMBINATION BOLLARD
10 Ft.
CONCRETE APPROACH PAD
WIDTH VARIES UPON GATE STRUCTURES
12 Ft. MIN. CLEAR AREA WHEN GATE IS OPEN
12 Ft. MIN. CLEAR AREA WHEN GATE IS OPEN
6 In. PAD
6 Ft. MIN.
STEEL TUBULAR FRAME
6 In. CLEARANCE BETWEEN GATE AND PAD
4 Ft.
APPROVED COVER MATERIAL
COMBINATION BOLLARD
Drawn By: Clay Riggs
Date: Aug. 2004
REV.
COMMENTS
DATE
1.
2.
CONTAINER ENCLOSURE WITH GATES
24.5' X 10' (I.D.) ENCLOSURE
FRONT-LOAD
City of DENTON
SOLID WASTE

Figure 13

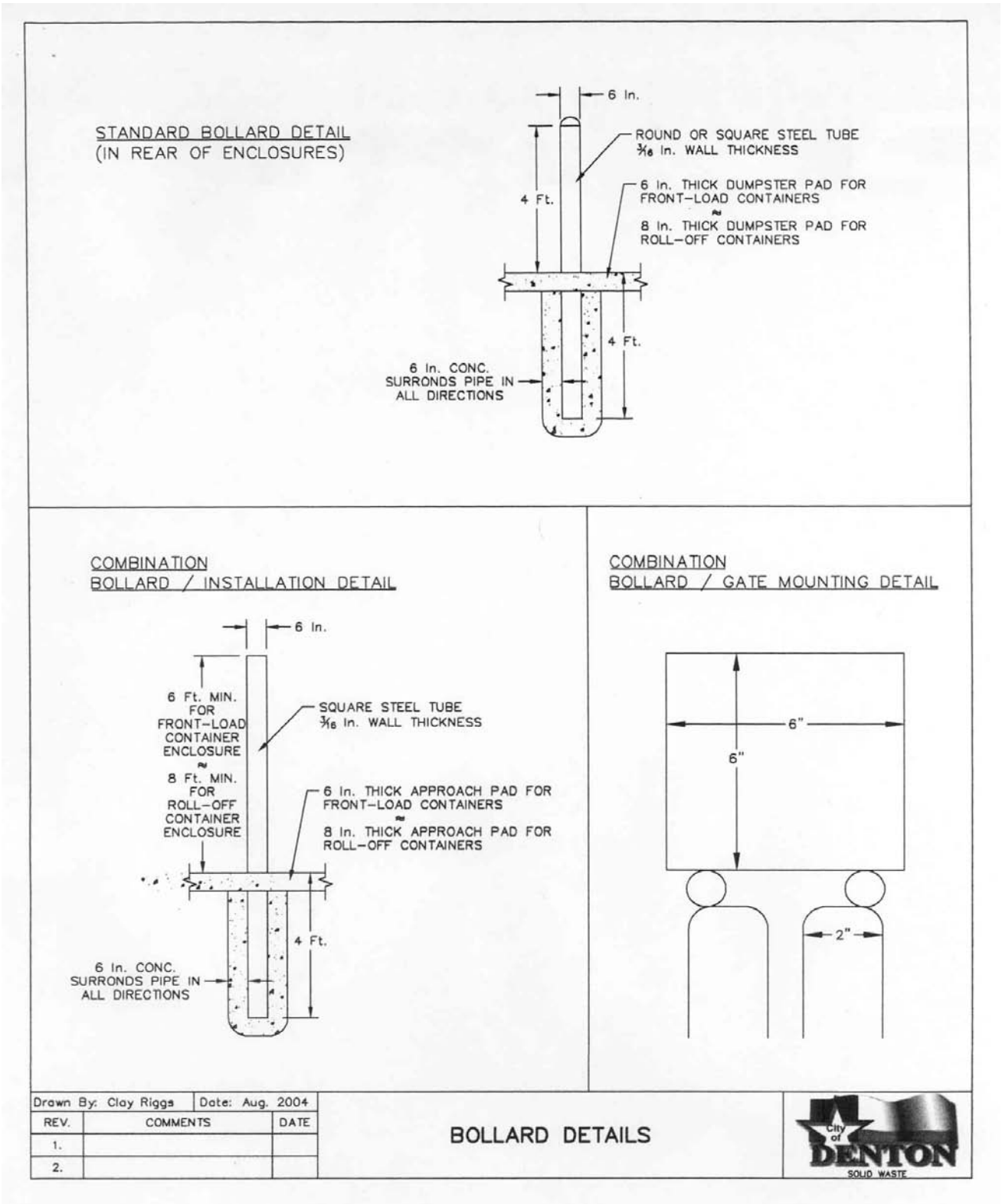
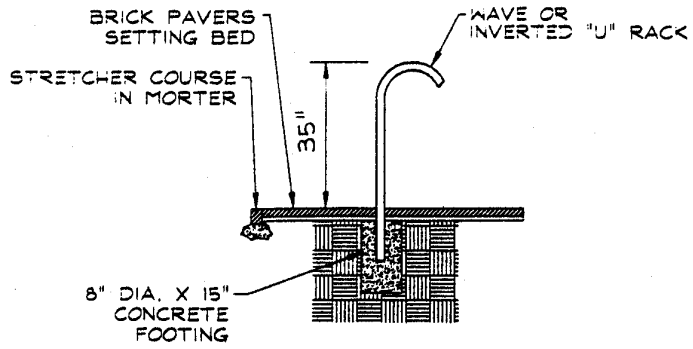

STANDARD BOLLARD DETAIL
(IN REAR OF ENCLOSURES)
6 In.
ROUND OR SQUARE STEEL TUBE
3/16 In. WALL THICKNESS
6 In. THICK DUMPSTER PAD FOR
FRONT-LOAD CONTAINERS
≈
8 In. THICK DUMPSTER PAD FOR
ROLL-OFF CONTAINERS
4 Ft.
4 Ft.
6 In. CONC.
SURRONDS PIPE IN
ALL DIRECTIONS
COMBINATION
BOLLARD / INSTALLATION DETAIL
6 In.
6 Ft. MIN.
FOR
FRONT-LOAD
CONTAINER
ENCLOSURE
≈
8 Ft. MIN.
FOR
ROLL-OFF
CONTAINER
ENCLOSURE
SQUARE STEEL TUBE
3/16 In. WALL THICKNESS
6 In. THICK APPROACH PAD FOR
FRONT-LOAD CONTAINERS
≈
8 In. THICK APPROACH PAD FOR
ROLL-OFF CONTAINERS
4 Ft.
6 In. CONC.
SURRONDS PIPE IN
ALL DIRECTIONS
COMBINATION
BOLLARD / GATE MOUNTING DETAIL
6"
6"
2"
Drawn By: Clay Riggs
Date: Aug. 2004
REV.
COMMENTS
DATE
1.
2.
BOLLARD DETAILS
City of
DENTON
SOLID WASTE

Figure 14



ANCHOR TO SUBSURFACE

SPECIFICATIONS:

WAVE-SHAPED RACKS

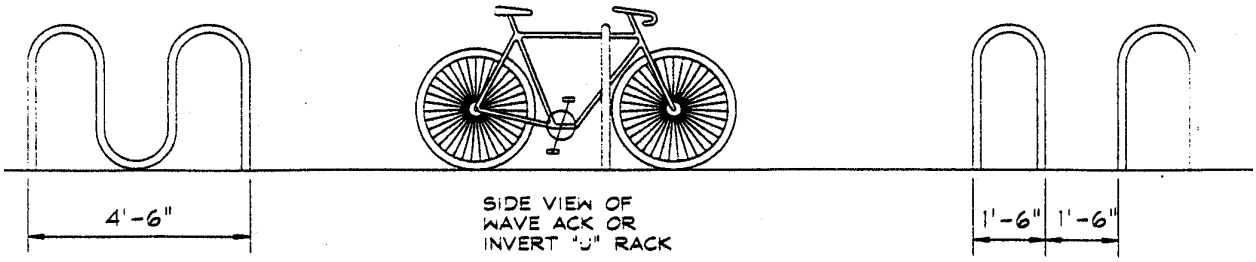
RACKS SHALL BE EQUA; OR SUPERIOR TO "WAVE LOK" AS MANUFACTURED BY SUNSHINE-U-LOK CORP. 31316 VIA COLINAS, SUITE 102, WESTLAKE VILLAGE, CA. 91362 (818) 707-0110

2" DIAMETER, MIN. SCHEDULE 10, 16 GAUGE STEEL PIPE WITH DIPPED AND BAKED BLACK POLYVINYL FINISH. 180 DEGREE BENDS IN A WAVE PATTERN TO PROVIDE FOUR VERTICLE POSTS A WIDTH OF 18" APART FROM CENTER TO CENTER. INSTALLED HEIGHT OF 35". ANCHOR TO SUBSURFACE.

INVERTED "U" SHAPED RACKS:

RACKS SHALL BE EQUAL OR SUPERIOR TO "WAVE-LOK" AS MANUFACTURED BY SUNSHINE-U-LOK CORP.

2" DIAMETER, MINMUM SCHEDULE 10, 16 GAUGE STEEL PIPE WITH DIPPED AND BAKED BLACK POLYVINYL FINISH. 180 DEGREE BENDS IN A WAVE PATTERN TO PROVIDE TWO VERTICLE POST A WIDTH OF 18" APART. INSTALLED HEIGHT OF 35". ANCHOR TO SUBSURFACE.



