

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

OVERVIEW

This document is offered to the Design Teams for information and guidance. It will be used by The University of New Mexico, PPD-Engineering and Energy Services as a guideline for submission review.

These standards are not intended to be all-inclusive but are intended to highlight specific UNM requirements and concerns. Applicable items shall be addressed at the appropriate submission phase. All designs are expected to meet or exceed code requirements and follow good professional practice.

For convenience, this document is organized using the CSI Master Format 2004 Edition Numbers & Titles. Designers and consultants are therefore expected to supply specifications and submittals in accordance with that format.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

TABLE OF CONTENTS

| | |
|---|----|
| DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS..... | 3 |
| DIVISION 01 – GENERAL REQUIREMENTS..... | 4 |
| DESIGN DOCUMENT SUBMITTAL REQUIREMENTS..... | 5 |
| DIVISION 02 – EXISTING CONDITIONS..... | 12 |
| DIVISION 07 – THERMAL AND MOISTURE PROTECTION..... | 14 |
| DIVISION 08 – OPENINGS..... | 15 |
| DIVISION 09 – FINISHES..... | 16 |
| DIVISION 10 – SPECIALTIES..... | 17 |
| DIVISION 11 – EQUIPMENT..... | 18 |
| DIVISION 12 – FURNISHINGS..... | 19 |
| DIVISION 14 – CONVEYING EQUIPMENT..... | 20 |
| DIVISION 21 – FIRE SUPPRESSION..... | 21 |
| DIVISION 22 – PLUMBING..... | 25 |
| DIVISION 23 – HEATING, VENTILATING and AIR-CONDITIONING (HVAC)..... | 27 |
| DIVISION 26 –ELECTRICAL..... | 37 |
| DIVISION 27 – COMMUNICATIONS..... | 43 |
| DIVISION 28 – ELECTRONIC SAFETY AND SECURITY..... | 45 |
| DIVISION 31 – EARTHWORK..... | 50 |
| DIVISION 32 – EXTERIOR IMPROVEMENTS..... | 51 |
| DIVISION 33 – UTILITIES..... | 53 |
| DIVISION 40 – PROCESS INTEGRATION..... | 59 |

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

00 70 00 Conditions of the Contract

00 72 00 General Conditions

Include the UNM General Conditions and an edited version of Division 00 as part of the contract.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 01 – GENERAL REQUIREMENTS

01 30 00 Administrative Requirements

1. Verify that all floor plan base sheets match Architectural plans
2. Verify that column gridlines, room numbers, key plan, necessary labels are indicated on appropriate plans
3. New work shall be adequately delineated/differentiated from existing facilities. (line width, symbols, etc.)
4. Duplication of information is to be avoided, i.e., same information shown in two different places, in different scales, etc. More or less duplicate plans are to be avoided. Try to economically use all parts of drawing sheets. “D” size drawings are preferred.
5. Indexes shall match actual documents.
6. Legends shall be appropriate for project and correct.
7. Provide title strip along right vertical margin with lettering at least ½” high.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DESIGN DOCUMENT SUBMITTAL REQUIREMENTS

This document outlines the general requirements and scope for project design phase document submission. It will be used by UNM PPD-Engineering and Energy Services as a guideline for submission review. This document is offered to the Design Teams for information and guidance.

Program Phase

Provide a written description of the project from the Programming phase. It is especially helpful if any unusual or special criteria, particularly those relating to Mechanical, Electrical, Civil and Structural engineering are identified.

Schematic Design Phase

It is expected that the following listed issues will be responded to in the Schematic Design submission. This submission shall also address the applicable technical items as listed on the technical design checklists.

1. Written description of the Plumbing, HVAC, HVAC Controls, Electric Power, Lighting, Sprinkler and Special Systems that are intended for the project, particularly and unusual or special features.
2. Written description of soils conditions and anticipated foundation requirements and design plan. Include report from geotechnical engineer to support this description.
3. Preliminary Site Utility Plan indicating sanitary disposal, storm drainage, domestic water, gas, electric power, fire protection, chilled water, steam, exterior lighting and special systems intended for the project. Clearly indicate points of connection to existing systems.
4. Indicate current existing site drainage pathways including offsite drainage entering the site and analysis of basic drainage through site.
5. Statement outlining the Mechanical/HVAC Design Criteria to include winter and summer design temperatures, degree days, outside air and ventilation requirements, filtration requirements, humidity requirements, exhaust criteria, noise criteria and any other significant design requirements.
6. Statement outlining the Electric Power Design Criteria to include voltages, grounding, special power quality requirements, lighting levels and any other significant design requirements.
7. Statement that UNM Standards and Design Criteria will be incorporated into the design of the project. Statement that UNM HVAC design standards will be incorporated into the project. Conflicts and conditions not covered by the UNM Standards should be clearly noted for resolution at this phase.
8. Statement that LEED Silver Green Building design criteria shall be incorporated into the design.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

9. Preliminary block (building) heating and cooling loads. Preliminary estimates for yearly energy consumption and energy costs using current rates.
10. Preliminary total building energy budget in BTUs per year.
11. Proposed design and construction schedule.
12. Define any known unusual conditions that might affect design or construction.

Design Development Phase

1. Final floor plans.
2. At this stage, all important HVAC and Electric design decisions shall be made. The DD submission shall define the main systems to be incorporated within the project and how they coordinate with other design requirements and the architecture and structure. Details and all sizes need not be included but enough design must be shown to insure the system and distribution plan is clearly defined. Significant main distribution systems should be sized to be sure they fit and allow access for maintenance.
3. Proposed electric power riser and one-line diagram indicating service, new service equipment, generator, etc. Include a preliminary building load calculation and transformer size.
4. Updated HVAC design criteria where appropriate when changes from the schematic submission occur or when criteria are added. The design criteria for specific spaces, i.e. classrooms, labs and the like should be defined.
5. Heat loss and heat gain calculations for all spaces and verification of the estimates for yearly energy consumption and energy costs using current rates. Also verify the total building energy budget in BTU's per year.
6. Preliminary Electric Service size calculations, loads, estimated demands, etc.
7. Major duct layout, sizes and verification that space is adequate for congested areas, duct crossing, coordinates with other facilities and construction, etc.
8. Major piping layout, sizes and verification that space is adequate for congested areas, coordinates with other facilities and construction, etc.
9. Mechanical and Electric room layout with sufficient space and access to equipment for maintenance.
10. Start of Equipment Schedules including not less than equipment identification, location and major sizes and capacities.
11. Further development of the Site Utility plans including all connection points, including but not limited to steam, chilled water, electric, gas, water and sanitary sewer
12. Proposed drainage plan shall include all drainage whether generated on site or not.
13. Outline Specifications to include suggested deviations from UNM standards or unusual concepts.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

50% Construction Documents (in addition to the above requirements).

1. Floor plan layout for power, telecommunications and mixed media devices.
2. Floor plan layout for Lighting
3. Complete electric service design and all panel locations.
4. Start of light fixture schedule.
5. Preliminary riser diagrams.
6. Final grounding scheme and solutions to power quality issues.
7. Generator if required.
8. Duct layout including all terminal units, valves, sectioning valves, balancing valves, etc.
9. Piping layout including all terminal units with CFM, dampers, etc.
10. Advanced equipment room and equipment layouts, including roof top units.
11. More complete mechanical schedules.
12. Finalization of design criteria.
13. Substantially complete schematic diagrams
14. Initial controls diagrams with start of sequence of operation.
15. HVAC detailed calculations indicating design parameters, minimum and maximum air flows.
16. Final summary of utility loads (gas, water, steam, chilled water and electric power)
17. Indicate the final anticipated energy costs and energy consumption.
18. Final site utility plans with sizes, connection points, valves, vaults, etc. Start of details.
19. Not less than 50% complete specifications including parts for all divisions. Division 1 should be essentially complete, containing special interest items; UNM assistance needed for this.
20. Proposed drainage topographic drawings shall be complete with critical spot elevations specified and cross-section volumetric flow analysis completed. Drain pathway arrows shall be included.