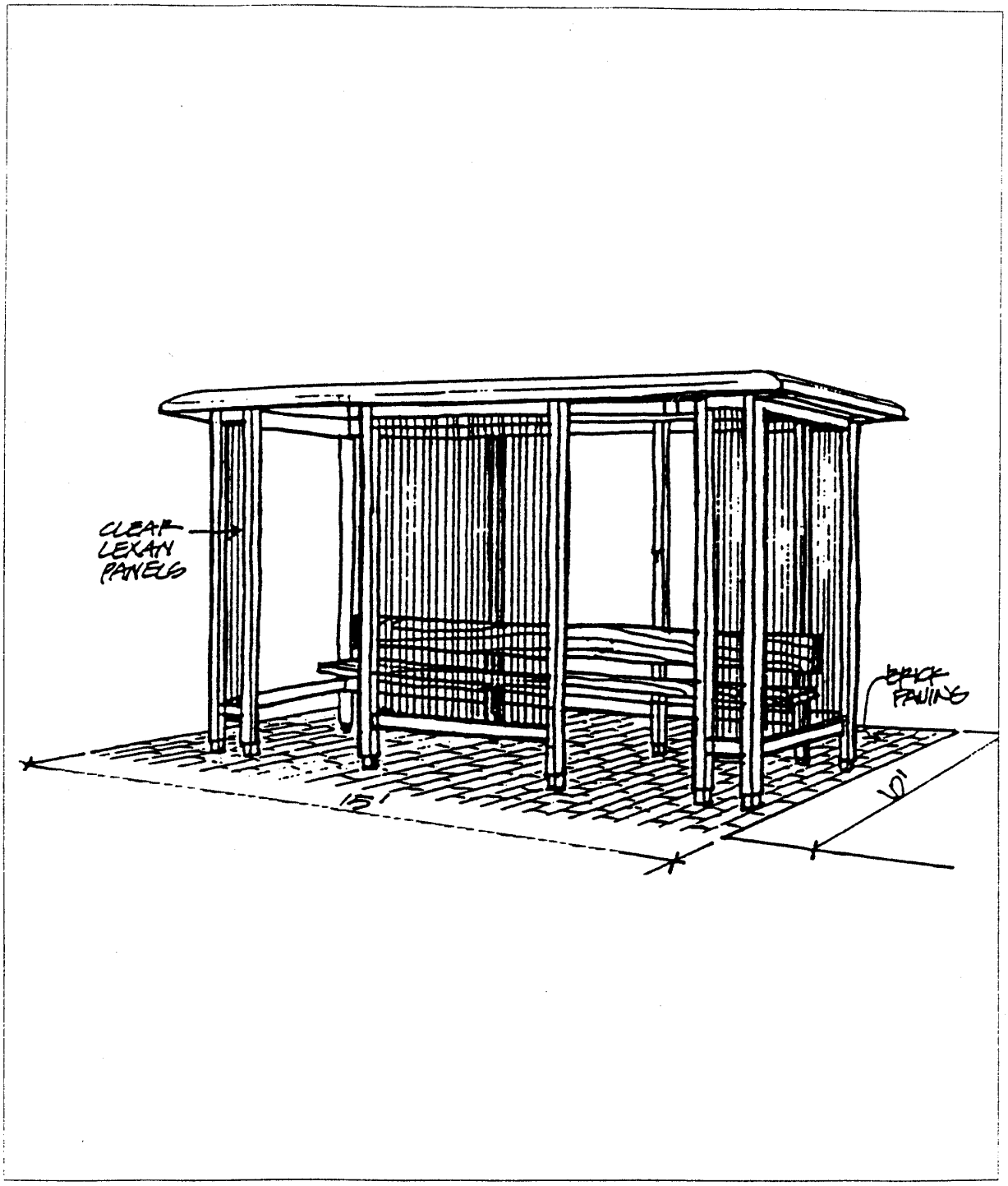
WAVE RACK

INVERTED "U" RACK

BICYCLE RACKS

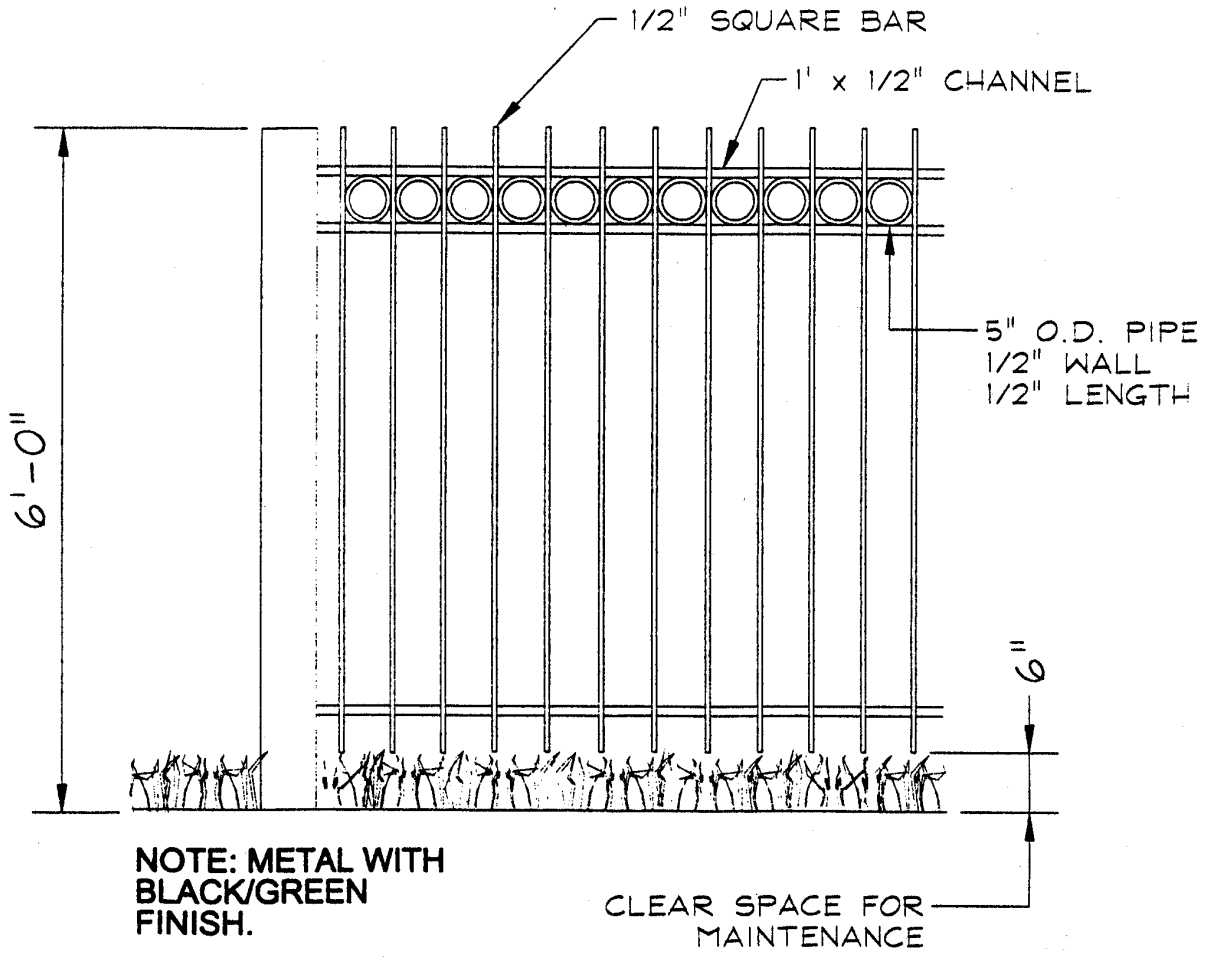
STANDARD DETAILS

Figure 15



BUS STOP SHELTER
STANDARD DETAILS

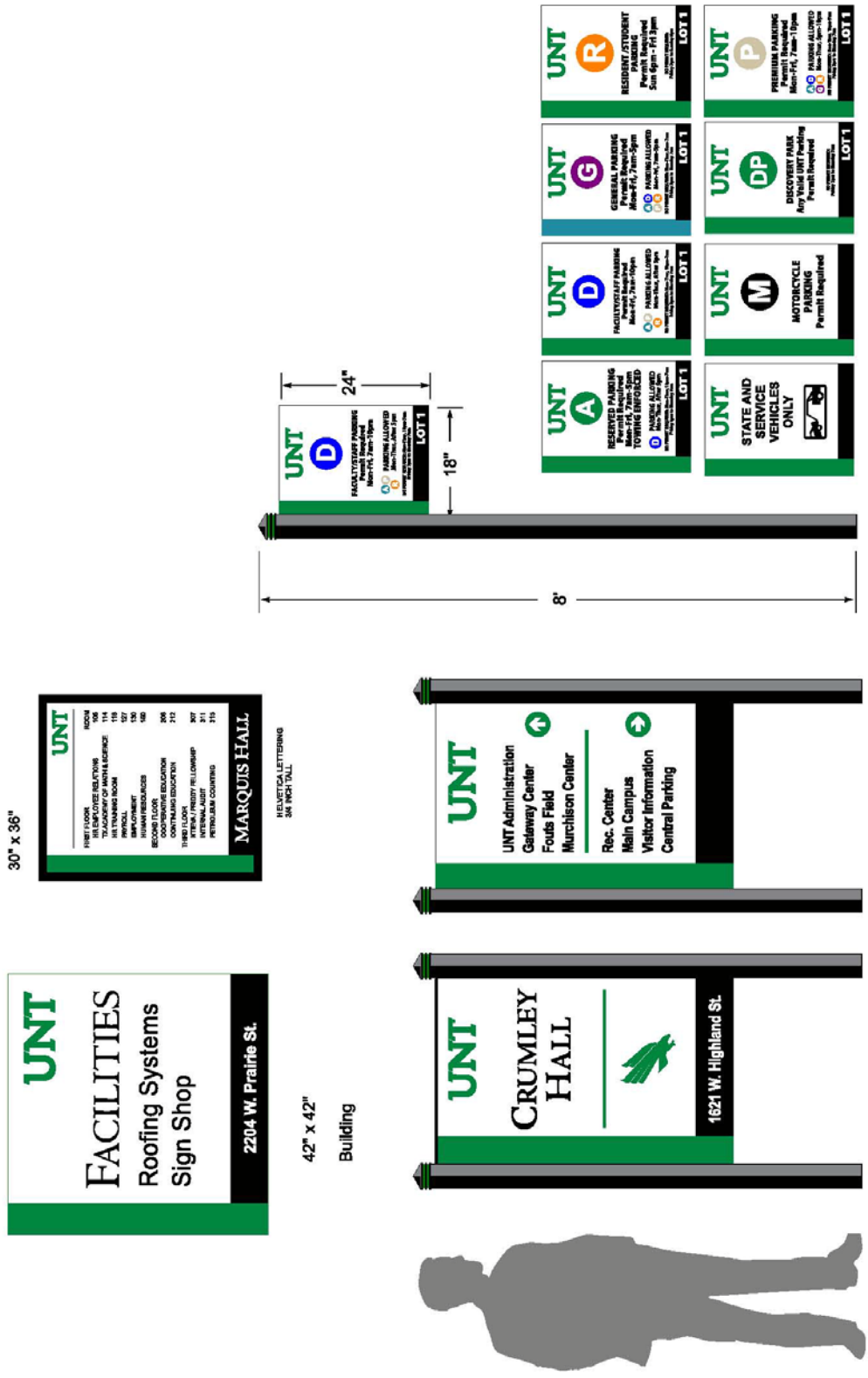
Figure 16



FENCES

STANDARD DETAILS

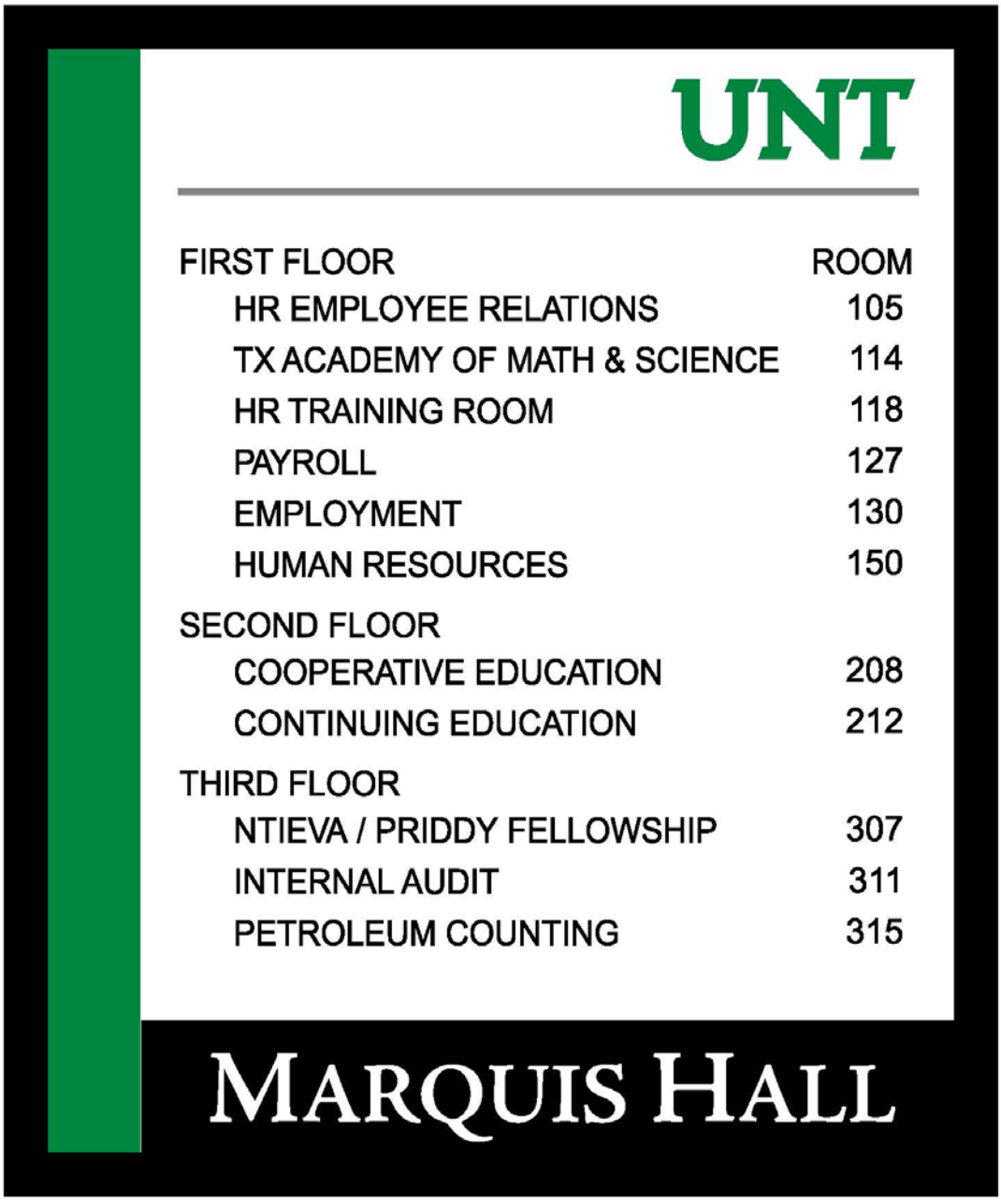
Figure 17



SIGNAGE STANDARDS – ALL INCLUSIVE

Figure 18

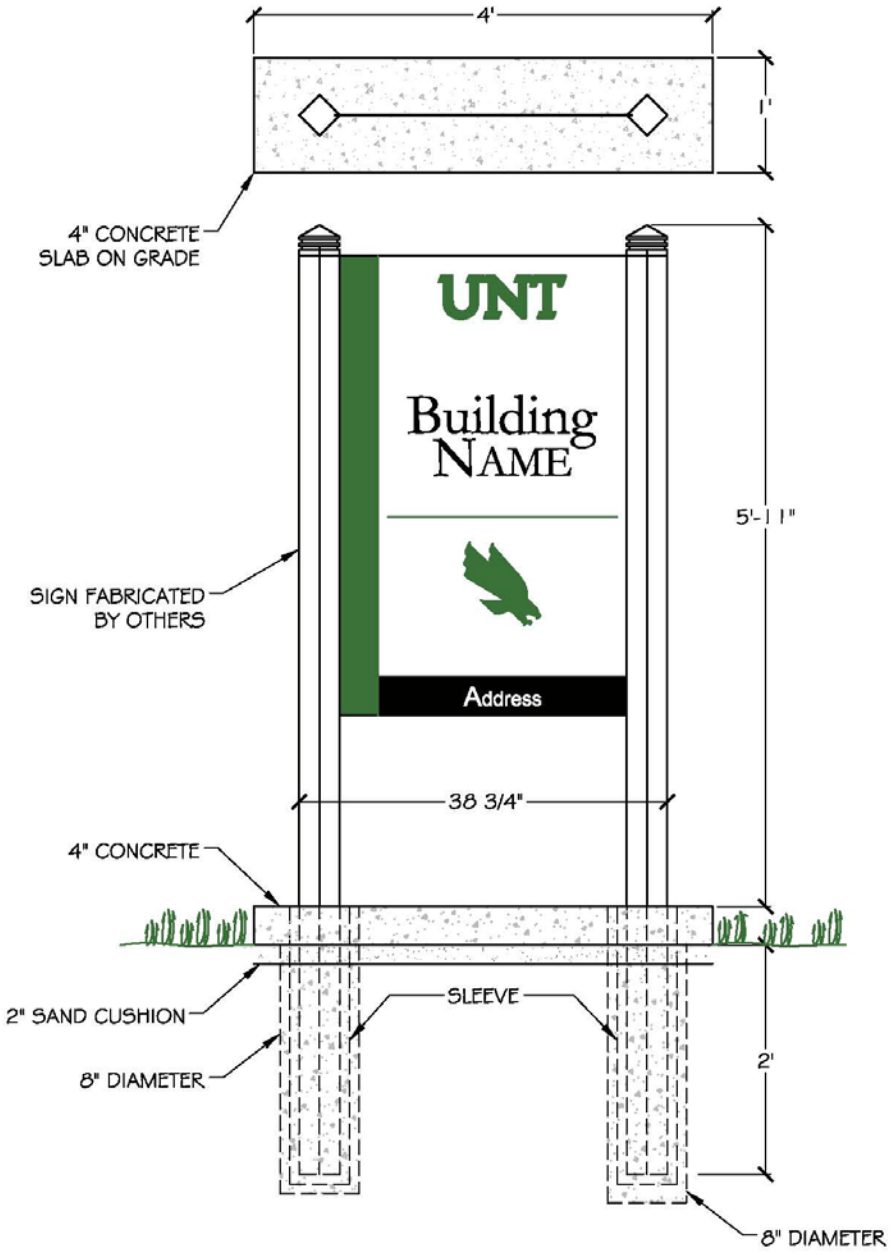
30" x 36"



HELVETICA LETTERING
3/4 INCH TALL

SIGNAGE STANDARD FOR INTERIOR CHANGEABLE TYPE DIRECTORY

Figure 19



SIGNAGE STANDARD FOR EXTERIOR BUILDING SIGN

Figure 20

Code Blue®

CB I-s

PEDESTAL - INTERACTIVE VOICE COMMUNICATION UNIT

The **CB I-s** is the original Code Blue Pedestal unit and sets the industry standard for rugged construction, full feature availability and high visibility. The **CB I-s** is easily recognized throughout a full 360-degree area. The user friendly lighted faceplate and the integral area light ensures rapid location in an open environment. The high powered strobe is easily identifiable by security when activated. The exclusive CB 3100 speakerphone is designed for maximum reliability and leads the market in system programming flexibility. The **CB I-s** is an excellent choice for walkways, parks, college and commercial campus areas, open landscape areas and anywhere a freestanding pedestal unit is required.

STANDARD FEATURES:

- ☑ CB 3100 Speakerphone
- ☑ 3 auxiliary inputs
- ☑ 2 auxiliary outputs
- ☑ Phone line surge suppressor
- ☑ Analog telephone connection
- ☑ 70w HPS area light with Code Blue Beacon
- ☑ High powerd strobe
- ☑ Lighted stainless steel faceplate
- ☑ 120v AC power
- ☑ Ultra weather resistant finish
- ☑ Vandal resistant hardware
- ☑ UV resistant lenses
- ☑ 12.75" diameter/ 9'1½" height
- ☑ ¼" thick steel construction
- ☑ Overhead Camera Mount
- ☑ Internal foundation anchor kit
- ☑ Passive vent
- ☑ ADA compliant

OPTIONAL FEATURES:

- ❑ Two button speakerphone
- ❑ Two button speakerphone with keypad
- ❑ 2.4 Ghz RF communication
- ❑ Cellular communication
- ❑ Night Charge™
- ❑ 70 watt metal halide area light
- ❑ Photocell for area light
- ❑ Powered vent
- ❑ Step-down power transformer
- ❑ Custom colors
- ❑ Custom graphics

Code Blue Corp. – 92 East 64th Street – Holland, MI 49423 – 800-205-7186 – Fax 616-392-8391 – www.codeblue.com

Figure 21

Code Blue®

CB I-s

Standard Finish Colors

Safety Blue	Gloss Black
Safety Red	Medium Bronze
Safety Yellow	Dark Bronze
Midnight Blue	Cardinal Red
Gloss White	British Racing Green

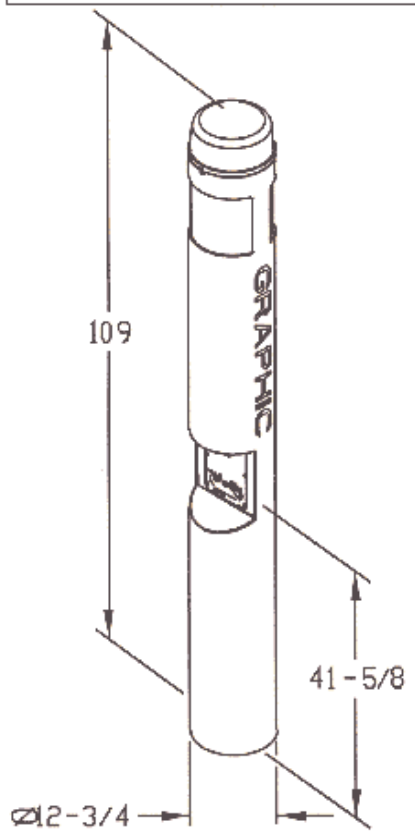
Graphics Text (wording)

Emergency	Courtesy
Assistance	Security

Graphics Color

Reflective White	Reflective Black
Reflective Blue	Reflective Red

Custom colors and graphics from RAL number or sample are available as a special order.