95% Construction Documents

1. Essentially Complete Drawings and Specifications.
2. Complete details
3. Complete HVAC control diagrams with sequence of operation.
4. Final short circuit and coordination calculations.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

Addenda

Provide the opportunity to review and contribute to addenda

POST CONSTRUCTION

Provide as-built drawings which have included the contractor's field mark-ups. This shall be transmitted to the Construction Manager in AutoCAD format.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

01 35 00 Special Procedures

Smoking is prohibited in UNM buildings under construction.

01 35 23 Owner Safety Requirements

1. The design team is required to obtain a copy of the SRS (Safety & Risk Services) Environment, Health and Safety Guidelines and incorporate appropriate items in the Project Manual and Construction Drawings.
2. Indicate that it is the General Contractor's primary responsibility to ensure that all sub-contractors comply with all safety issues. Also note that the Contractor is fully responsible for having an Environmental, Health and Safety compliance program that is acceptable to UNM/SRS.
3. For any work areas that are posted as biohazardous, the UNM Biosafety Officer (272-8001, alternate 277-5488) must be contacted for clearance prior to start of work.
4. All persons performing electrical work at UNM must use and adhere to UNM "Lock-out/Tag-out" policies.
5. The contractor will be responsible for providing an on site welding permit system according to OSHA 29CFR1926 and NFPA 51B. The contractor will ensure that all welders are properly trained and certified in the specific type of equipment they are to use on the project. The contractor will ensure that welding operations do not occur when other fire hazard situations exist in their area, other hazardous operations are in process or flammable liquids are in the area
6. When exposure to gases, fumes, vapors or dust may exceed the OSHA PEL, the contractor shall be responsible for the establishment and maintenance of a respiratory protection program. All respirators shall be approved by NIOSH and shall be suitable for the airborne hazards at the worksite. Self-contained breathing apparatus must be worn when employees work in an oxygen-deficient atmosphere. Appropriate respiratory protection is required for painters during spraying operations.
7. Smoking is prohibited within 50 feet of any paint spraying operations. Paint spraying operations are prohibited in confined spaces.
8. Hearing protection is required when employees use tools and equipment, which produce noise in excess of 85 dBA and would require the contractor to manage a Hearing Conservation Program. This program would require training, provision of a selection of hearing protectors, audiometric testing and noise monitoring.
9. The contractor is responsible for ensuring proper usage of personal protective equipment. All workers within the construction site or area must wear personal protective equipment at all times, including hard hats, eye protection, safety shoes, and protective clothing (long pants and shirts with sleeves covering the shoulders at a minimum). Workers must use additional protective gear, such as ear protection, respirators, face protection (shields), and gloves, as appropriate.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

01 35 43 Environmental Procedures

1. Chemical Safety - All hazardous materials and wastes shall be properly labeled and stored while on site. Bulk chemical storage for drums or other containers of hazardous or otherwise regulated liquids larger than 25 gallons requires secondary containment and grounding for flammables.
2. Contractor shall maintain on-site copies of Material Safety Data Sheets (MSDSs) for all hazardous material brought onto the site. These MSDSs must be kept readily accessible for employee use.
3. Chemical spills shall be reported to SRS
4. Hazardous materials that could cause illness if released or not properly used shall be kept properly stored. If any report of serious illness on site is reported, the contractor shall shut down that particular operation until the situation is corrected.

01 40 00 Quality Requirements

01 41 00 Regulatory Requirements

01 41 13 Codes

Design criteria must include the use of NFPA standards. The standards include 12 volumes and 248 individual standards. Also, since New Mexico operates under different jurisdictional codes such as the Uniform Fire and International Building Codes, the most stringent requirement will apply on all UNM projects.

01 41 16 Laws

All UNM buildings shall comply with NM Executive Order 2006-001, State of New Mexico Energy Efficient Green Building Standards for State Buildings

01 50 00 Temporary Facilities and Controls

Indicate construction work site limits, fencing, laydown yard, etc.

01 55 00 Vehicular Access and Parking

Ensure special requirements for work site entrances, handicap access, walkways to remain open, fire truck and emergency vehicle access etc., are noted and must be maintained at all times

01 55 26 Traffic Control

Indicate that if traffic flow or road access must be interrupted or roads closed, the contractor shall obtain approval not less than 10 days prior.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

01 55 19 Temporary Parking Areas

Indicate contractor worker parking.

01 56 00 Temporary Barriers and Enclosures

1. The contractor will be responsible for preventing access to the building site to unauthorized persons. Pedestrians can create safety hazard issue as well as fire safety hazards. Barriers to prevent unauthorized pedestrian traffic will not cause obstructions to emergency vehicle access.
2. Do not obstruct existing streets, walkways, access corridors, etc. unless specific written permission is granted by owner.

01 56 16 Temporary Dust Barriers

Do not generate airborne dust, which may contain asbestos- or lead-containing materials.

01 57 00 Temporary Controls

1. For projects disturbing more than 1 acre of soil or pavement, prior to breaking ground, the Contractor must make required EPA notifications, obtain an NPDES permit or waiver, and develop and comply with any required site-specific Storm Water Pollution Prevention Plan (SWPPP). SRS may request revision of contractor's SWPPP. UNM may be required to collect damages for Contractor non-compliance with the NPDES or SWPPP of up to \$1000 per day per violation.
2. All projects disturbing more than 3/4 acre of soil or pavement must obtain a Fugitive Dust Permit from the City Air Quality Division (AQD) prior to breaking ground and must comply with the associated AQD-approved Dust Control Plan. Required dust controls must be maintained over project duration, including site watering, track-out prevention, street sweeping and covering all truck loads of soil to/from site. Any required erosion/dust controls must be regularly inspected & maintained over project duration.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 02 – EXISTING CONDITIONS

Photographs and/or videotapes of existing conditions including adjacent structures shall be taken and submitted. Existing conditions before the start of work shall be documented.

02 01 00 Maintenance of Existing Conditions

1. Support and protect existing structures & utilities
2. Promptly repair damages to adjacent structures and facilities if incurred

02 20 00 Assessment

02 21 00 Surveys

Require that a professional surveyor document the existing conditions of adjacent structures prior to start of work. Establish benchmarks including elevations and maintain a project log to become part of the as-built records. Survey/resurvey to verify no adverse project impact. Notify the Architect and UNM of changes in elevations, cracks, sags, or other damage in adjacent structures.

02 30 00 Subsurface Investigation

02 32 00 Geotechnical Investigations

1. Soils testing laboratory and other required specialty testing to be retained by owner.
2. Concrete testing laboratory to be retained by contractor. Do specifications indicate required testing; i.e. number of cylinders, maximum fill lifts, etc.