Faceplate Options

FP 1

Standard Faceplate Assembly with Single red *Push For Help* button

FP 2

Optional Faceplate Assembly with additional black *Info* button

FP 2-K

Optional Faceplate Assembly with additional *Call* button and keypad

Cellular Option

Provides wireless communications to eliminate trenching for phone lines. System requires a reliable AMPS cellular service to be provided by customer.

Night Charge™ Option

Provides continuous power to the Code Blue unit from a non-continuous power source. Typically used with an outdoor lighting network when power is only on during a portion of the day or night.

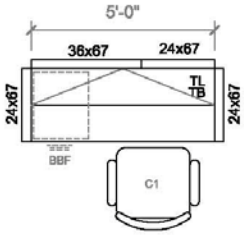
Code Blue Unit Specifications

Overall Height	9' 1"
Outside Diameter	12¾"
Housing Material	1/4 inch steel
Overall Weight	375 pounds
Access Opening	8½" x 12"
Standard Power Requirements	120v AC

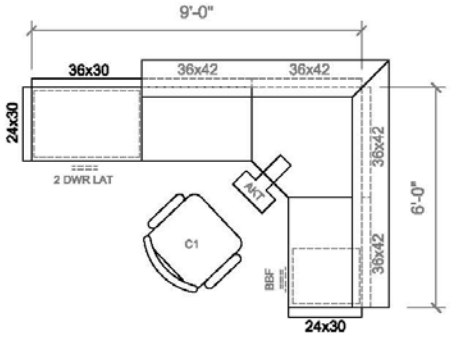
Mounting hardware and template for each CB I-s is shipped in advance of unit for foundation work.

Code Blue Corp. – 92 East 64th Street – Holland, MI 49423 – 800-205-7186 – Fax 616-392-8391 – www.codeblue.com

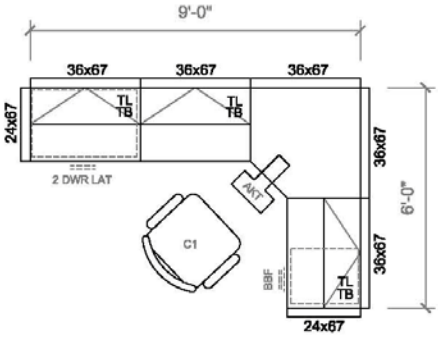
Figure 22



A1 TYPICAL (TEACHING ASSISTANTS / RESEARCH ASSISTANTS)



A2 TYPICAL RECEPTION STATION WITH TRANSACTION TOP AND ADA COUNTER
(KEYBOARD TRAY TO BE INSTALLED PER USER SPECIFICATION)



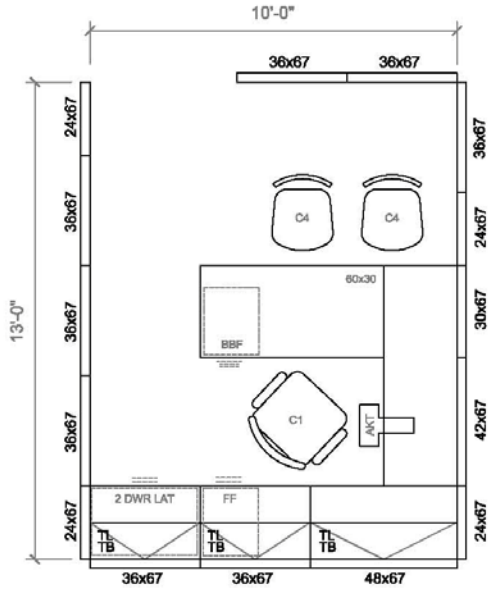
A3 TYPICAL CLERICAL / ADMIN STATION WITH HIGH PANELS
(KEYBOARD TRAY TO BE INSTALLER PER USER SPECIFICATION)

SHEET	TITLE:		
1 OF 6	OFFICE FURNITURE TYPICALS A TYPICALS SYSTEMS FURNITURE PLASTIC LAMINATE	SCALE: 1/4" = 1'-0"	DATE: 11.10.04 BY: TMR

UNIVERSITY of NORTH TEXAS
OFFICE OF FACILITIES PLANNING AND CONSTRUCTION
P.O. BOX 311040, DENTON, TX 76203-1040
940-369-7000

REV #	DESCRIPTION	DATE	BY
X	XXXX	XXXX	XXXX

Figure 23

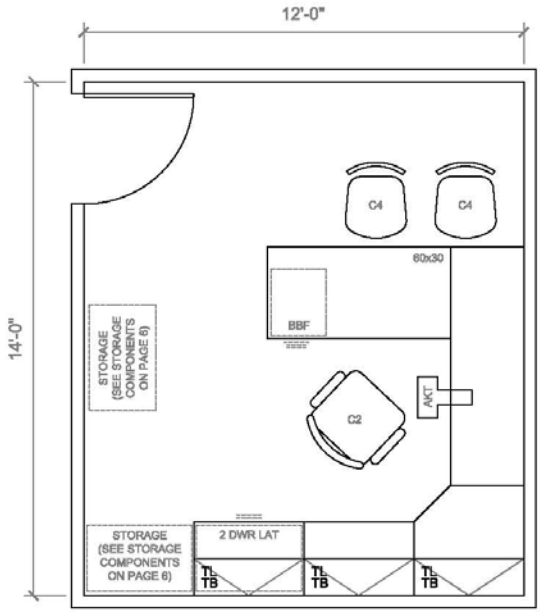


B TYPICAL **FACULTY / STAFF**
(KEYBOARD TRAY TO BE INSTALLED PER USER SPECIFICATION)

SHEET	TITLE:				REV #	DESCRIPTION	DATE	BY
2	OFFICE FURNITURE TYPICALS B TYPICAL SYSTEMS FURNITURE PLASTIC LAMINATE				X	XXXX	XXXX	XXXX
OF 6	SCALE: 1/4" = 1'-0"	DATE: 11.10.04	BY: TMR					

UNIVERSITY of NORTH TEXAS
OFFICE OF FACILITIES PLANNING AND CONSTRUCTION
P.O. BOX 311040, DENTON, TX 76203-1040
940-369-7000

Figure 24

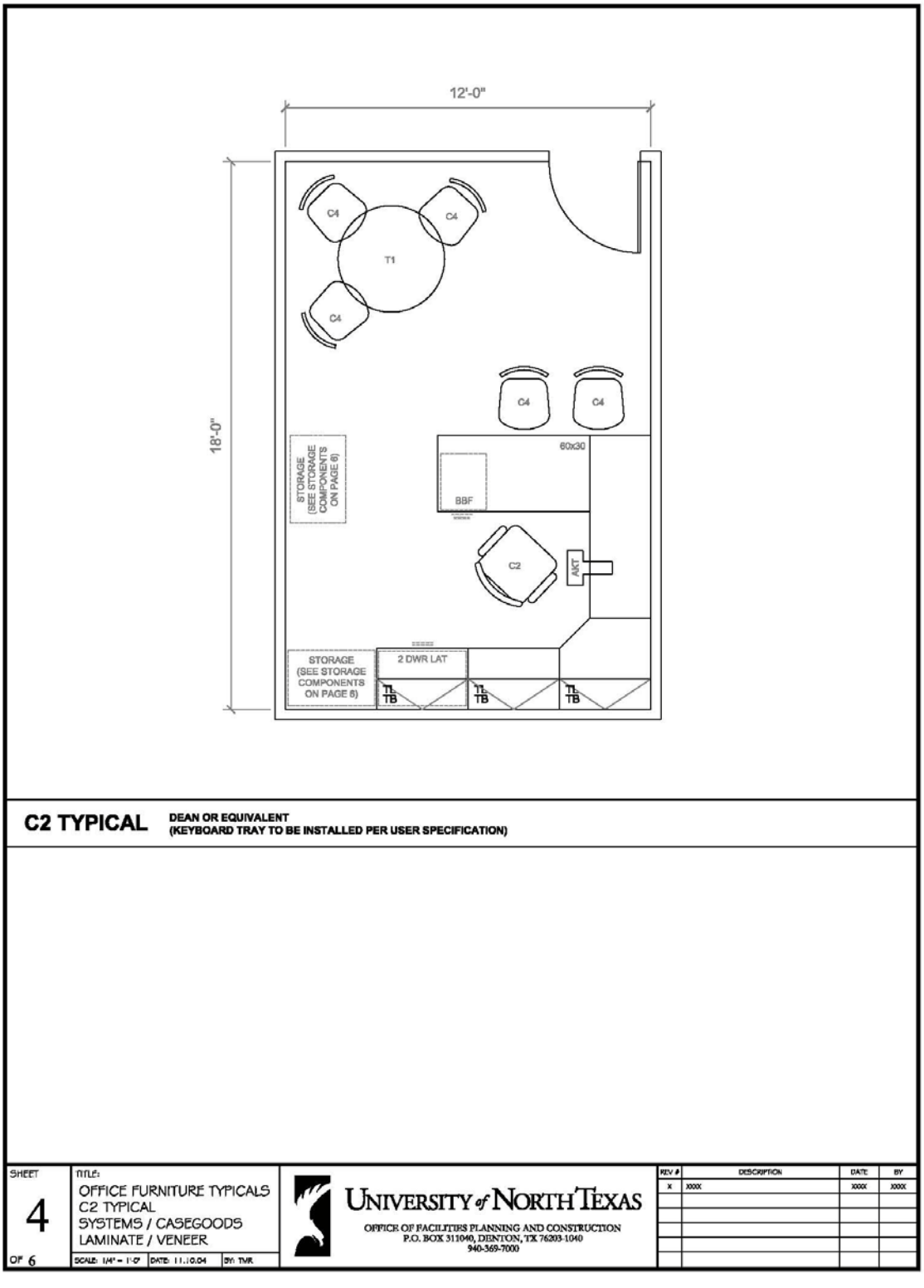


C1 TYPICAL **DEPARTMENT CHAIR, DIRECTOR, OR EQUIVALENT (KEYBOARD TRAY TO BE INSTALLED PER USER SPECIFICATION)**

SHEET	TITLE:			REV #	DESCRIPTION	DATE	BY
3 OF 6	OFFICE FURNITURE TYPICALS C1 TYPICAL SYSTEMS FURNITURE PLASTIC LAMINATE	SCALE: 1/4" = 1'-0"	DATE: 11.10.04 BY: TMR	X	XXXX	XXXX	XXXX

UNIVERSITY of NORTH TEXAS
OFFICE OF FACILITIES PLANNING AND CONSTRUCTION
P.O. BOX 311040, DENTON, TX 76203-1040
940-369-7000

Figure 25

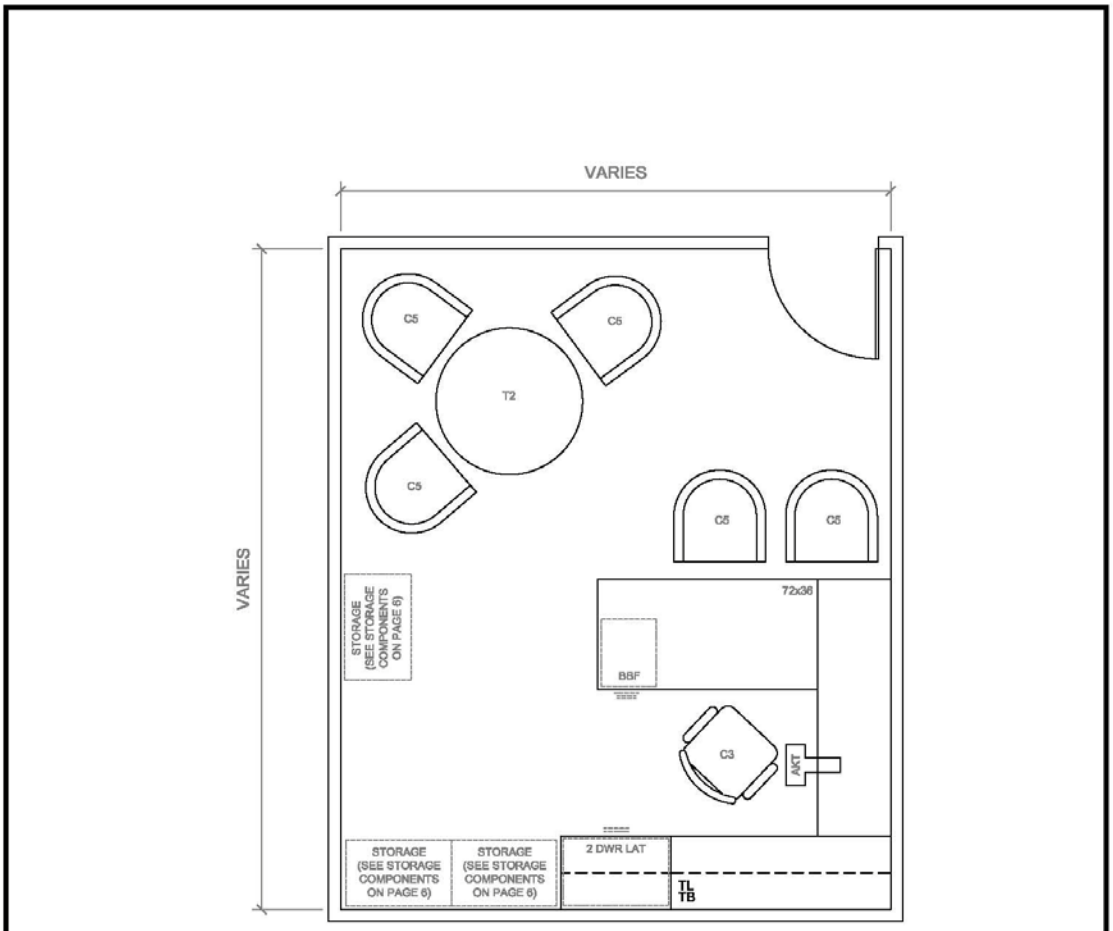


C2 TYPICAL **DEAN OR EQUIVALENT (KEYBOARD TRAY TO BE INSTALLED PER USER SPECIFICATION)**

SHEET	TITLE:				REV #	DESCRIPTION	DATE	BY
4	OFFICE FURNITURE TYPICALS C2 TYPICAL SYSTEMS / CASEGOODS LAMINATE / VENEER				X	XXXX	XXXX	XXXX
OF 6	SCALE: 1/4" = 1'-0"	DATE: 11.10.04	BY: TMR					

UNIVERSITY of NORTH TEXAS
OFFICE OF FACILITIES PLANNING AND CONSTRUCTION
P.O. BOX 311040, DENTON, TX 76203-1040
940-369-7000

Figure 26



D TYPICAL **VICE PRESIDENT OR EQUIVALENT**
(KEYBOARD TRAY TO BE INSTALLED PER USER SPECIFICATION)

SHEET 5 OF 6	TITLE: OFFICE FURNITURE TYPICALS D TYPICAL CASEGOODS VENEER SCALE: 1/4" = 1'-0" DATE: 11.10.04 BY: TMR	UNIVERSITY of NORTH TEXAS OFFICE OF FACILITIES PLANNING AND CONSTRUCTION P.O. BOX 311040, DENTON, TX 76203-1040 940-369-7000	REV # X, DESCRIPTION XXXX, DATE XXXX, BY XXXX