02 60 00 Contaminated Site Material Removal

Prior to start of work, verify that there are no hazardous materials at the site with UNM-SRS. If so, request direction as to what needs to be done to remove the hazard prior to start of work. Documents need to advise the contractor that if hazardous materials are found during the performance of work, stop work and contact UNM and the Architect for direction

02 80 00 Facility Remediation

1. Ozone Depleting Substances (e.g., Freons & related refrigerants) - Refrigerants must be recovered by EPA-certified technicians prior to demolition of refrigeration & HVAC equipment.
2. Prior to demolition or removal, any equipment containing hazardous or otherwise regulated materials must have those materials abated/removed.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

3. If asbestos and/or lead-containing materials are known to be present in the work area as determined by the pre-construction survey, then asbestos and/or lead

awareness training must be completed prior to any construction workers being sent/assigned to work in such a work area, and appropriate PPE must be worn when required by work conditions.

4. Installation and/or application of lead-based paint and asbestos-containing materials during renovation are prohibited.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

No black roofs are allowed.

07 80 00 Fire and Smoke Protection

07 84 00 Firestopping

07 84 13 Penetration Firestopping

All penetrations through fire rated walls, floors, ceilings, barriers and partitions will be appropriately filled with approved "FIRE STOP" material. The material must carry an Underwriters Laboratory and Factory Mutual listing/approval for the application to be used. Documentation from the manufacture must be provided to SRS for review.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 08 – OPENINGS

08 10 00 Doors and Frames

Visual panels in doors may be used when needed for safe travel through a high traffic area. The visual panel will be limited to a maximum of 12" x 12" and be installed by the door manufacturer. The panel and frame must be stamped as a fire rated unit equal to the rating for the door.

08 50 00 Windows

Window panels in fire rated walls must be stamped by the manufacturer, as meeting the fire rating requirements of the adjacent door/wall. The stamp must be visible when installed. Windows or glass -panels cut from a stamped panel will not be authorized.

08 60 00 Roof Windows and Skylights

All skylights will incorporate skylight guards, handrails or other guarding mechanism that meets OSHA standards.

08 70 00 Hardware

08 71 00 Door Hardware

1. Self-closing devices will be installed on all fire rated doors. The devices will be manufactured and installed as an Under Writers Laboratory (UL) listed unit. Self-closing hinges, which meet the intent of NFPA 80, may be used with prior approval from SRS and/or the AHJ.
2. Doorstop devices will not be installed on any fire rated door. If the user requires/requests an open flow of traffic through the area with a fire rated door, normally required to be kept closed in an emergency, magnetic door hold open devices shall be incorporated and must be connected to the building fire alarm system, as required by NFPA 80 & 101. The magnetic devices must release when any part of the fire alarm/notification system is activated. All magnetic devices will incorporate smoke detection on both sides of the door.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 09 – FINISHES

09 06 00 Schedules for Finishes

1. Chemical Emissions - Only “low-VOC” architectural coatings, adhesives & solvents can be specified and used. A written inventory of total coatings, adhesives & solvent volumes used and VOC contents must be submitted to SRS at the end of the project.
2. All interior finish materials shall comply with NFPA 101. Only Class A or B material will be used. Class C material is considered to have an unacceptable flame spread rating and will not be permitted in any UNM construction project. Documentation of flame-spread ratings will be made available and provided to SRS upon request. Requests may be made if a questionable material is noted during the specification review or during construction site visits.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 10 – SPECIALTIES

10 50 00 Storage Specialties

Custodial Services Main Storage Room: This room is ideally located adjacent to the trash room and loading dock and shall be approximately 250 to 300 sq. ft. with a double door from the corridor. Room shall have a hot and cold water hose bibb and floor sink/floor drain. The room shall have interior lighting and control switch and several 110 volt receptacles around the perimeter of the space. The room shall have not less than twelve linear feet of utility shelving, the top shelf being not higher than 5 feet

10 56 00 Storage Assemblies

A minimum of three (3) feet of aisle space is required between rack and stack storage.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 11 – EQUIPMENT

11 10 00 Vehicle and Pedestrian Equipment

11 13 00 Loading Dock Equipment

Loading Dock: Loading docks require nearby access to a hot and cold water hose bibb. Loading dock requires a drain to a sanitary sewer.

11 80 00 Collection and Disposal Equipment

Trash Rooms: State Health Department regulations require an enclosed facility for trash. Trash must be protected from the elements and free of rodent and insect harborage. Minimum size is 120 sq.ft. Trash rooms shall have double doors from the outside loading area and double doors are preferred from the interior corridor into the trash room. Trash rooms shall have a dedicated 110 volt outlet in addition to other required power facilities. Trash rooms shall have sealed concrete floors, a floor drain connected to the sanitary sewer and hot and cold water hose bibb. Trash rooms shall have interior lighting and control switch. Trash rooms shall have adequate ventilation and be protected from freezing.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 12 – FURNISHINGS

12 90 00 Other Furnishings

12 93 00 Site Furnishings

12 93 13 Bicycle Racks

1. All buildings shall have bicycle racks in close proximity.
2. Bicycle racks shall be of the loop type, firmly anchored to concrete.
3. Enclosed bicycle lockers should be installed where appropriate
4. Enclosed bicycle lockers shall be mounted on a hard surface with proper drainage to prevent condensation inside and rusting of contents.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 14 – CONVEYING EQUIPMENT

14 20 00 Elevators

1. All elevator shafts will incorporate sprinkled shafts, smoke detection at each level outside the elevator, heat, smoke detection and sprinklers in the elevator room regardless if the elevator is electric or hydraulic. The elevator will also incorporate fire department recall for all elevators with a shaft over 25 feet in total length. Elevator lobbies must include smoke guards. A recall key will be provided in a location as determined by SRS.
2. Signage will consist of written/visual signs noting Fire Dept. elevator operation and "IN CASE OF FIRE, USE NEAREST STAIRWAY DO NOT USE ELEVATOR". The signage will be posted in a conspicuous location. Signage will not be placed near or under bulletin boards or in other areas where hanging material will obscure the signage. All fire rated doors will have the appropriate signage (provided by the manufacturer) indicating its fire rating. This signage will be in the way of a metal placard, attached to the side of the door. The placard will not be covered/painted or otherwise obscured.
3. Consider providing a vestibule for any elevator that is exposed to the outside and/or harsh environment.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 21 – FIRE SUPPRESSION

21 10 00 Water-Based Fire-Suppression Systems

21 12 00 Fire-Suppression Standpipes

Fire Department connections (FDC) will be installed in a location, which will provide the quickest/easiest access to fire department vehicles. The FDC must be placed so no more than 100 ft. of fire hose is required to make connection between the FDC and the fire engine.

21 12 16 Fire-Suppression Hose Reels.

UNM has adopted a policy (which has been approved by the State Fire marshal) of not installing class I or II fire hose cabinets in any UNM facility. Class III cabinets for fire department standpipe connections will be permitted. Fire hose cabinets will not be used as a means to waive the requirement for sprinkler protection.

21 13 00 Fire-Suppression Sprinkler Systems

21 13 13 Wet-Pipe Sprinkler Systems

1. The minimum detection and protection requirements for storage, custodial and trash rooms will be smoke detection and wet pipe fire sprinkler systems connected to the fire alarm panel.
2. Fire sprinkler system drawings (contract drawings) shall indicate the service entry, the siamese connections, the supply manifold assembly with all alarms and switches, the vertical and horizontal distribution piping and valves and supply piping to all protected areas. Indicate test drains piped to reasonable central locations. Drains can not simply be left to drain anywhere. Indicate head coverage as part of the specification with proper accounting for drop soffits, special conditions, etc. It is recommended that head locations, or at least head locations at special conditions be detailed. These drawings shall be submitted to CID for permit.
3. Fire sprinkler shop drawings shall be reviewed and approved by the design engineer. The drawings with professional fire protection engineer's seal shall also be transmitted to the State Fire Marshall's office for review in accordance with the State Fire Marshall's Plans Review and Submittal Requirements, the latest edition. Proof of submission is necessary so that work can commence. Due to staffing, the Fire Marshall may not be able to review the drawings on a timely basis and therefore, the Design engineer's review and approval will be sufficient to start work.
4. Verify good riser location and accessibility
5. All sprinkler systems will incorporate a backflow preventer.

**THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS**

Physical Plant Department-Engineering & Energy Services Division

6. All new construction will comply with NFPA 13 and the UBC requirement that all structures will incorporate full fire sprinkler systems. Sprinklers in conjunction with full smoke/heat detection or other suppression systems will be considered on an individual basis.
7. Pipe joints may be welded, threaded or Victaulic grooved-rigid couplings. No Plain End, Pressfit or FIT type couplings permitted
8. Standard pendent/upright wet sprinkler systems will be used in all facilities unless justified recommendations for alternative systems are presented.

21 20 00 Fire-Extinguishing Systems

1. Special system installation will be determined on the overall protection requirements of the facility.
2. If high rack, closed rack or pile storage is to be designed, consideration will be given to the requirements of specialized suppression system design
3. Areas or rooms used for storage of flammables and fuels shall have appropriate fire suppression systems. Flammables shall be in original containers or safety cans, and stored in cabinets remote from traffic.
4. The standard type fire extinguisher to be specified in all projects shall be:
 - For business and all light/ordinary hazard areas: 2 1/2 gallon water
 - For Mechanical rooms and rooms with flammable liquids: 10 lb. ABC Dry Chemical
 - For elevator rooms: 10 lb. CO₂
 - For computer rooms: 2A10BC Halotron (or equivalent)
 - For Automotive and Industrial areas: 15-20 lb. ABC Dry Chemical
 - For laboratories or other areas with high cost or sensitive equipment as determined by SRS: 2A10BC Halotron (or equivalent)
 - For areas including laboratories which utilize flammable liquids as determined by SRS: 10-15 lb. ABC Dry Chemical
5. No extinguisher with less than a 2A-10BC rating will be accepted for UNM projects. Exception - CO₂, which does not carry an "A" rating and will be used only in specific coverage areas. The general area will still be covered by an extinguisher with a 2A-10BC rating.
6. The cabinet's style and features will be specified during plan reviews of each project. UNM does not specify a particular style, but each cabinet will have the following features
 - Be of a size which will accommodate a 2 1/2 gallon water extinguisher, a 15 lb. Halotron or a class C water mist extinguisher if necessary
 - Window port for visual inspection of the pressure gauge.
 - The outside of the cabinet will have, in clear contrasting color to the cabinet, the words FIRE EXTINGUISHER regardless of the type/size of the visual panel.

**THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS**

Physical Plant Department-Engineering & Energy Services Division

- The door will be a straight pull-to-open type without a locking mechanism unless specified by SRS for a specific application.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

21 22 00 Clean-Agent Fire-Extinguishing Systems

FM 200 or similar alternative systems will be used in computer rooms requiring such protection. Alternative systems such as water mist will be considered on a case-by-case basis.

21 23 00 Wet-Chemical Fire-Extinguishing Systems

Only Wet Chemical hood systems will be installed in cooking facilities.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 22 – PLUMBING

1. Provide adequate building wall thickness to accommodate piping and fittings.
2. Provide adequate maintenance access.

22 08 00 Commissioning of Plumbing

Pipe testing, flushing and treatment shall be specified

22 10 00 Plumbing Piping and Pumps

22 11 00 Facility Water Distribution

1. Isolation valves at each branch take-off for CW, DHW, DHW return
2. Isolation valves at each item of equipment which are separate from balancing and control valves.
3. Provide accessible isolation valves at major branch take-offs, each floor and in long runs of pipe.
4. Reasonable drain valves and caps

22 13 00 Facility Sanitary Sewerage

1. Areas or rooms used for storage of hazardous or otherwise regulated liquids larger than 5 gallons may not have floor drains
2. Specify 4-band worm clamps on cast iron no-hub sanitary piping.
3. Sanitary sewage sump pumps shall only be used to convey waste generated below grade and only where gravity flow is impossible.
4. All sanitary waste generated above grade shall drain via gravity.

22 14 00 Facility Storm Drainage

22 14 26 Facility Storm Drains

1. Storm drains shall be designed so that no sump pumps are needed.
2. Indicate an adequate water-harvesting plan consisting of swales, retention facilities, volume control, overflow considerations, etc. Roof drains should direct water into plantings or be used for other beneficial uses whenever possible before discharge to the storm disposal system.
3. Indicate foundation/flooring drainage if required
4. No building entrances at bottom of grade unless such entrances are protected by an adequate swale.

22 14 26.13 Roof Drains

1. Indicate roof drain locations.
2. Indicate roof drain outfall locations.
3. All roof drain piping shall be cast iron. PVC roof drain piping is not allowed.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

22 30 00 Plumbing Equipment

22 35 00 Domestic Water Heat Exchangers
Approved steam heated DHW heater specified.

22 40 00 Plumbing Fixtures

22 42 00 Commercial Plumbing Fixtures
Specify electronic 120 volt hard-wired sensor activated toilet, urinal and lavatory fixtures. Restroom water faucets should turn off automatically after 4 seconds.

22 45 00 Emergency Plumbing Fixtures
Chemical storage areas shall have plumbed eyewash, deluge showers

22 45 13 Emergency Showers
Emergency Showers shall be located such that there is adequate drainage for 30 gpm from the space under the shower.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 23 – HEATING, VENTILATING and AIR-CONDITIONING (HVAC)

1. Combustion Equipment - Provide SRS with manufacturer specifications, including air emission rates, at least 4 months before construction to allow time to obtain the required air quality permit prior to equipment installation
2. The building architectural design shall provide adequate ceiling space and equipment room area for a well coordinated layout of ductwork, piping systems, electrical conduits, cable tray, special plumbing systems, etc. as necessary to provide accessible and maintainable components.
3. Areas or rooms used for chemical storage shall have appropriate ventilation.
4. Provide composite equipment room, mechanical room, etc. drawings, including all trades, to be sure all facilities fit and are accessible. Provide an overall plan with plumbing, HVAC, major electric boxes, etc. to ensure adequate space. Don't forget piping and racks.
5. Provide section cuts where necessary for clarity.
6. Provide building sections where space is limited and facilities are large, particularly above ceiling spaces, to be sure the items fit and are accessible. Indicate what work should go in what location to insure this.
7. Contractors' installation assembly/coordination drawings are required.

23 05 00 Common Work Results for HVAC

23 05 93 Testing, Adjusting and Balancing for HVAC

Air balance system by reducing fan speed. At least one balancing dampers shall be remain wide-open

23 06 00 Schedules for HVAC

1. Selection of the building HVAC system must be made at the schematic design phase. The mechanical engineering design team must be actively involved in the project prior to submission of the schematic design drawings and specifications so that the HVAC system selected will fit and function within the architectural scheme.
2. Selection shall be based on the total owning and operating costs for the system over a thirty year period, operating five days per week, ten hours per day (or building specific requirements). The analysis shall include but not be limited to system first costs, additional first costs associated with the system that increases or decreases building construction costs, energy consumption costs, usual and customary maintenance and replacement costs and any other costs that affect total operating cost.

The system selected shall be as simple in configuration and design as possible, yet durable to satisfy the building needs. It shall emphasize ease of maintenance

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

- activities and flexibility to accommodate future renovation. Evaluation and justification of alternative system designs which use less energy is encouraged.
4. The design goal is to create a facility that meets LEED Silver requirements and complies with New Mexico Executive Order 2006-001.
 5. The design shall comply with current ASHRAE Standards unless that conflicts with UNM design criteria or a specific waiver is approved by UNM.