Figure 27

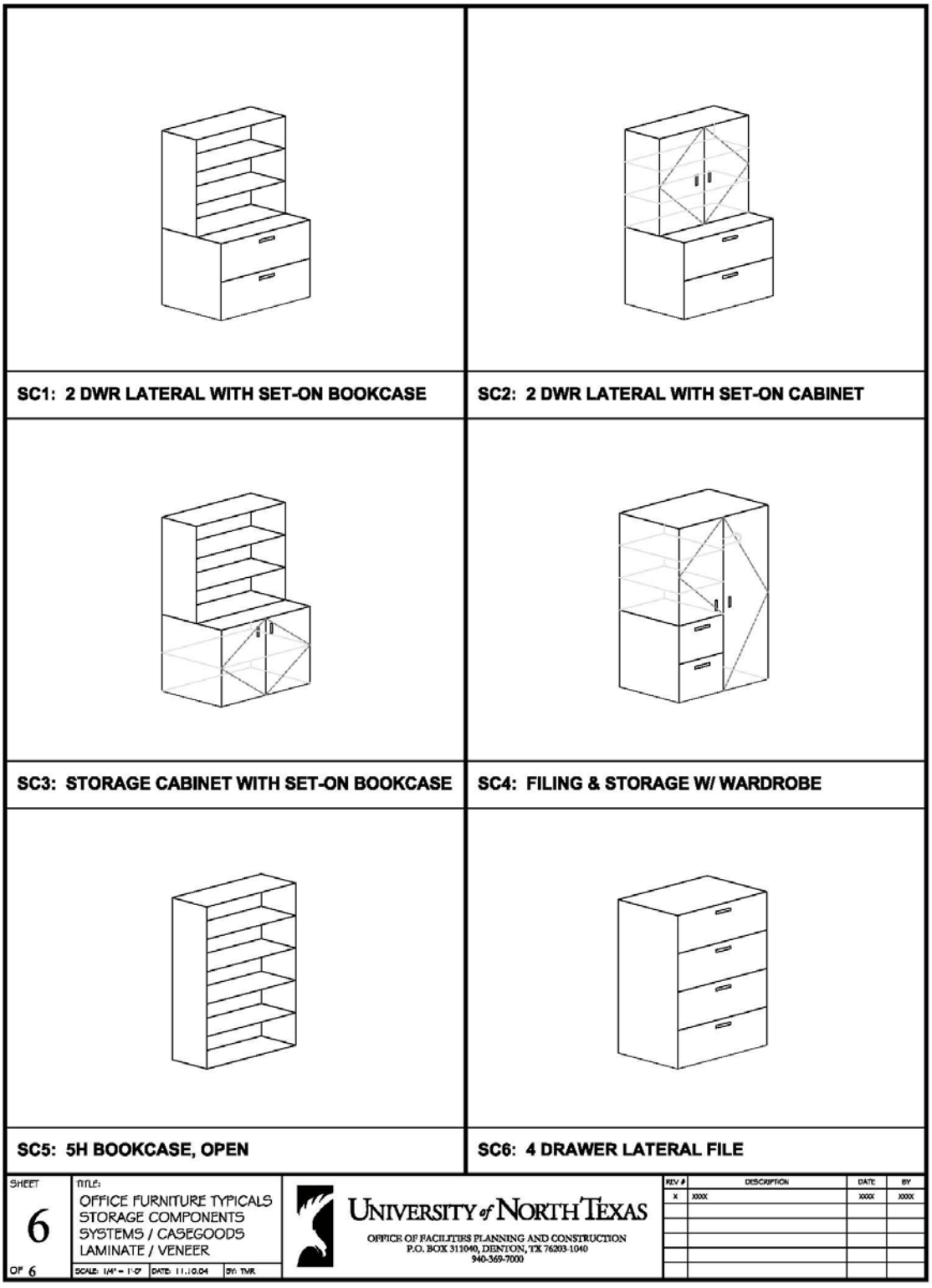
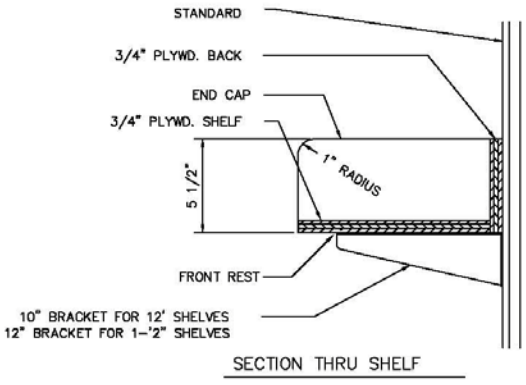
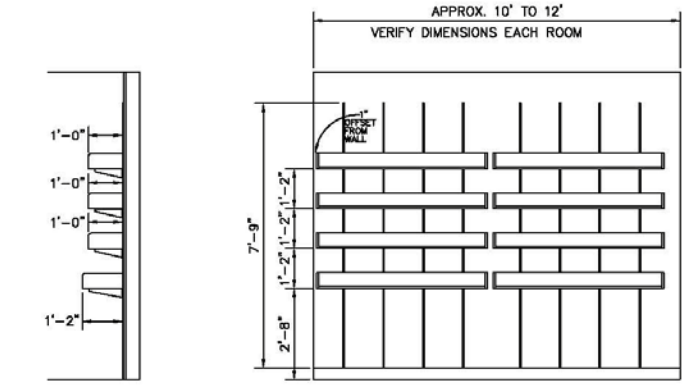

SC1: 2 DWR LATERAL WITH SET-ON BOOKCASE
SC2: 2 DWR LATERAL WITH SET-ON CABINET
SC3: STORAGE CABINET WITH SET-ON BOOKCASE
SC4: FILING & STORAGE W/ WARDROBE
SC5: 5H BOOKCASE, OPEN
SC6: 4 DRAWER LATERAL FILE
SHEET
6
OF 6
TITLE:
OFFICE FURNITURE TYPICALS
STORAGE COMPONENTS
SYSTEMS / CASEGOODS
LAMINATE / VENEER
SCALE: 1/4" = 1'-0"
DATE: 11.10.04
BY: TMR
UNIVERSITY of NORTH TEXAS
OFFICE OF FACILITIES PLANNING AND CONSTRUCTION
P.O. BOX 311040, DENTON, TX 76203-1040
940-369-7000
REV #
DESCRIPTION
DATE
BY
X
XXXX
XXXX
XXXX

Figure 28



SECTION THRU SHELF

NOTES:
USE KV NO. 187 EITH KV212 FRONT REST ANACHROME STEEL BRACKETS AND KV NO. 87 ELECTROPLATED STEEL STANDARDS. PLACE STANDARDS 16" O.C.. PROVIDE HORIZONTAL BLOCKING BEHIND STANDARDS AT TOP, BOTTOM AND CENTER. FASTEN STANDARDS TO BLOCKING WITH WOOD SCREWS. CONCEAL EXPOSED PLYWOOD EDGES WITH WOOD VENEER TAPE. FASTEN END CAPS TO SHELF WITH CEMENT COATED STAPLES OR SCREWS, CONCEAL HEADS OF FASTENERS.



SIDE ELEVATION

TYPICAL ELEVATION

ADJUSTABLE SHELVES
DESIGN STANDARDS

Figure 29

UNIVERSITY of NORTH TEXAS

POLICY STATEMENT
ELEVATOR SHUNT-TRIP DEVICES

Current State Elevator Laws require a shunt-trip shut-off device to kill power to elevators when water flow is detected in the fire sprinklers located in the elevator machine room or top of shaft. This loss of power greatly increases the risk that citizens and firefighters may become trapped in such elevators. The Fire Department uses elevators during fire situations for rescue, evacuation, and to transport fire fighting equipment and personnel to staging floor areas.

The Board of Regents for the University of North Texas System, has appointed the University System Architect as the Building Official, and Authority Having Jurisdiction for the University System as defined by all applicable codes.

Upon the recommendation of the UNT Fire Marshal, the University System Architect has ruled that such shunt-trip devices are not permitted in University of North Texas facilities. In the past, the Uniform Fire Code has allowed fire sprinkler heads to be omitted from the elevator machine rooms and top of the elevator shafts, with the concurrence of the Fire Chief, or other authority having jurisdiction. This eliminates the need or requirement for a shunt-trip device by the state elevator inspectors. Please note that supervised smoke detectors tied to the building fire alarm system are required in these areas. If you have any questions, please contact the Fire Marshal at 940-565-2109 or the University System Architect at 940-369-7000.

Recommended By:

Wendell McCloud
University Fire Marshal

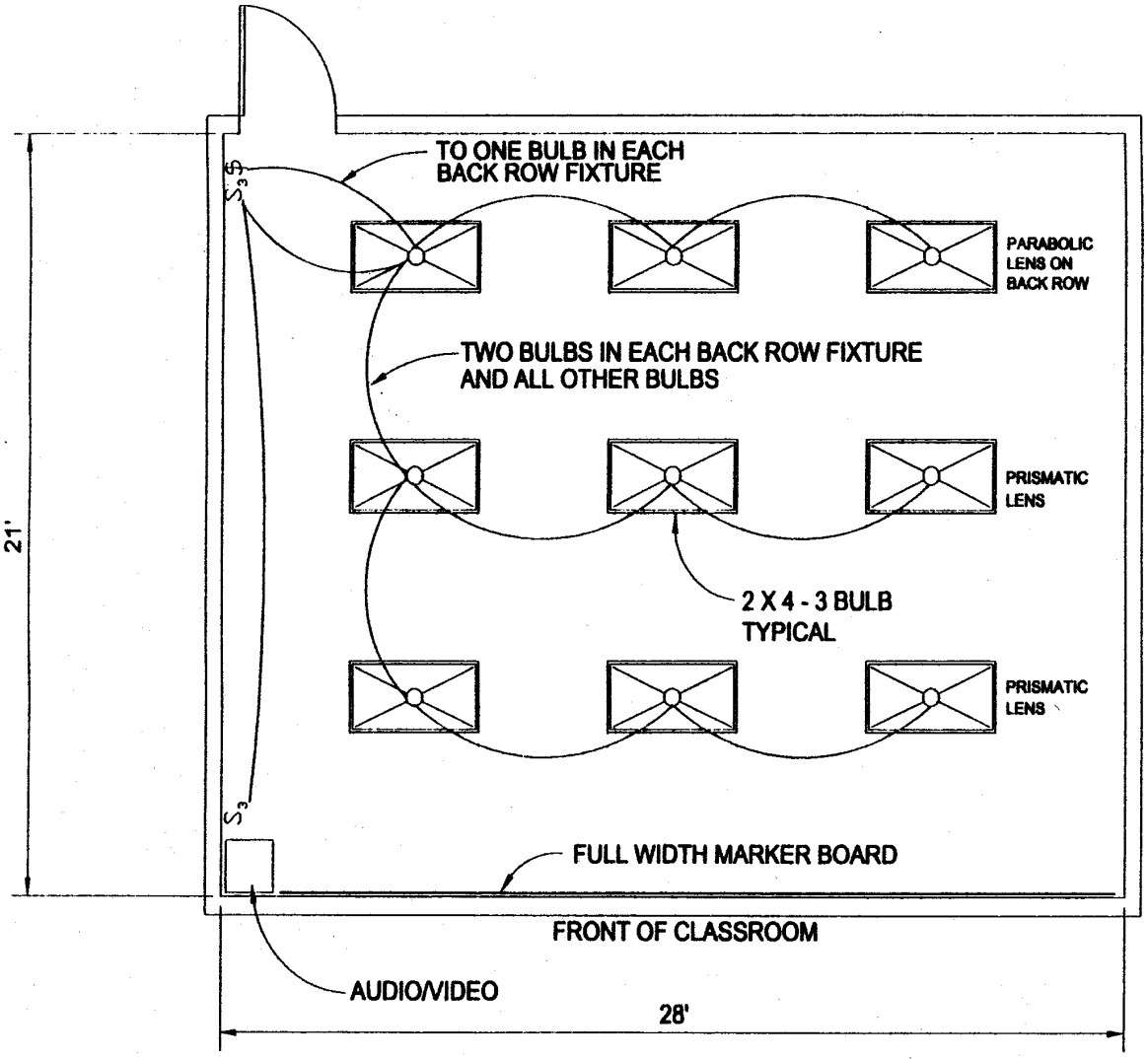
7/15/02
Date

Approved By:

A. Peter Gigli, AIA, NCARB
University System Architect

7.16.02
Date

Figure 30



IF THE EMERGENCY LIGHT BULB IS ALWAYS ON, IT MUST BE IN THE BACK FIXTURE

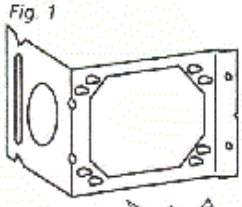
Figure 31

TYPICAL CLASSROOM LIGHTING - CAPACITY 36

Stud Wall

Box Mounting Bracket For Electric Box

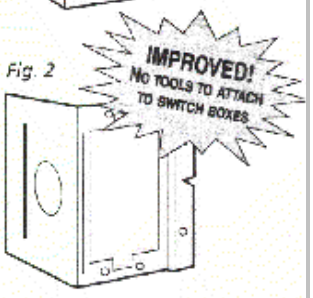
Fig. 1



Features

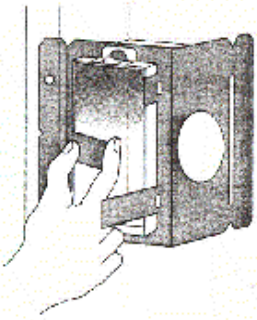
- Easily attaches 4" and 4 11/16" outlet boxes to metal stud (HS3 switch boxes).
- Support leg eliminates movement of box in wall.
- Can be attached to metal or wood stud.
- Offset to eliminate dry wall bulges.
- Delivers compliance with:
  NEC Article 300-4(d) when used for 4" and 4 11/16" outlet boxes to metal or wood studs.
  CEC Rule 12-3012 for 4" and 4 11/16" outlet boxes to metal or wood studs.

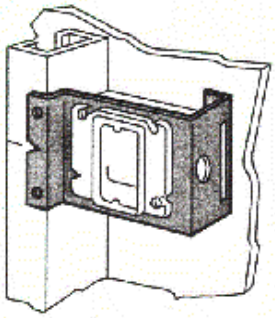
Fig. 2



SMS8

Applications





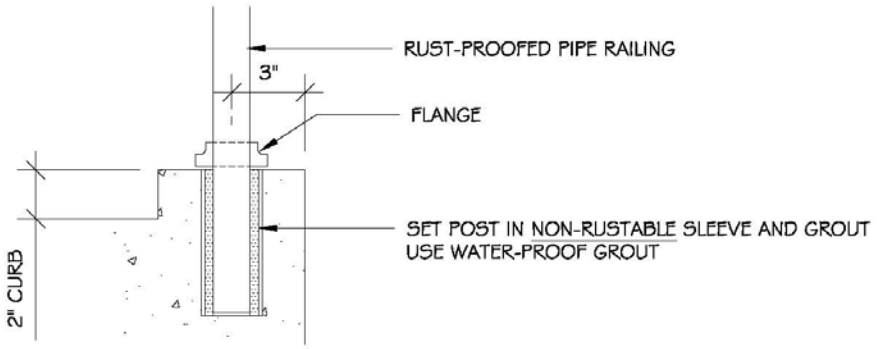
Sizing Chart

UL & cUL Listed
Positioning Only

CATALOG NUMBER	FIG. NO.	APPLICATION	BOX SIZE(S)	STUD DEPTH	QTY. PER BOX
H23	1	U.S.	4" sq. & 4 11/16"	2½" & 3½"	100
H23TC	1	Canada	4" sq. & 4 11/16"	2½" & 3½"	100
H4	1	U.S.	4" sq. & 4 11/16"	4"	50
H6	1	U.S.	4" sq. & 4 11/16"	6"	50
H46TC	1	Canada	4" sq. & 4 11/16"	4" & 6"	100
HS3	2	U.S. & Canada	Switch	2⅛" & 3⅛"	100

Read safety instructions and instruction sheets contained in packages before using or applying fasteners.