23 08 00 Commissioning of HVAC

1. All new buildings' HVAC and control systems shall be commissioned.
2. After one year of operation, the design team and UNM shall meet to analyze utility consumption results and determine system modifications that may be necessary to achieve the goal.
3. Commissioning & Warranty
 - a. All sensors, actuators, and end devices including sequence of operation shall be commissioned by the contractor and a report provided to UNM.
 - b. Final commissioning shall be the responsibility of the installation contractor and subject to oversight and scheduled with UNM personnel. A completed commissioning report shall be submitted and included in the equipment manuals. Each report shall include the results of each end device commissioned along with the initial point reading compared to actual, corrected point reading compared to actual and any offsets used in calibration. Test instruments used for calibration of sensors shall be calibrated prior to testing to insure their accuracy.
 - c. Each new control system shall have provided a two-year manufacturer warranty for all components from date of UNM acceptance. A one-year service and maintenance warranty shall be provided from the date of UNM acceptance.
 - d. Each new installation shall require a minimum of two on site training sessions provided by the equipment installer / provider. A UNM representative shall coordinate the training with the installer after final acceptance by UNM. The training shall include sequence of operation, override procedures, calibration procedures, workstation operation. Each session shall be no shorter than 2 hours and no longer than 4 hours. Class size shall be determined by UNM.

23 09 00 Instrumentation and Control for HVAC

1. Direct Digital Controls shall be employed.
2. HVAC systems shall interface with campus EMCS (Energy Management and Control System)
3. Variable volume laboratory designs shall be used.
4. Heating water pumps shall be equipped with VFDs
5. Heating water temperature shall be reset based upon OA temperature
6. Discharge air temperature shall be reset based upon reheat demand

**THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS**

Physical Plant Department-Engineering & Energy Services Division

7. Minimum OA (Outside Air) intake reset shall be based upon ASHRAE 62.1.
8. An unoccupied/occupied building schedule shall be provided.
9. Building occupancy and temperature over-ride shall be provided at room temperature sensor
10. Provide utility metering of chilled water, steam, domestic water, natural gas in accordance with PPD-Utilities Metering Guidelines
11. Thermostat locations shall be specified to ensure even temperature distribution in the conditioned space.

23 09 13 Instrumentation and Control Devices for HVAC

All points included in the HVAC system shall be labeled in accordance with the UNM Point Naming Convention.

This applies to all components of the HVAC system that are integrated with the control system including but not limited to air handlers, heat exchangers, fans, terminal units, dampers, thermostats, pumps and valves.

This naming convention shall be reflected in all drawings, control sequences, programming, graphics and field labels.

23 09 13.43 Control Dampers

Measure CO₂ in air returning from spaces to each fan system, and adjust minimum outside air volume accordingly. In the occupied zones where occupant density is routinely greater than one person /30sf provide space return air CO₂ sensor to ensure air quality control.

23 09 23 Direct-Digital Control System for HVAC

A UNM approved building DDC system is required. This system shall seamlessly interface with the campus EMS via BacNet TCP/IP protocol. Approved systems include Delta and Automated Logic for central and north campus projects. Other systems may be considered with prior approval from PPD Engineering & Energy Services for projects in other locations.

DDC Controls Systems Specifications

1. General Logic Requirements
 - a. P, PI, or PID completely selectable for each control loop.
 - b. Floating control output available for VFD control.
 - c. There shall be a proofing function for all DO points to alarm if action does not take place.
 - d. All alarm levels to be set by UNM.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

2. Air Side Requirements
 - a. Discharge air temperatures reset on space demand.
 - b. OA reset based on CO₂ levels.
 - c. Unoccupied schedules at the zone or terminal unit level.
 - d. Zone occupied overrides completely adjustable.
 - e. All air handler controllers shall be the primary controller.
3. Water Side Requirements
 - a. Heating water temperature shall reset upon OA or space demand.
 - b. Heating water pumps shall be equipped with VFDs.
4. Exhaust Requirements
 - a. Variable volume laboratory system & hoods
5. DDC Hardware
 - a. All exposed control wiring shall be in no less than 3/4" conduit with compression type connectors. All flexible conduit shall be of the weatherproof type, no less than 3/4" diameter and not longer than 5' in length and fittings of the same manufacture shall be used. All junction boxes within air handler plenums shall be weatherproof. All electrical local and state codes shall be enforced.
 - b. All CAT-5 cable runs not to exceed 300'.
 - c. All transducers or converters, D/A, A/D, electronic to pneumatic shall be mounted in the DDC control cabinet with the primary controller. When connecting DDC to existing pneumatic end devices a separate transducer is required for each AO control signal. A separate panel mounted adjacent to the primary control cabinet if more space is required is acceptable.
 - d. All converters, transducers, sensors, wire terminations and end devices shall be labeled according to UNM labeling standards for ease of troubleshooting. A point list and wiring table shall be installed on the inside door of each control cabinet
 - e. All relays used shall have a lighted indicator as to when they are energized.
 - f. All control cabinets shall be labeled on the outside as to what equipment they control.
 - g. Under no circumstances shall any control cabinets contain voltages in excess of 50 volts and all control circuitry shall use voltages under 50 volts. Separate transformer or power supply enclosures shall be provided as required.
 - h. All DDC valves and damper motor operators shall be spring loaded and on a loss of power shall fail to the following positions:
 - Outside air fail closed
 - Return air fail open
 - Heating water fail open, or to coil on 3-way valves
 - Steam preheat fail open
 - All steam converter or generator valves fail closed

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

6. Communications & Graphics
 - a. Direct Digital Control, Bacnet communication integration shall be compatible to interface with UNM campus EMCS. All necessary equipment for functional integration shall be provided.
 - b. 110 volt AC outlet and UNM data port shall be installed outside and near each control cabinets and a service switch shall be mounted inside the cabinet.
 - c. Ports available in all control cabinets to completely access all building DDC programs via laptop computer direct connect.
 - d. A desktop or laptop computer point of entry and security key shall be provided for each new building system installed.
 - e. Capability of change of program, add sensors, and tune system shall be made available to UNM.
 - f. One view screen per mechanical room shall be provided to access all controllers within a building network.
 - g. All graphics shall be linked to allow easy mobility from page to page.
 - h. Each DDC building system controller will be completely stand-alone and all settings and trend data contained within a building computer with complete access by UNM maintenance personnel. The system shall not rely on a computer outside the building envelope to contain a database for its operation.
 - i.
7. Documentation
 - a. All sequence of operation submittals shall be in the logic and verbal format with a (1) = on, start, alarm, etc. All digital signals drawn with a solid line, all analog signals with a dotted line. All submittals sizes shall not exceed 11 x 17 and shall become the property of UNM
 - b. All points of entry shall be defined on a system architecture logic diagram.
 - c. All files and data created in the DDC installation shall be the property of UNM.
 - d. If system uses function blocks, documentation of function block operation shall be provided.
 - e. Six copies of all equipment manuals for controllers, end devices, sensors, and sequence of operation diagrams shall be provided to UNM at the end of each system installation, after the commissioning completion and acceptance by UNM. Each manual shall be in a standard size three ring binder labeled on the front cover and edge. Electronic file versions (CD) shall also accompany each copy submitted.

23 10 00 Facility Fuel Systems

23 11 00 Facility Fuel Piping

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

23 11 23 Facility Natural-Gas Piping

1. Provide a shut-off valve at each connected item of equipment
2. Consideration should be given to installation of a master emergency gas shut off valve to specific areas such as laboratories, classrooms and other similar spaces that can be accessed by the occupants in an emergency. The valve would be in a conspicuous location and be in a break-glass box to provide security from malicious actions.
3. All gas piping must be labeled as to the contents of the piping.
4. Gas piping shall not be run through HVAC duct work or have pressure relief valves, inspection ports or any other part of the system which could produce a leak, near any air intake or ventilation vent/port.

23 20 00 HVAC Piping and Pumps

23 21 00 Hydronic Piping and Pumps

1. Process cooling shall be provided as necessary through the use of plate & frame heat exchanger interface with the campus chilled water system. Pumps are only required on the process side of the heat exchanger. Return water to the campus system shall be no less than 58°F.
2. Backflow preventers shall be installed to isolate all hydronic systems from domestic water supplies.

23 21 13.23 Aboveground Hydronic Piping

1. Utility meter location with dimensioned straight pipe upstream and downstream
2. Isolation valves on each branch take-off
3. Isolation valves at each item of equipment, coil, reheat VAV box, etc, which are separate from balancing and control valves.
4. Drains at low points
5. Vents at piping high points and at equipment
6. Pipe reheat and air handling coils rigid unless unit is supported by springs
7. Where used (primarily at pumps), use braided flexible stainless steel connectors (no rubber connectors)
8. Reverse return heating system piping
9. Reverse return coil bank piping
10. Piping shall be copper or steel. Victaulic couplings are not allowed.
11. Metal insulation jackets in exposed areas
12. Lace-up insulation or pre-formed plastic jacketing around all hot piping appurtenances such as steam pressure reducing valves, check valves, flanges, valves, etc.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

23 21 23 Hydronic Pumps

Dual heating water pumps shall be provided at 100% capacity each and shall be provided with VFDs.

Chilled water pumps are not to be used within buildings.

23 25 00 HVAC Water Treatment

1. Specify pipe testing, flushing and treatment.
2. Equipment must be included to allow addition of water treatment chemicals to all hydronic systems.

23 30 00 HVAC Air Distribution

1. Base system design for typical variable air systems for classroom spaces, administrative spaces, and common spaces shall be single duct VAV system with hot water re-heat coils in terminal units. Electric reheat is not allowed.
2. Alternative systems shall be studied where constant volume airflow is required such as in laboratory spaces. Economic evaluation shall be made of constant volume reheat and dual duct constant volume with separate fans on each deck.
3. Return air duct/path design shall insure that the free open area required is not restricted. Return air design velocity through ceiling grilles shall not exceed 300 fpm of free open area. Return air design velocity through wall transfer openings shall not exceed 450 fpm of free open area
4. All exhaust ducts shall be under negative pressure inside buildings.
5. Design velocity for general exhaust ducts shall not exceed 1500 fpm except as required for special systems. Special exhaust systems shall be designed in accordance with Industrial Ventilation guidelines.
6. Variable flow systems with variable frequency drives shall be used wherever possible.

23 31 00 HVAC Ducts and Casings

1. The maximum velocity for medium pressure supply duct shall not exceed 2500 fpm
2. The maximum pressure drop for low pressure supply duct shall not exceed 0.07" w.c./100 ft.

23 31 13 Metal Ducts

No spin-in duct take-offs. Use conical or 45° flare fitting

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

23 32 00 Air Plenums and Chases

1. Vertical duct shafts shall be accessible from each floor, and be provided with enough extra space, perhaps 20% to 25%, to accommodate the installation of future ductwork, pipes, conduits, etc. within the shaft construction
2. Return air paths and grille sizes adequate from spaces to air handling units

23 33 00 Air Duct Accessories

23 33 33 Dampers

23 33 13.16 Fire Dampers

Fire/Smoke Dampers (FSD)

1. FSDs will be operated by a duct type smoke detector/tube device. Fusible links will NOT be acceptable for any UNM project.
2. All FSDs will be tied into the building fire alarm system as addressable nodes.
3. Smoke/fire dampers between different occupancies
4. Ducts entering or leaving electrical & IT equipment rooms will require a FSD.
5. All FSD will incorporate access doors for inspection. The access doors will:
 - a. be of fire rated construction when penetrating a fire rated wall.
 - b. be rated for smoke seal when penetrating a fire/smoke rated wall.
 - c. have ceiling access doors measuring a minimum of 24"x 24" for inspection access.
 - d. be labeled "fire/smoke damper" on the outside of the access door and/or the access tile or ceiling area as appropriate and determined by SRS.
 - e. incorporate smoke detection activation on both sides of the damper.
 - f. duct access panels which are tightly sealed with a mechanical latching mechanism

23 33 46 Flexible Ducts

1. Flexible ductwork shall be limited to 90° of bends and a length of 6 feet
2. Use rigid ductwork elbow at diffusers
3. No flexible ductwork on high pressure side of terminal box

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

23 33 53 Duct Liners

No internal acoustical duct lining shall be used in any supply air system.

23 34 00 HVAC Fans

1. Fan speed shall be much less than 1750 rpm
2. Supply fan external static pressure less than 3" w.c.
3. Exhaust fan static pressure shall be adequate for hood and fan discharge requirements

23 36 00 Air Terminal Units

1. Balancing damper at branch take-off on low pressure side of terminal box
2. Ensure proper access to terminal boxes
3. Ensure that electrical, computer & telecom rooms have proper ventilation and cooling.

23 36 16 Variable-Air-Volume Units

1. Three duct diameters straight length of rigid ductwork shall be installed on the supply to VAV boxes
2. Appropriate VAV minimum airflow settings shall be provided to minimize energy consumption.

23 38 00 Ventilation Hoods

1. No return air from laboratory spaces
2. No positive exhaust ductwork inside building
3. Avoid filters in exhaust ductwork
4. Fume exhaust fan upblast discharge velocity 3,000 fpm

23 70 00 Central HVAC Equipment

1. O.A. (Outside Air) intakes shall be located so they are not in close proximity to streets, loading dock, exhausts, etc.
2. O.A. duct shall be long enough to pre-heat outside air to assist in avoiding freezing temperatures being introduced over coils.
3. O.A. quantity shall be measured with a device accurate at the minimum O.A. flow.

23 72 00 Air-to-Air Energy Recovery Equipment

Heat recovery systems may only be considered for systems requiring considerable amounts of outside air and when economically justified. Energy balance calculations shall be provided as part of the justification. Note that run-around coils often use more fan energy than the heat that is recovered.

23 73 00 Indoor Central-Station Air-Handling Units

1. Air Handling Units (AHUs) must be enclosed in an equipment room with enough clearance to allow for coil removal. Roof top units are not allowed.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

2. Air Handling Unit components shall be arranged in a blow through configuration with heating & cooling coils down-stream of supply fans.
3. Two stages of filters shall be specified.
4. Air handling unit chilled water coils shall be selected for 55°F discharge air temperature at airflow of no more than 400 fpm. Coils shall be selected at 20°F water temperature rise. This temperature rise will help ensure the campus chilled water return temperature is at least 16°F.
5. Cooling coils shall use 2-way valves selected with a differential pressure shut-off rating of 50 psig. minimum.
6. Chilled water coils shall be 6 rows maximum with 12 fpi maximum. If conditions require greater coil capacity, two coils in series shall be used to achieve required duty, and shall be placed a minimum of 18 inches apart (with access between) to allow coil cleaning.

23 76 00 Evaporative Air-Cooling Equipment

Evaporative cooling can be considered for use only for spaces requiring considerable amounts of outside air (e.g. laboratory system application) upon UNM approval.