Figure 32



Typ. Detail @ Post
Scale: 2" = 1'-0"

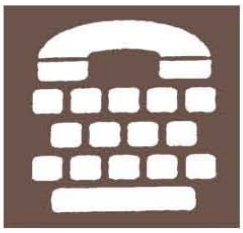
Figure 33

SYMBOLS:

Symbol of Accessibility

Telephone

Drinking Fountain



Text Telephone

Information

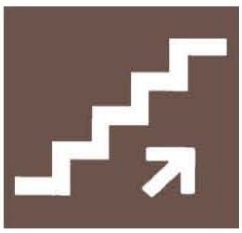
Volume Control Telephone

Fire Extinguisher

Men's Toilet

No Smoking

Women's Toilet

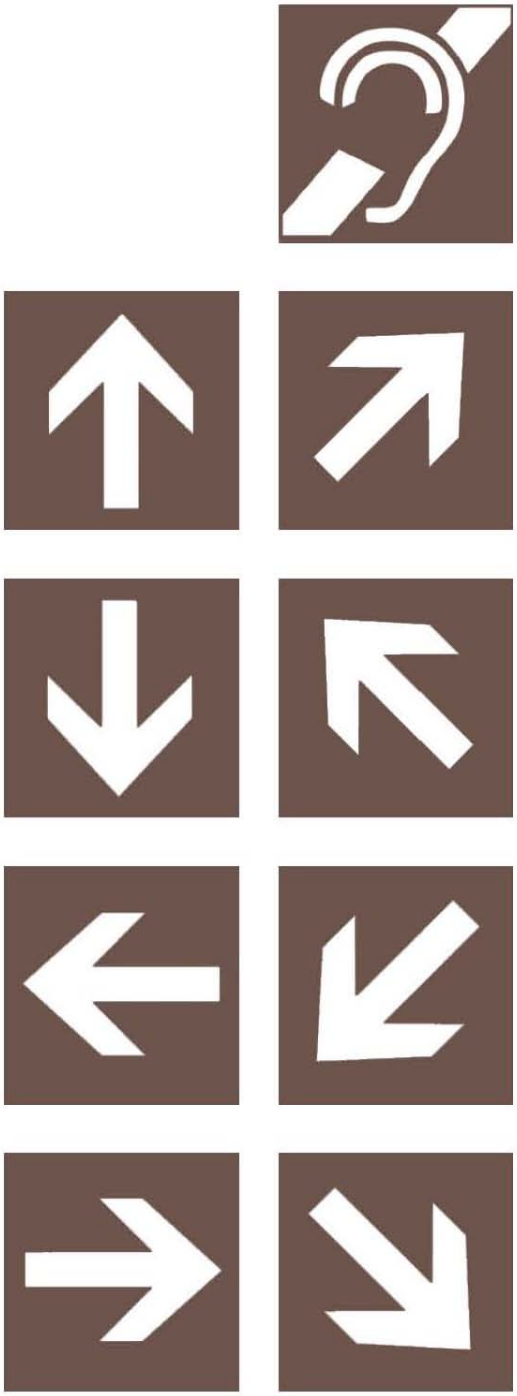


Stairs

No Food or Drink

Figure 34

DIRECTIONAL ARROWS:



Assistive Listening Device

Directional Arrows

Figure 35

SIGN TYPE 1:

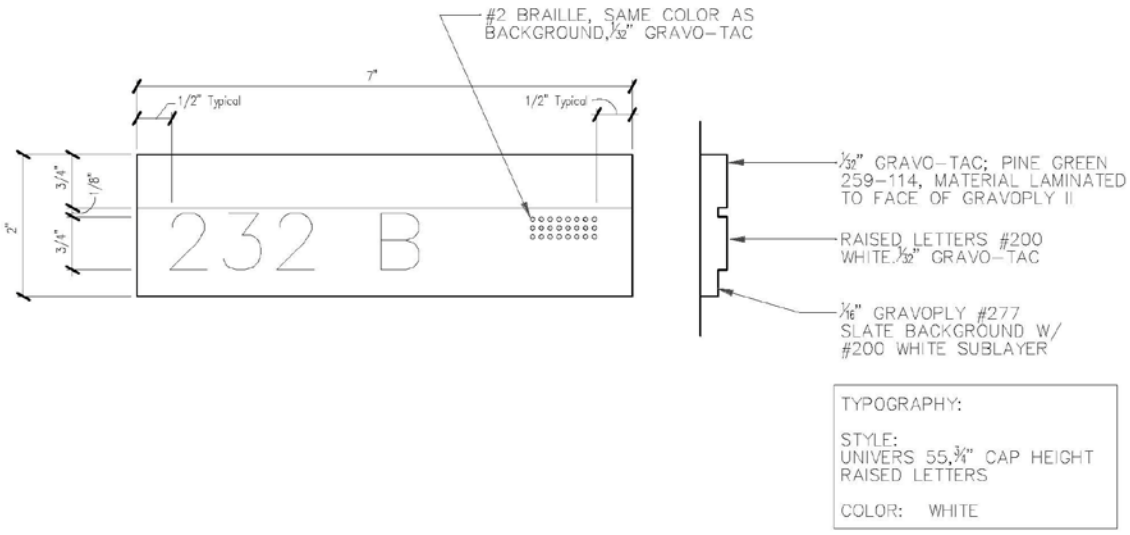


Figure 36

SIGN TYPE 2:

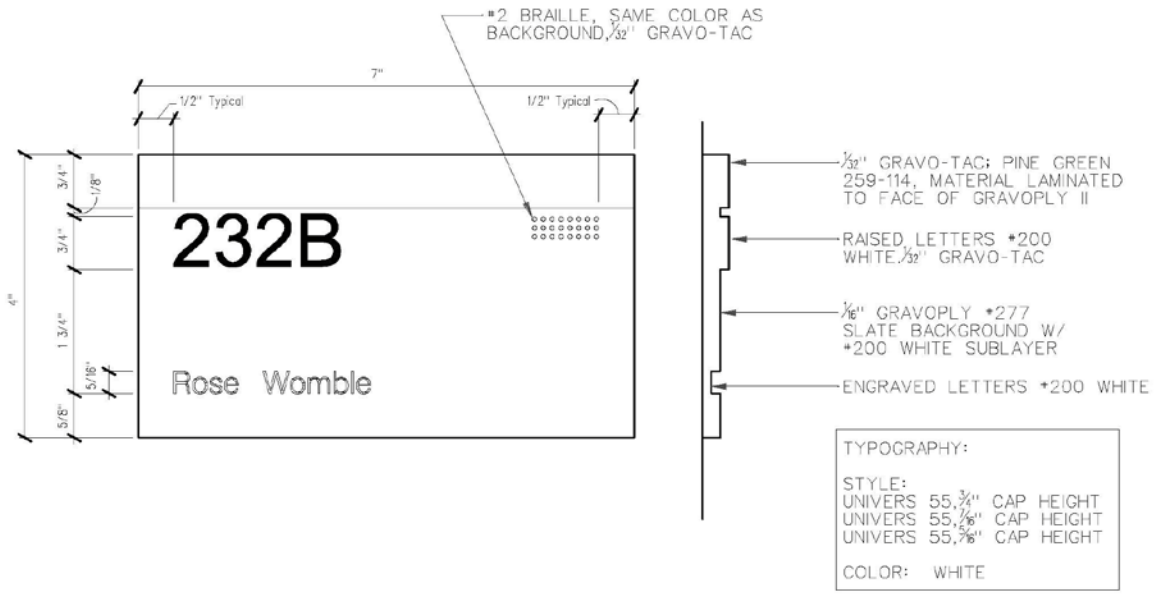


Figure 37

SIGN TYPE 2A:

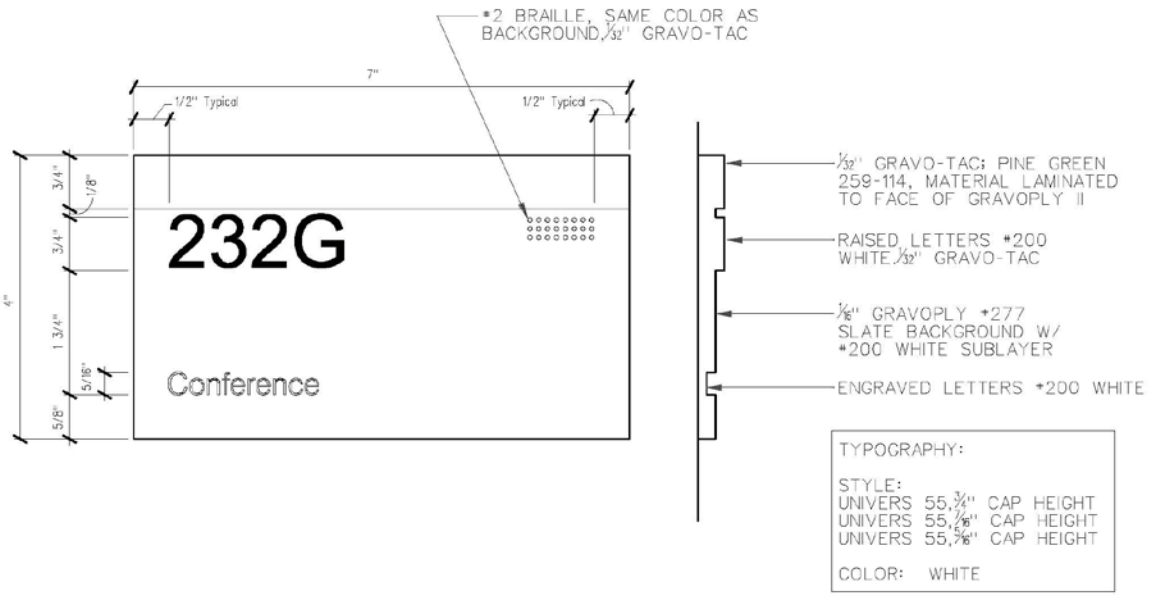


Figure 38

SIGN TYPE 2B:

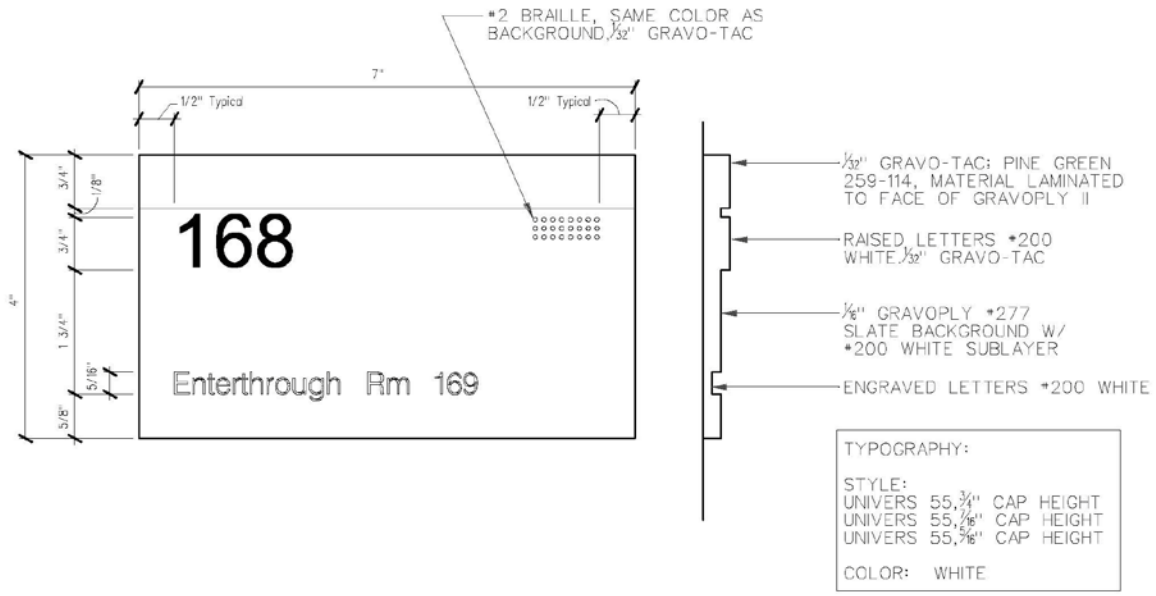


Figure 39

SIGN TYPE 3:

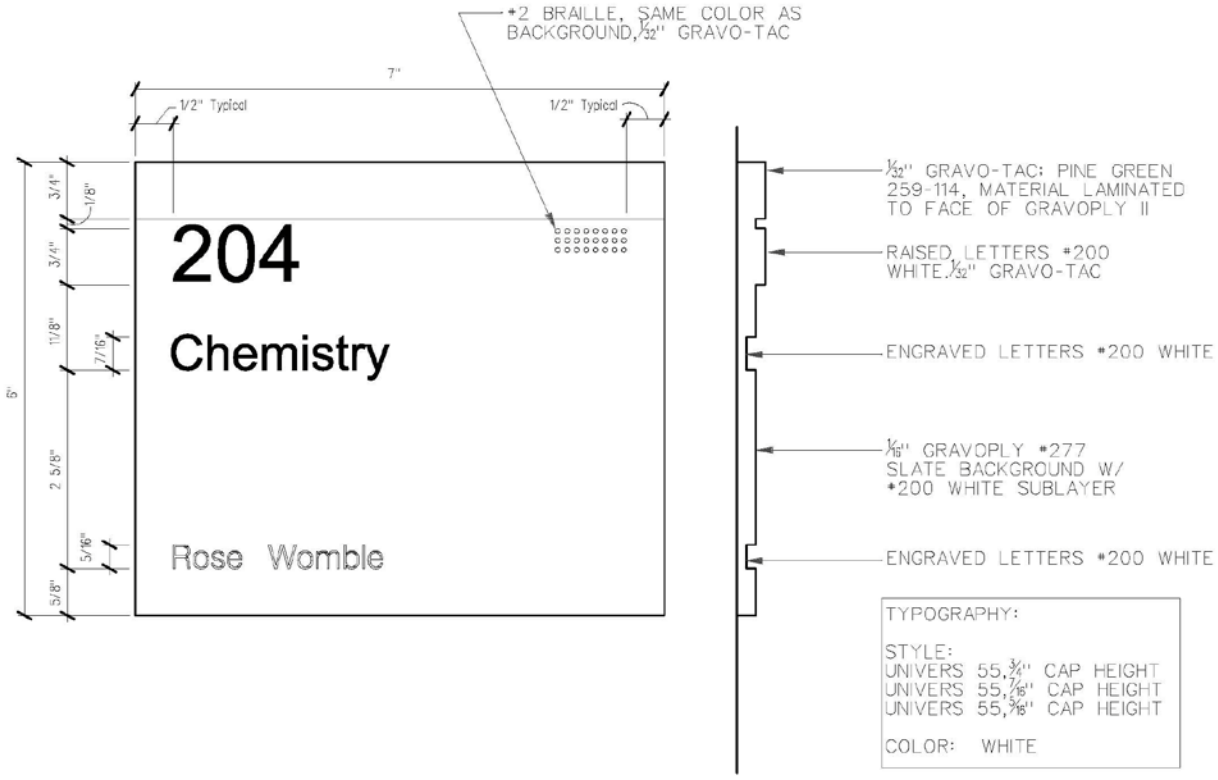


Figure 40

SIGN TYPE 3A:

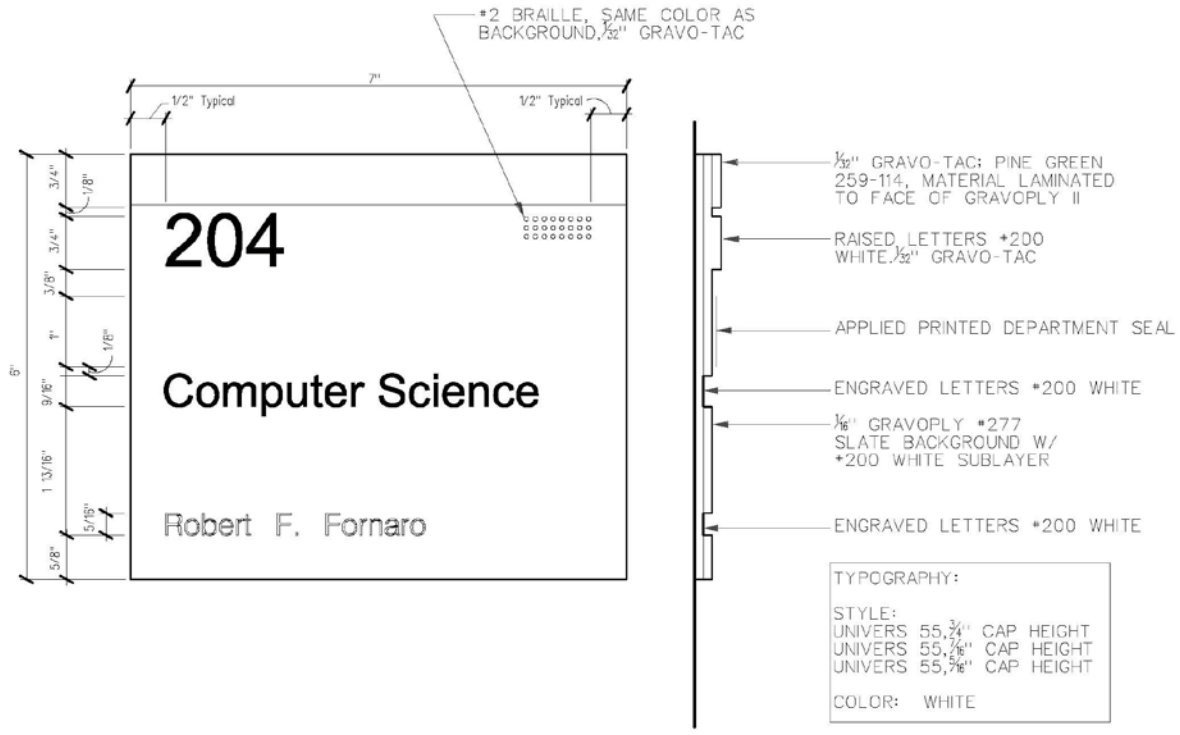


Figure 41

SIGN TYPE 3B:

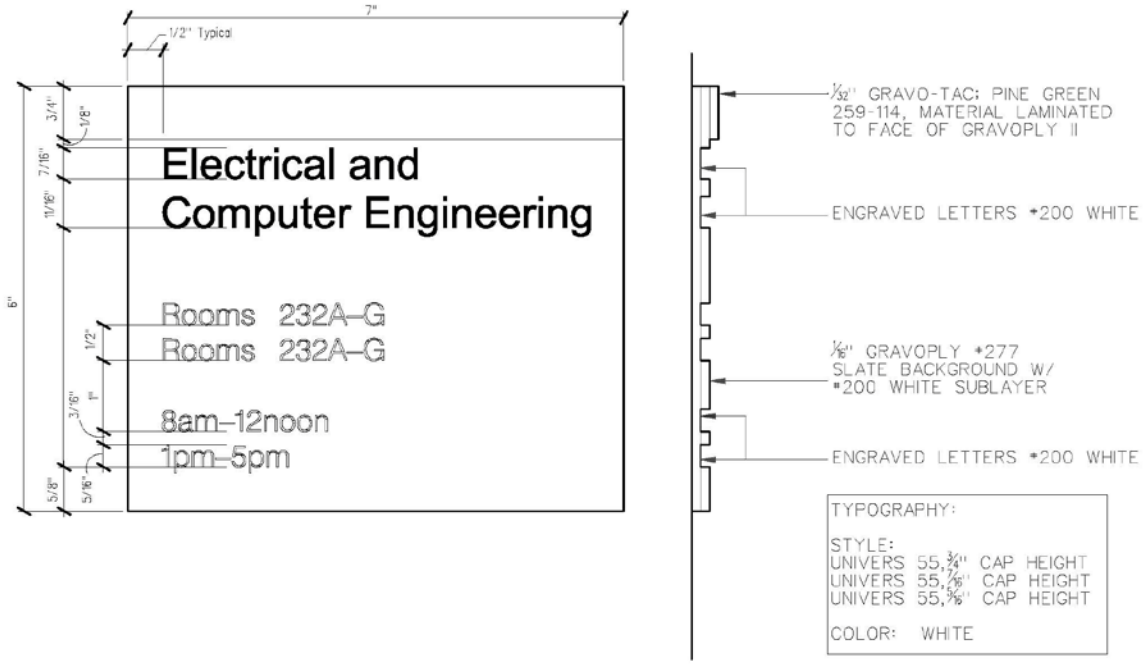


Figure 42

SIGN TYPE 4:

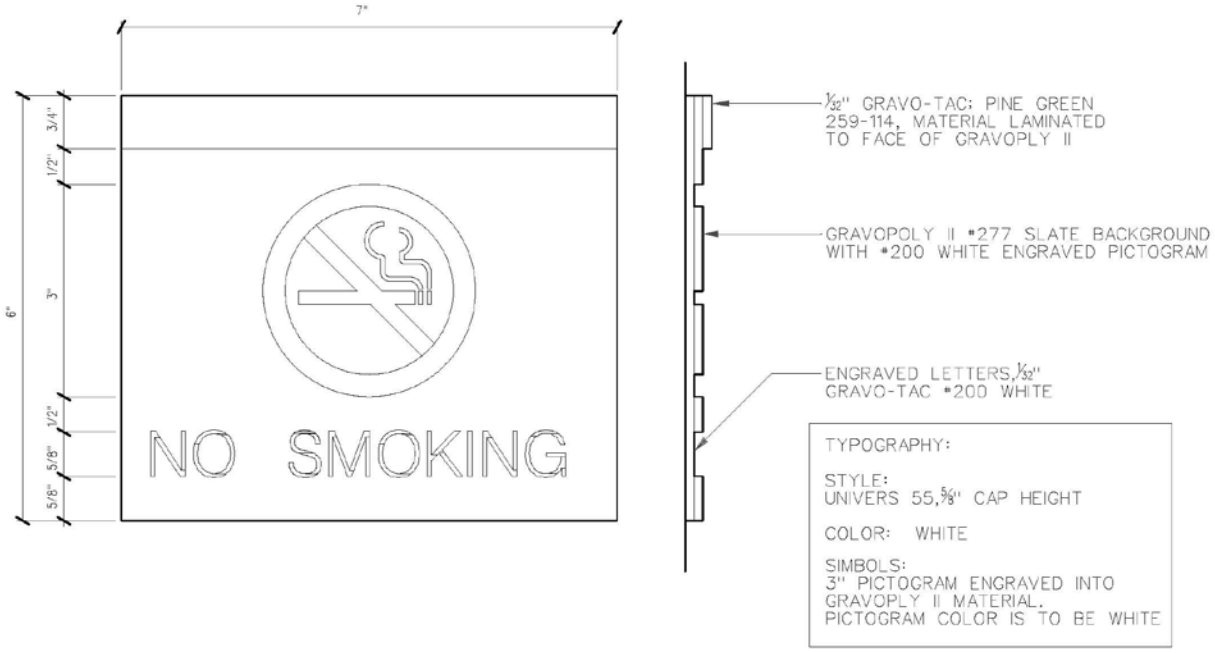


Figure 43

SIGN TYPE 6:

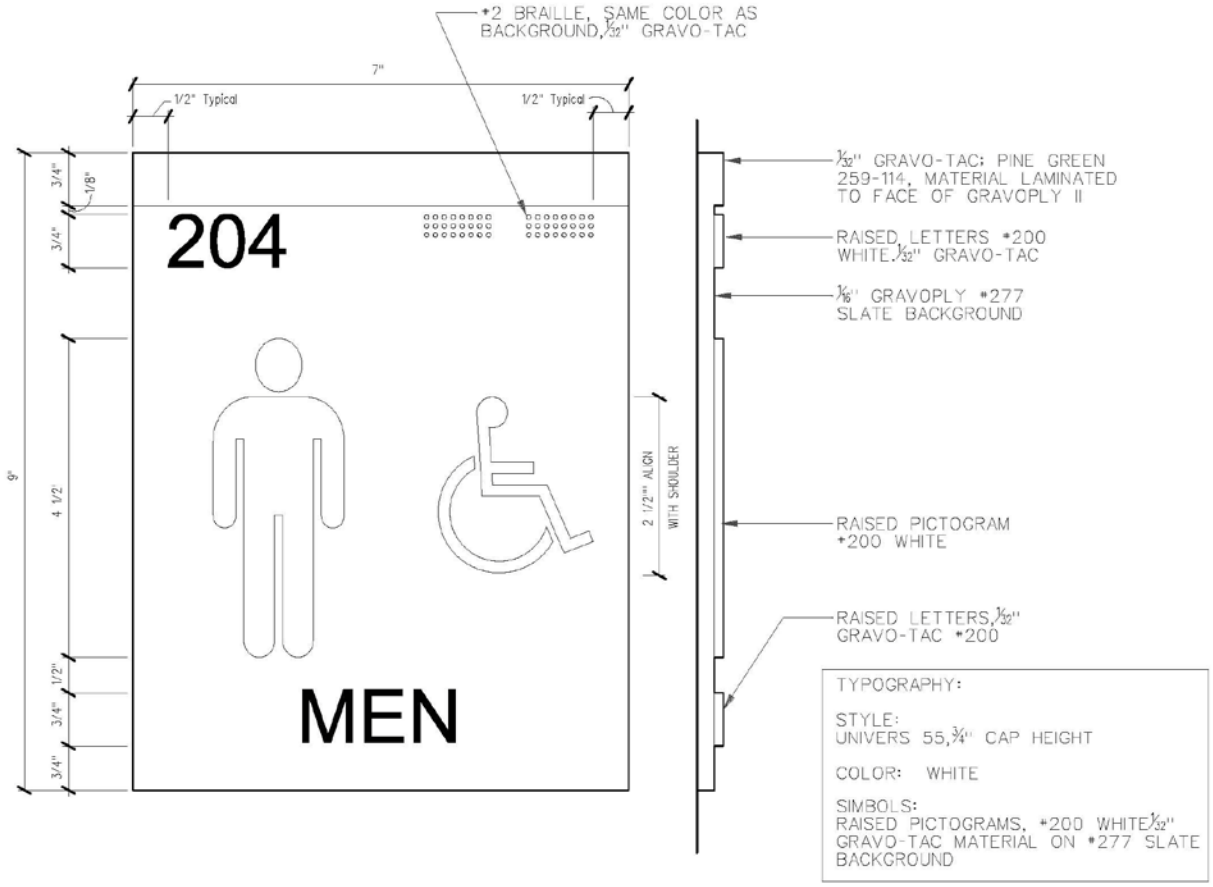


Figure 44

SIGN TYPE 6A

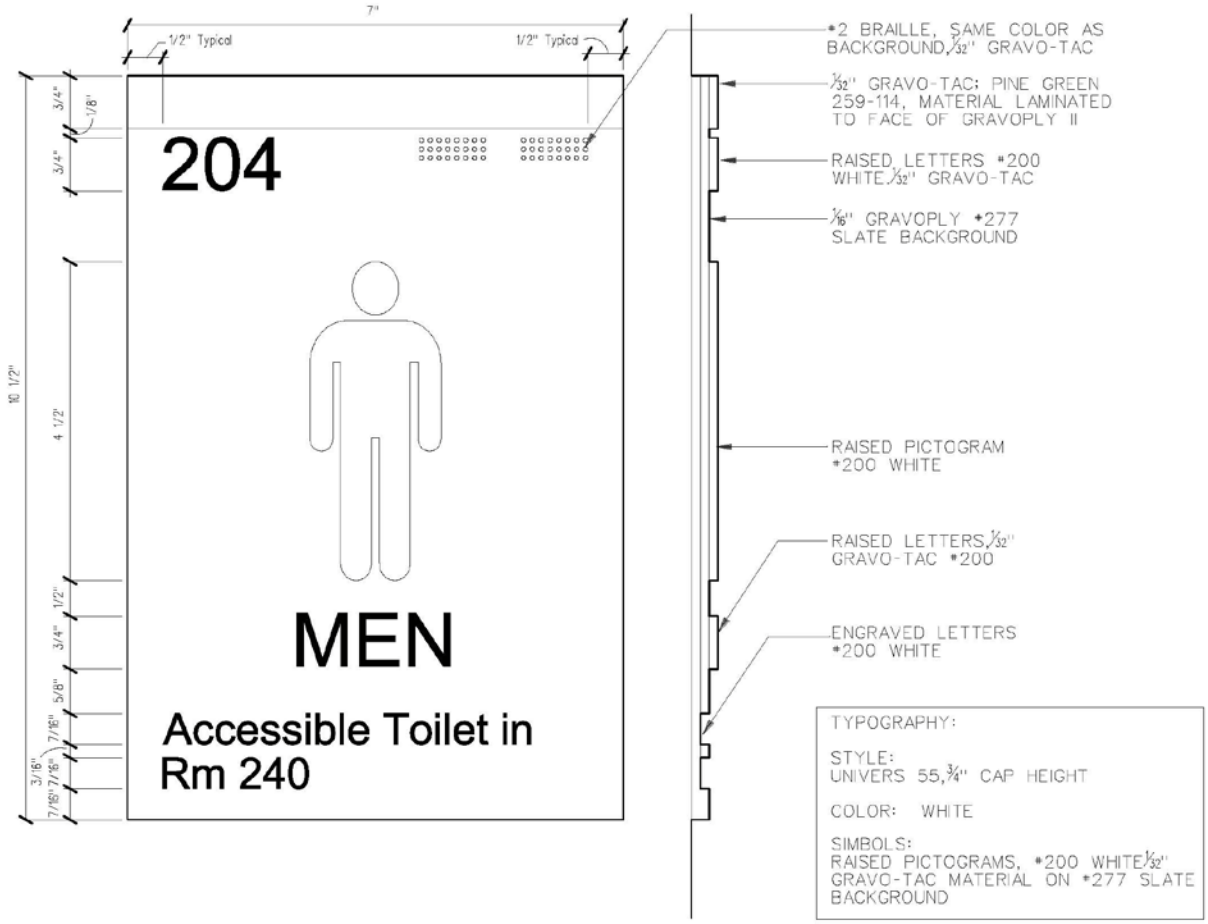


Figure 45

SIGN TYPE 8:

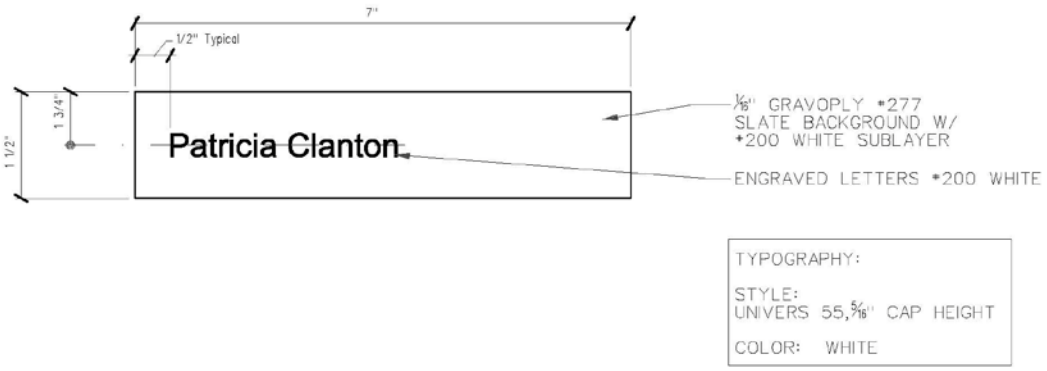


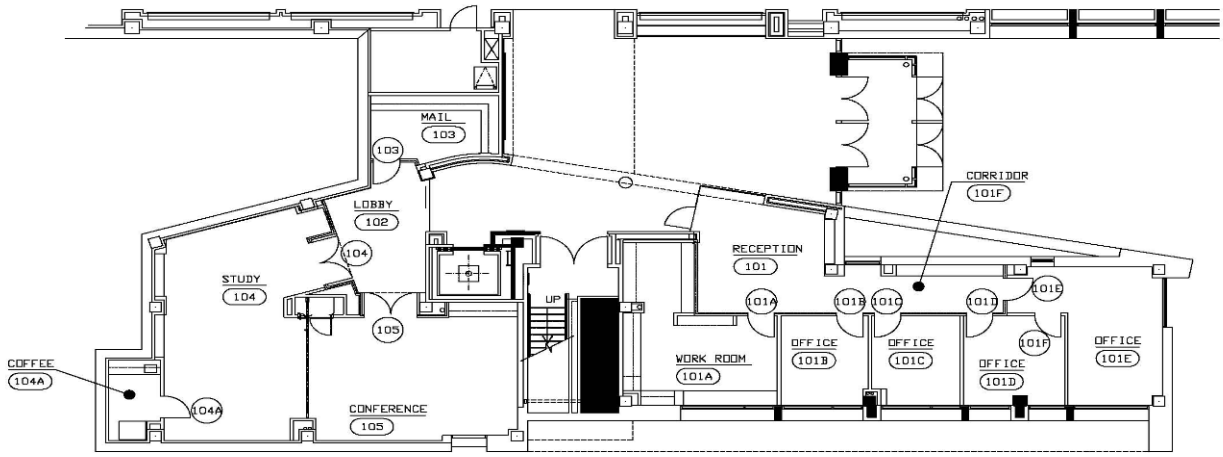
Figure 46

Sample Signage Schedule:

Signage Schedule
UNT Chemistry Building

Refer sheet 5.10 for sign types and locations. All signs to be mounted on corridor side unless otherwise noted.