23 80 00 Decentralized HVAC Equipment

23 81 00 Decentralized Unitary HVAC Equipment

23 81 23 Computer-Room-Air-Conditioners

1. Computer rooms, electrical rooms, telecom rooms and similar spaces shall be properly conditioned. Refer to the “Vantage” ITS master plan for guidelines.
2. Computer rooms shall be equipped with standalone dedicated cooling systems that are independent of the central air handler(s).
 - a. For buildings connected to campus CHW, a CHW fan-coil unit shall be used.
 - b. For buildings not connected to campus CHW, a split system shall be installed.

23 84 00 Humidity Control Equipment

23 84 13 Humidifiers

1. Avoid the use of humidifiers except where essential for programming requirements.
2. Straight length of stainless steel ductwork shall be provided at humidifier locations

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 26 –ELECTRICAL

1. Electrical closets and rooms will be constructed of at least a one-hour fire barrier, regardless of the construction requirements of the rest of the building. The closet door will be solid core (or fire rated metal) and be labeled for at least 20 minutes unless a higher requirement is called for by code, with a self-closing device. Doorstops will not be installed on the door. NOTE- magnetic hold open devices may be installed per NFPA 101 and 80 and connected to the fire alarm system.
2. Remove completely all abandoned or unused electrical equipment.

26 05 00 Common Work results for Electrical

26 05 19 Low-Voltage Electrical Power Conductors and Cable

1. All conductors shall be copper. Aluminum conductors are not permitted at UNM.
2. Metal-clad and non-metallic cables (including types: MI,AC,NM,MC,NMC,SNM,SE,USE,UF, or BX) should NOT be used on UNM property without the expressed consent of the Physical Plant Department Engineering and Energy Services Division (PPD-E&ES).
3. PVC pipe shall not be used above grade except in special applications that have been pre-approved or are required for a special installation.
4. All EMT fittings shall be of the compression type (gland & ring). Set-screw fittings will NOT be acceptable
5. The ends of all conduits containing wires of any type shall be bushed.
6. Conductor splices/taps in gutters shall be made using “Polaris” type connectors. Taped split-bolt connections are not acceptable.
7. All bolted pressure connections shall be torqued to manufacturer specifications.
8. In general and where practical, all conductors should be continuous (no splices) from their point of origin to their point of termination. In NO case shall “Service Conductors” be spliced.

26 05 26 Grounding and Bonding for Electrical Systems

Grounding requirements shall be clearly defined and conductor sizes specified.
Load summary schedule shall be provided.
Main equipment shall be properly sized.

26 05 29 Hangers and Supports for Electrical Systems

All conduit should be run parallel and perpendicular to the structure. No unsuitable angles, bends or suspended conduit will be allowed. Exposed conduit shall be run parallel and perpendicular to the structure and generally tight to structure.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

26 05 33 Raceway and Boxes for Electrical Systems

Under no circumstances will non metallic “Wiremold” (surface raceway) contain any conductors which carry more than 50 volts. In all cases where “self-adhesive” surface raceway is used, in addition to the raceway adhesive, at least 2 mechanical fasteners per ten foot length shall also be used (straps, screws, etc.).

26 05 53 Identification for Electrical Systems

1. Labels will be installed on all panels, disconnects, hardwired equipment, etc., identifying its use and where it is fed from. Labels will be installed on all switches and receptacles, identifying its circuit.
2. The phasing of all conductors (#8 and larger) shall be identified by color coding tape. Conductors sizes #10 and smaller shall have colored insulation. The grounded (neutral) conductor sizes #6 and smaller shall be white or light gray, or have 3 continuous white stripes on other than green insulation. Grounded (neutral) conductors larger than size #6 shall be color coded white with coding tape. Grounding conductors sizes #6 and smaller shall have green insulation or be bare the entire length. Grounding conductors larger than size #6 shall be color coded green with coding tape. (Ref: NEC # 210.4, 200.6, 250.119.)

26 05 73 Overcurrent Protective Device Coordination Study

1. Indicate short circuit calculation values on drawings.
2. AIC ratings shall be appropriate for the load.

26 06 00 Schedules for Electrical

26 06 20 Schedules for Low-Voltage Electrical Distribution

1. All switchboards, panels, Motor Control Centers (MCC), etc. shall be shown on the appropriate plans and on the riser diagram.
2. Equipment designations shall be coordinated on the various plans and sensible. These designations carry through and become panel labels.
3. HVAC equipment locations and designations on electric drawings shall match those on the Mechanical Drawings.
4. The following shall be specified at least once but not twice (mech & elect sections): electrical disconnects, equipment starters, VFDs, etc.
5. Power feeder/branch circuit sizing (conductor size and overcurrent protection devices) shall be coordinated with MECH equipment schedules.
6. Power shall be provided to sensor-activated lavatories, urinals, and toilets.
7. Power circuits shall be shown for elevator cab fan and lights and power shown for elevator(s).

26 09 20 Instrumentation and Control for Electrical Systems

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

26 09 23 Lighting Control Devices

1. Dual switching and switching of small areas to reduce energy usage shall be considered.
2. Occupancy sensors shall be used to control lighting in appropriate rooms. Room lighting shall be controlled by motion sensors and should turn off 5 minutes after the last occupant leaves.

26 20 00 Low-Voltage Electrical Distribution

Provide NMEC/NEC required working clearances for switchboards, panels, etc. in adequately sized electrical rooms.

Switchboard, panel and MCC physical sizes shall be shown correctly.

Switchboards, panels and MCCs shall be shown in appropriate locations.

Provide an all-inclusive plan that shows all equipment to ensure access.

26 22 00 Low-Voltage Transformers

26 22 13 Low-Voltage Distribution Transformers

Transformer secondary disconnects shall be provided in NEC required locations.

26 24 00 Switchboards and Panelboards

1. Panel main breakers shall be provided in appropriate locations and NEC required locations.
2. All panels installed at UNM:
 - a) Will be "Bolt-in" circuit breaker type.
 - b) Will have copper busses.
 - c) Will be provided with neutral and equipment ground lugs (bars).
 - d) Will have a permanent label affixed to the panel front cover, showing the panel designation, panel voltage, and where it is fed from.
 - e) Will provide 30% unused (spare) capacity for future use.
 - f) NMA 1 panels will be "Door in Door" construction.
 - g) Any recessed panel installed, in addition to the circuits for which it is being installed, will have (ea) spare conduits (minimum $\frac{3}{4}$ trade size) stubbed from the panel into ceiling space above for future.
 - h) Bonding (grounding) bushings will be provided on all new panel feeders.
 - i) The "AIC" rating of all panels and circuit breakers should be approved by PPD E&ES prior to installation.
 - j) Panel schedules must be completed (updated) and protected from dirt by a plastic sleeve on the inside cover of the panel. This applies to both new and modified existing panels.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

- k) All electrical equipment: panels, disconnects, etc. must meet the code clearance requirements.
- 3. No conductors shall be spliced within panel boards. Under no circumstances will “wire nuts” be accepted within any panel board.
- 4. At no time will a contractor leave any electrical switchgear, panels, or energized devices open or exposed in a public area without having qualified electrical personnel working on or guarding the exposed electrical components.
- 5. All panels shall have door-in-door fronts.
- 6. All panels shall have copper busses.
- 7. All panels/switchboards shall utilize bolt-on circuit breaker devices in lieu of fuses.