Rm. No.	Door No.	Name	Sign Type	Sign Location	Number	Wording 1	Wording 2	Remarks
101	N/A	RECEPTION	2	A	101	Student Service	-	SIGN ON EXISTING STOREFRONT BY EXISTING DOOR
101A	101A	WORK ROOM	1	A	101A	-	-	
101B	101B	OFFICE	1	A	101B	-	-	
			8	A	-	OCCUPANT NAME	-	
101C	101C	OFFICE	1	A	101B	-	-	
			8	A	-	OCCUPANT NAME	-	
101D	101D	OFFICE	1	A	101B	-	-	
			8	A	-	OCCUPANT NAME	-	
101E	101E	OFFICE	2	A	101E	Ruthanne Thomas	-	
101D	101F	OFFICE	-	-	-	-	-	
103	103	MAIL ROOM	1	A	103	-	-	
104	104	STUDY	2	D	104	Lounge		
104A	104A	COFFEE	1	A	104A	-	-	
105	105	CONFERENCE	2	D	105	Conference		



UNT Chemistry Building - Level 1 Partial Floor Plan

Figure 47

Appendix H: Facilities Management and Construction CAD Standards

UNIVERSITY OF NORTH TEXAS

OFFICE OF FACILITIES MANAGEMENT AND CONSTRUCTION

INTERIORS CAD STANDARDS

TABLE OF CONTENTS

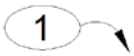
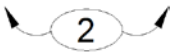
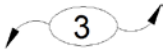
I. Layers List

Use the following list of approved layers when converting an existing drawing for a new project. DO NOT CREATE NEW LAYERS. If you have questions about what belongs on which layers, consult a Project Manager for assistance.

Stat	Name	On	Freeze	Lock	Color	Linetype	Lineweight	Plot Style	Plot	Description
✓	0				white	Continuous	Default	Color_7		Default AutoCAD Layer (Standard)
	A-Anno-Keyn				white	Continuous	Default	Color_7		Annotation Key Note
	A-Anno-Nplt				red	Continuous	Default	Color_1		Annotation NoPlot
	A-Anno-Stamp				red	Continuous	Default	Color_1		Annotation Stamp - Not For Construction
	A-Anno-Text				white	Continuous	Default	Color_7		Annotation Text
	A-Anno-Ttlb				white	Continuous	Default	Color_7		Annotation Title Block
	A-Area				cyan	Continuous	Default	Color_4		Annotation Scope of Work for Project
	A-Door-Exst				white	Continuous	0.13 mm	Color_7		Existing doors to remain
	A-Eqpm				red	Continuous	0.13 mm	Color_1		Existing Equipment to Remain
	A-Fire-Exst				red	Continuous	Default	Color_1		Existing Fire System to Remain
	A-Glaz-Exst				177	Continuous	Default	Col..177		Existing Glass or Glazing to Remain
	A-Mlwk-Exst				37	Continuous	0.13 mm	Color_37		Existing Millwork to Remain
	A-Rmno-Iden-Exst				white	Continuous	Default	Color_7		Tags for Existing Rooms
	A-Rmno-Iden-New				white	Continuous	Default	Color_7		Tags for New Rooms Added
	A-Wall-Exst				green	Continuous	0.05 mm	Color_3		Existing Partitions to Remain
	A0-Demo-Door				8	DASHED	Default	Color_8		Existing Doors to be Demolished
	A0-Demo-Fire				8	DASHED	Default	Color_8		Existing Fire System & Alarms to be Demolished
	A0-Demo-Glaz				8	DASHED	Default	Color_8		Existing Glass or Glazing to be Demolished
	A0-Demo-Grid				8	DASHED	Default	Color_8		Existing Ceiling Grid to be Demolished
	A0-Demo-Hvac				8	DASHED	Default	Color_8		Existing Mechanical & HVAC to be Demolished
	A0-Demo-Lite				8	DASHED	Default	Color_8		Existing Light Fixture to be Demolished
	A0-Demo-Mlwk				8	DASHED	Default	Color_8		Existing Millwork to be Demolished
	A0-Demo-Powr				8	DASHED	Default	Color_8		Existing Power & Data to be Demolished
	A0-Demo-Wall				8	DASHED	Default	Color_8		Existing Walls to be Demolished
	A0-Dims				8	Continuous	Default	Color_8		Dimensions for Areas to be Demolished
	A1-Dims				8	Continuous	Default	Color_8		Dimensions for New Partitions and Openings
	A1-Door-Neww				red	Continuous	0.20 mm	Color_1		New Doors
	A1-Door-Relo				magenta	DASHED2	0.09 mm	Color_6		Existing Doors to be Relocated
	A1-Fire-Neww				red	Continuous	0.09 mm	Color_1		New Rated Fire Partitions
	A1-Glaz-Neww				177	Continuous	Default	Col..177		New Glass or Glazing
	A1-Mlwk-Neww				30	Continuous	Default	Color_30		New Millwork
	A1-Mlwk-Relo				magenta	DASHED2	Default	Color_6		Existing Millwork to be Relocated
	A1-Wall-Neww				blue	Continuous	0.25 mm	Color_5		New Partitions to be Constructed
	A1-Wall-Patt				yellow	Continuous	0.00 mm	Color_2		Poche for New Partitions
	A2-Dims				8	Continuous	Default	Color_8		Dimensions for Power & Data
	A2-Powr-Exst				8	Continuous	0.00 mm	Color_8		Existing Power & Data to Remain
	A2-Powr-Neww				red	Continuous	0.20 mm	Color_1		New Power & Data
	A2-Powr-Relo				magenta	DASHED2	0.09 mm	Color_6		Existing Power & Data to be Relocated
	A3-Clng-Head				8	Continuous	Default	Color_8		Existing Sprinkler Heads to Remain
	A3-Fire-Exst				8	Continuous	Default	Color_8		Existing Fire Alarms to Remain
	A3-Fire-Neww				red	Continuous	Default	Color_1		New Fire Alarms
	A3-Fire-Relo				magenta	DASHED2	Default	Color_6		Existing Fire Alarms to be Relocated
	A3-Grid-Exst				8	Continuous	0.05 mm	Color_8		Existing Ceiling Grid to Remain
	A3-Grid-Neww				white	Continuous	0.09 mm	Color_7		New Ceiling Grid
	A3-Hvac-Exst				8	Continuous	Default	Color_8		Existing Mechanical & HVAC to Remain
	A3-Hvac-Neww				red	Continuous	Default	Color_1		New Mechanical & HVAC System
	A3-Hvac-Relo				magenta	DASHED2	Default	Color_6		Existing Mechanical & HVAC to be Relocated
	A3-Lite-Exst				8	Continuous	0.05 mm	Color_8		Existing Light Fixtures to Remain
	A3-Lite-Neww				red	Continuous	0.20 mm	Color_1		New Light Fixtures
	A3-Lite-Relo				magenta	DASHED2	0.09 mm	Color_6		Existing Light Fixtures to be Relocated
	A4-Dims				8	Continuous	Default	Color_8		Finish Dimensions
	A4-Patt				white	Continuous	Default	Color_7		Finish Patterns
	A5-Dims				8	Continuous	Default	Color_8		Dimensions for Furniture Plan
	A5-Furn-Exst				8	Continuous	0.05 mm	Color_8		Existing Furniture to Remain
	A5-Furn-Prop				magenta	Continuous	0.09 mm	Color_6		Proposed or New Furniture
	A6-Detail				white	Continuous	Default	Color_7		Plan Details
	A6-Elev				white	Continuous	Default	Color_7		Plan Elevations
	B-Base				blue	Continuous	0.25 mm	Color_5		Existing Building Base
	B-Belo				40	Continuous	0.13 mm	Color_40		Existing Building Below
	B-Cols				blue	Continuous	0.25 mm	Color_5		Existing Building Columns
	B-Glaz				blue	Continuous	0.15 mm	Color_5		Existing Building Glass or Glazing
	B-Hatch				252	Continuous	Default	Col..252		Existing Building Hatch for Walls
	B-Pfix				177	Continuous	0.15 mm	Col..177		Existing Building Plumbing Fixtures
	B-Roof				252	Continuous	Default	Col..252		Existing Building Roof
	C-Pkng				252	Continuous	Default	Col..252		Area designated for Vehicle Parking
	C-Pkng-Isld				253	Continuous	Default	Col..253		Parking Island & Wheel Stops
	C-Pkng-Strp				254	Continuous	Default	Col..254		Parking Stripes
	C-Rail				white	TRACKS	Default	Color_7		Railway & Train Tracks
	C-Road				white	Continuous	Default	Color_7		Roadways and Drives
	C-Road-Curb				253	Continuous	Default	Col..253		Back of Curbs for Roadways
	Defpoints				white	Continuous	Default	Color_7		AutoCAD defpoints layer (standard)
	L-Bike				white	Continuous	Default	Color_7		Bike Racks
	L-Fence				252	FENCELINE1	Default	Col..252		Fence or Barriers
	L-Irrg				134	DASHED	Default	Col..134		Landscape Irrigation
	L-Plnt				65	Continuous	Default	Color_65		Landscape, Plants, or Trees
	L-Pond				161	Continuous	Default	Col..161		Ponds, Lakes, or Waterways
	L-Sprt				37	Continuous	Default	Color_37		Sport or Athletic Fields
	L-Walk				54	Continuous	Default	Color_54		Sidewalks
	L-Wall				8	Continuous	Default	Color_8		Retaining Walls
	NICN				30	Continuous	Default	Color_30		Not In Contract Layer
	NOPLOT				red	Continuous	Default	Color_1		No Plot Layer
	Symbol Library				white	Continuous	Default	Color_7		

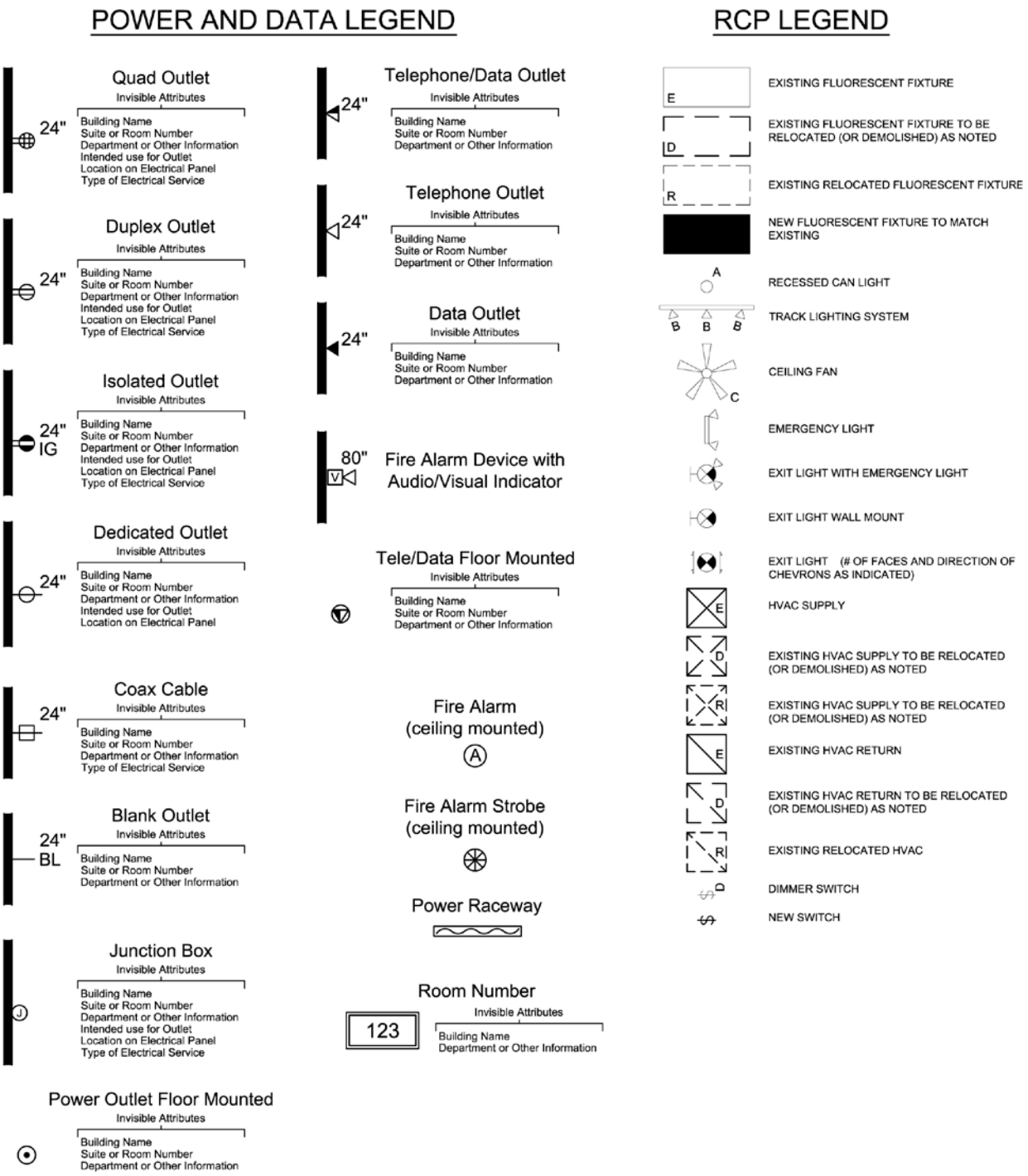
II. Block List

Below is a list of blocks created for insertion in paperspace.

	**Empty Keynote Bubble** Import this block in paperspace and center over number(s) in the notes section of your titleblock.
	**Single Keynote Bubble** Import this block in paperspace and locate above viewport over areas of floor plan requiring keynote(s). Mirror for proper direction; contains editable attribute.
	**Double Keynote Bubble** Import this block in paperspace and locate above viewport over areas of floor plan requiring keynote(s). Mirror for proper direction; contains editable attribute.
	**All Keynote Bubble** Import this block in paperspace and locate above viewport over areas of floor plan requiring keynote(s). Contains editable attribute.
	**Door / Hardware Type Symbol** Import this block in paperspace and locate above viewport over all doors within scope of project. Contains editable attributes for both door type and hardware type.
	**Elevation Symbol** Import this block in paperspace and locate above viewport to indicate areas where an elevation has been provided later in the set of drawings. Contains editable attribute to reference where elevation can be located.
	**Flooring Change Symbol** Import this block in paperspace and locate at any area where flooring types transition. Contains editable attribute.
	**Accent Paint Symbol** Import this block in paperspace and locate at any area where there will be an accent paint color, using p-lines to indicate stopping points. Contains editable attribute.
	**Finish Symbol** Import this block in paperspace and locate within each space containing a room number to indicate individual finishes for that area. Should be multiple finish symbols per room indicating flooring type, base type, paint color, etc. Contains editable attributes for finish type and finish number (should correspond with Finish Schedule).
	**Room Number Symbol** Versions of the room number block exist for insertion in both paperspace and model space – be sure you select the correct block or the scale will be incorrect. Contains editable attribute.

III. Symbols Library

Below is a list of symbols provided in the Master Template for use in all drawings. DO NOT CREATE YOUR OWN SYMBOLS; use those provided within the library. If a symbol does not exist for a specific circumstance within a project drawing that you are working on, please notify a Project Manager for assistance. Some blocks contain invisible attributes that cannot be seen on the drawing. The invisible attributes can be extracted into a spread sheet for tracking.

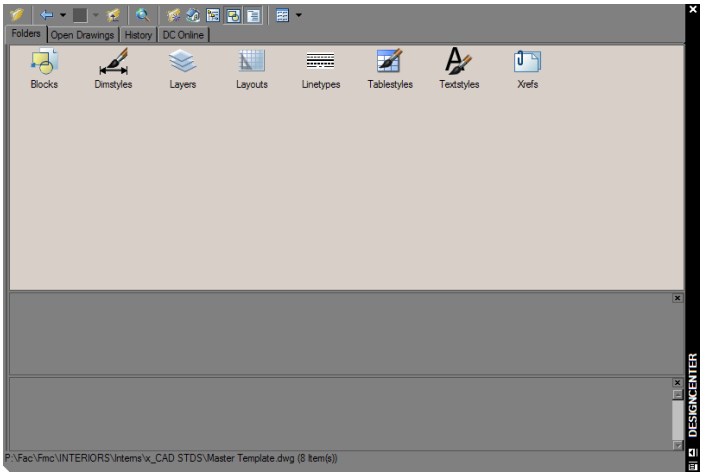


IV. Converting a New Drawing

STEP ONE: Open P:\Fac\Fmc\Cadd\RECORD FILES and open the record drawing for the building/floor where your new project is located. Using Save As, save a copy of the record drawing into the project folder from which you will be actively working.

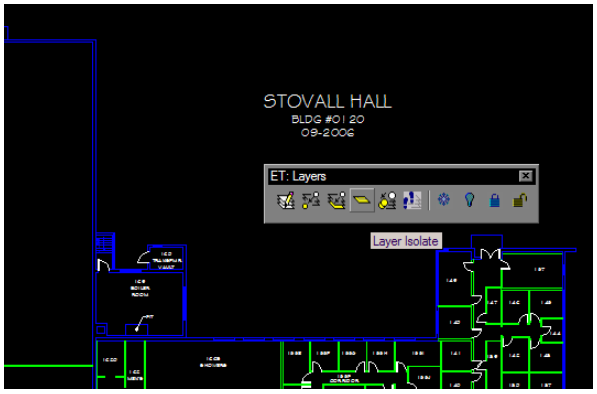
STEP TWO: Once you have opened your copy of the record drawing (or your "active drawing") that you'll be working from, go to File/Open and navigate to P:\Fac\Fmc_CAD STDS and select the CAD file titled "Master Template.dwg". You will keep this file open for the entire conversion process.

STEP THREE: Within your active drawing, open Design Center and select the tab at the top left that says "Open Drawings". Double-click the file titled "Master Template" and then select the "Folders" tab. You will see the following:

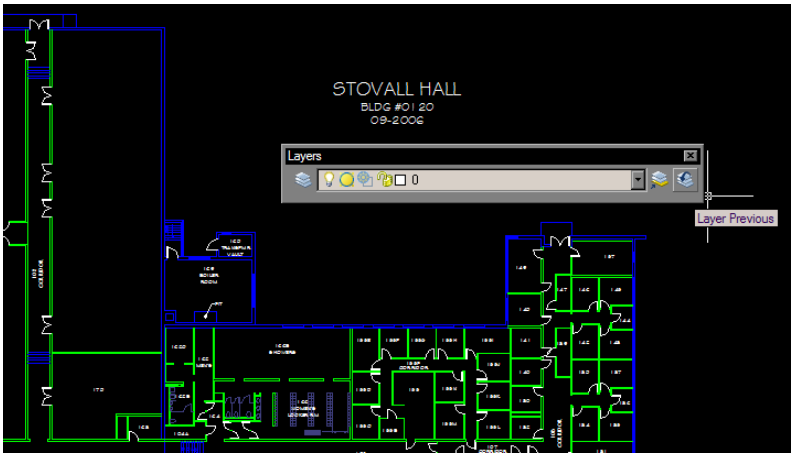


Double-click on the Layers icon. Once you see the complete master list of layers, select all icons, then drag and drop into your active drawing. This will import the master layers into your active drawing.

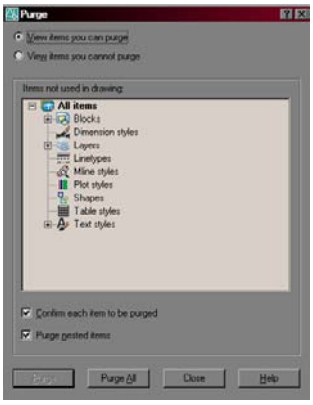
STEP FOUR: Begin converting all old layers in your active drawing to the new, master layer list by isolating and changing layers individually. To isolate a layer, click on the Layer Isolate icon (on the Express Tools: Layers toolbar).



As you convert a layer and move on to the next one, you'll need to press the Layer Previous icon (on your Layers Toolbar) to return to the previous view.



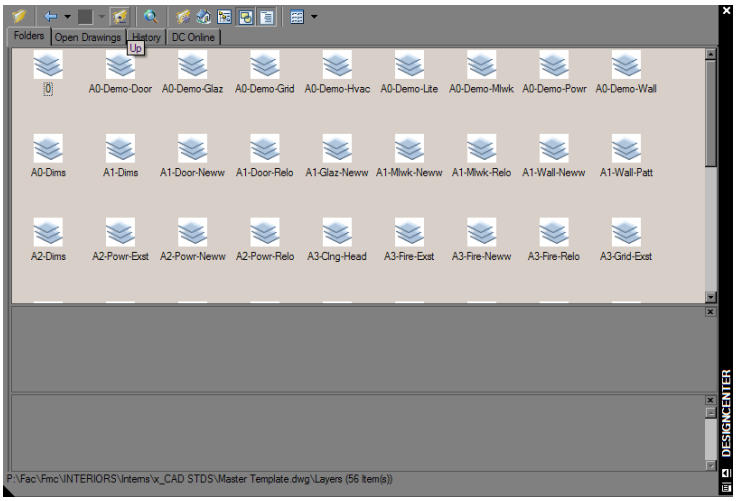
STEP FIVE: Once you have successfully converted all old layers to the new Master layer scheme, you will need to purge all old layers and blocks to clean the drawing. Type "purge" in the command line to initiate the Purge dialog box.



Select "Purge All" and then click "Yes to All". You will need to repeat this step multiple times until the "Purge All" button is greyed out.

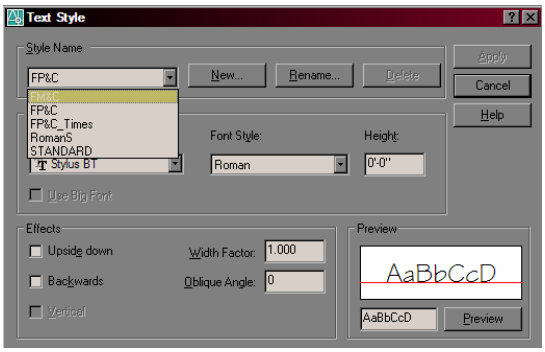
Once you have purged all unused layers, blocks, etc., you will need to open Layer Manager to ensure that the only layers remaining correspond to the Master layer scheme. Occasionally, layers will remain that you cannot purge or delete, even if you cannot find anything that is still left on that layer. Please notify a Project Manager so they can reconcile any remaining old layers.

STEP SIX: Once no old layers remain, you will need to open Design Center and by pressing the Up button to return to the main folder list:



At the main folder list, double-click the Text Styles icon and drag/drop text style "FM&C" into your active drawing. Isolate any text within your drawing and convert the text style to FM&C. Once all text is converted, repeat Step Five.

After purging is complete, go to Format/Text Style and remove all text styles but "FM&C" and "Standard" by selecting each from the drop down and clicking Delete.



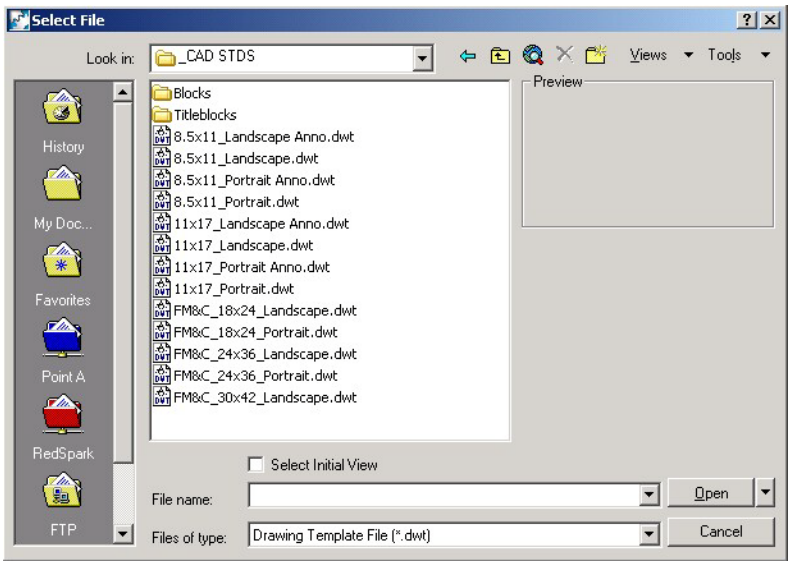
Notify a Project Manager if any text styles cannot be deleted.

STEP SEVEN: Return to the main folder list in Design Center and double-click on the Dimstyles icon. Drag/drop dimension styles "FM&C14" and "FM&C18" into your active drawing.

Drawing conversion is complete when layers listed in Layer Manager match those in the Master Template, the only text styles within the active drawing are "FM&C" and "Standard", and the only dimension styles are "FM&C14", "FM&C18", and "Standard".

V. Importing FM&C Interiors Titleblock Templates

STEP ONE: Position your cursor over one of the tabs at the bottom of the screen – doesn't matter which one, although there should only be two (Model and Layout1). Right click and select "From Template" from the menu. Navigate to P:\Fac\Fmc_CAD STDS and after determining the appropriate size/layout for your project, first import the template file ending with "...ANNO.dwt". This is your annotation, or title, page for your drawing set.



Once you have imported the annotation template, repeat the steps to import the corresponding template for the remainder of the drawing set.

STEP TWO: Rename your tabs accordingly (AN, A0, A1, A2, A3, A4, A5, A6, etc.) and then update all titleblock text to include specific project details. Edit all text FIRST on both the AN tab and the A0 tab, and THEN create the appropriate number of copies of the A0 so that all you have to modify on subsequent sheets is the sheet title and sheet number.

To create a copy, right click above the tab you want to make a copy of, and select "Move or Copy" from the menu. Then highlight "(move to end)" and check the box next to "Create a Copy" at the bottom of the dialog box. Click OK. Repeat as many times as necessary to complete your set.

STEP THREE: Set up your Annotation page by copy/clipping the symbol library into the model space of your active drawing. Then in paperspace on your Anno sheet, create viewports for each legend. Upon issuing the set of construction documents, you can delete any unused symbols from the legends prior to handing the set off to the contractor.

ALL VIEWPORTS ON ANNOTATION SHEET SHOULD BE SET TO 1/8" SCALE.

1/8" scale is the preferred scale for most drawings, but ¼" or ½" can be used if necessary (for elevations, details, or projects with a smaller area of

scope). At the beginning of the project, decide which scale is most appropriate for the size of the project ("size" you will be plotting), then dimension using the correlating dimscale. FM&C18 = 1/8", FM&C14 = ¼", and FM&C12 = ½".

VI. Drawing Standards

Following is a list of standards that need to be followed when preparing a set of construction documents. It is imperative for the sake of efficiency that all drawings be created and maintained in a consistent manner.

P-LINES: When drawing single entities such as doors or pieces of furniture, these should be drawn using the rectangle command or using p-lines. This eliminates random lines floating about in model space and makes it easier and faster to select those entities quickly.

EXPLODE: Do not use the explode tool. Ever.

LAYER MANAGEMENT: Use only the layers listed in the Master template. If you are unsure of what layer a CAD entity should be placed on, check with one of the Project Managers. If a new layer needs to be assigned, it will be assigned by a PM.

Do not change the layer color, line weight, or line type unless specifically asked to do so by a Project Manager. The only times this should occur is in the case of lower/upper millwork cabinetry, elevations/details, or various other rare situations. If unsure of how to proceed with differentiating between items on the same layer, check with a Project Manager for clarification/guidance.

SPACE PLANNING & CONSTRUCTION DRAWINGS: All Record Drawings have floor plates set at coordinates 0,0. During design development, space plans should be drawn within the active CAD file by copying the area of project scope above or out to the sides of the floor plate. Space planning should always be done using the correct layer standards. Upon receiving signature of approval on a space plan, the approved plan should be moved back into correct position within the floor plate.

DRAWING CLEANUP: During the process of converting a record drawing into an active drawing for a new project, and in the process of preparing construction documents, it is the responsibility of each individual who is working on that file to not only work cleanly, but also to clean up the existing drawing as you go.

Items that you should be aware of include:

- Corners whose lines don't meet up/touch
- Copying notes without using Ortho to ensure that they align
- When drawing squares, rectangles, or other shapes, use P-LINES or the correlating shape command instead of a series of individual lines
- Drawing or leaving what should be one continuous line as several individual line segments
- Use the Solid command to poche walls (instead of Hatch)
- Use MText instead of Dtext
- Trim overlapping lines
- Trim lines at intersecting walls
- Use a common pick point when copying the same entity multiple times (i.e. when copying the "E" label that denotes existing entities, use a common pick point so that the label is inserted at the same location at every occurrence)

- Check all text for grammatical and spelling errors
- Delete duplicate entities, such as several lines laying on top of one another, in order to maintain the integrity of the linetype when plotting

ALWAYS DOUBLE-CHECK YOUR OWN WORK!!!

VII. AutoCAD Command Aliases

Keyboard Alias	AutoCAD Command
A	Arc
AA	Area/ Perimeter
BR	Break
BPOLY	Boundary
C	Circle
CO	Copy
D	Dim Style Manager
DAL	Dimension Align
DDEdit	Edit text, including dimension text
DI	Distance
DIV	Divide
DO	Donut
DT	DText
E	Erase
EX	Extend
F	Fillet
+ F	When trimming or extending, type in F to trim/extend with a fence
H	Hatch
HE	Hatch Edit
I	Insert
L	Line
Lead	Leader
LTS	LTScale
M	Move
MI	Mirror
ML	Multiline
MT	MText
O	Offset
Oops	If something was erased accidently
OS	OSnap
P	Pan
Painter	Match Properties
PEdit	Edit properties of p-lines
PL	Poly Line
PO	Point
POL	Polygon
PR	Properties
PU	Purge
REGEN	Regenerate
RO	Rotate
S	Stretch
SC	Scale
SP	Spell Check
SPL	Spline
ST	Text Style
TR	Trim
TR+Enter+Enter	All entities become cutting edges

TR+Enter+Enter+Shift	Toggles between trim and extend
TP	Tool Palette
UN	Drawing Units
X	Explode
XC	XClip
XL	XLine (Construction Line)
XR	XReference
Z	Zoom