26 24 19 Motor-Control Centers

- 1. Motor-operated equipment (i.e. fan coil units) must be supplied by a minimum of a local manual motor starter with thermal overloads. It should be mounted on the side of the control enclosure, or within 3 feet maximum of the unit.
- 2. MCCs shall utilize motor circuit protectors in lieu of fused switches.

26 27 00 Low-Voltage Distribution Equipment

26 27 19 Multi-Outlet Assemblies

Standard tumbler switches and duplex receptacles shall be commercial specification grade, 20 amp. All terminations must be made using the screw terminals, not the “stab-in” provisions. Receptacles in restrooms, in kitchens, in labels, on building exteriors, or within six feet of any water source shall be of the GFCI type.

26 28 00 Low-Voltage Circuit Protective Devices

- 1. Surge protection devices shall be provided in appropriate locations.
- 2. Shunt trip requirements shall be provided where required.

26 28 16 Enclosed Switches and Circuit Breakers

- 1. Circuit breakers shall be used in lieu of fuses throughout, including disconnect switches.
- 2. Where feasible, all protective devices shall be circuit breaker type. An enclosed circuit breaker is to be used in preference to a fused safety switch. Non-fused safety switches may be acceptable for local equipment maintenance disconnection.

26 32 00 Packaged Generator Assemblies

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

26 32 13 Engine Generators

1. Provide SRS with manufacturer specifications, including air emission rates, at least 4 months before construction to allow time to obtain the required air quality permit prior to equipment installation.
2. Is generator shown in proper scale and location. Is the location suitable for maintenance and appearance.
3. Bollards specified.
4. Does the fuel selection satisfy SRS requirements; anticipate that natural gas will be the primary fuel unless another fuel is specifically required
5. Power and alarm conduit and wiring to generator, jacket water heater, battery charger, GFCI maintenance outlet, etc.
6. Residential muffler specified
7. Is a remote generator operating/indicating panel included and is its location satisfactory
8. Is transfer switch properly located and are power conduit and wiring indicated

26 50 00 Lighting

26 51 00 Interior Lighting

26 51 13 Interior Lighting Fixtures, Lamps and Ballasts

1. All fluorescent light fixtures installed must be provided with high frequency, instant start, electronic ballasts and applicable (i.e. T-8 or compact fluorescent) lamps. Where lamps will be frequently switched or controlled by occupancy sensors, ballasts shall be high frequency, program rapid-start type.
2. All fluorescent light fixtures must be provided with a full coverage lens, or clear "tube protectors". Open lamp strip fixtures will be accepted only after specific approval.
3. All multi-lamp ballasts must be of the "Parallel circuit" type. Lamp color shall be as approved by UNM.
4. "U-lamp" light fixtures shall NOT be installed.
5. Special areas (conference rooms, etc.) shall have suitable lighting for presentations.
6. Lamp CRI and CCT shall be specified/scheduled for each luminaire type.
7. Ceiling types, grid layout and luminaire layout shall be coordinated with Architectural drawings. Base sheet shall match.
8. Emergency egress lighting shall be minimized for energy conservation.

26 53 00 Exit Signs

1. All Exit lighting will be standardized. The standardization will apply to the EXIT sign housing, lettering and color. All EXIT signs will meet the size criteria of NFPA 101. All housings will be white and the signs will incorporate the GREEN colored lettering. Exit signs shall be LED type.
2. Exit signs and egress lighting shall be shown in appropriate locations.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

3. All exit lighting will be internally lit with battery back up power or shall be connected to an emergency source of power, which will provide not less than 1-1/2hrs of continuous power in the event of main building power failure.
4. Exit signs with attached emergency light packs will not be acceptable unless specifically approved

26 56 00 Exterior Lighting

1. Exterior light fixtures shall comply with the UNM lighting master plan.
2. NM Night Sky Protection Act shall be complied with (i.e., fully shielded luminaires). Additionally, house-side shields shall be provided for luminaires near residential/housing and Astronomy Observatory.
3. Electric signs shall be indicated where required and power shall be shown for electric signs.

26 56 13 Lighting Poles and Standards

Light poles shall have raised bases if potentially subject to vehicular damage. Light pole base detail(s) shall be shown. In ground base depth shall be at least 1/4 length of pole.

26 56 16 Parking Lighting

Parking lot lighting shall be shown if required. The lighting control method shall be indicated and appropriate. Luminaires shall be compatible (source, finish, appearance) with master plan and shall comply with the campus lighting master plan.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 27 – COMMUNICATIONS

Please refer to the UNM ITS Design Guidelines and Guide Specifications available at <http://its.unm.edu/communications/designguidelines/> for complete specifications pursuant to this division. The items included herein are only intended as a partial summary and shall not be considered to supersede anything in the ITS Design Guidelines.

27 10 00 Structured Cabling

Project requirements shall be coordinated with UNM ITS to ensure that it is understood how cabling, jacks, plates, equipment racks, etc., are included and funded for the project.

27 11 00 Communications Equipment Room Fittings

1. IT closets and rooms shall be constructed of at least a one-hour fire barrier, regardless of the construction requirements of the rest of the building. The closet door will be solid core (or fire rated metal) and be labeled for at least 20 minutes unless a higher requirement is called for by code, with a self-closing device. Doorstops will not be installed on the door. NOTE- magnetic hold open devices may be installed per NFPA 101 and 80 and connected to the fire alarm system.
2. The electrical installation for IT rooms shall comply with NEC 75 or may also comply with NEC 645. One may have an advantage over the other.
3. It is recommended that the main IT/ service entry room (at least), be equipped with a single room electrical shut off button for all equipment (dedicated room subpanel is suggested. A second shut-off is required for dedicated HVAC equipment. The on-floor generally smaller rooms need not have this feature so long as compliance with other applicable code requirements are met.
4. Ensure that telecommunications rooms are appropriately sized & located.
5. Adequate ventilation (24/7) shall be provided for telecommunications rooms.
6. Pathways shall be provided for cabling runs back to telecommunications rooms.

27 15 00 Communications Horizontal Cabling

Pathways shall be provided for cabling runs through hard ceiling areas.

27 30 00 Voice Communications

27 32 00 Voice Communications Telephone Sets, Facsimiles and Modems

1. Telephones shall be installed in elevator cabs.
2. Adequate handicap telephones shall be indicated.
3. Code Blue phones shall be indicated and telephone service shall be shown to Code Blue stations.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

27 50 00 Distributed Communications and Monitoring

27 53 00 Distributed Systems

27 53 13 Clock Systems

Clocks, where required shall be a GPS wireless clock system consisting of a roof mounted GPS signal receiving device with cabling to a master FM radio transmitter and 110 volt hard-wired clocks. The transmitter shall include a battery back up. The system shall be similar to one manufactured by Primex Wireless or equal.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 20 00 Electronic Surveillance

28 23 00 Video Surveillance

Exterior CCTV cameras shall be shown if required.

28 30 00 Electronic Detection and Alarm

28 31 00 Fire Detection and Alarm

1. The work covered by this section of the Specification shall include all labor, equipment, materials and services to furnish and install a complete fire alarm system of the “addressable” type. It shall be complete with all-necessary hardware, software and memory specifically tailored for this installation. It shall be possible to permanently modify the software on site by using a plug-in programmer/computer. The system shall consist of, but not be limited to, the following:
 - a. Fire Alarm Control Panel
 - b. Remote Annunciation
 - c. Addressable manual fire alarm stations
 - d. Addressable area smoke detectors, with sensitivity/maintenance alert
 - e. Beam detectors
 - f. Addressable duct smoke detectors, with sensitivity/maintain alert
 - g. Addressable heat detectors
 - h. Sprinkler waterflow alarm switches
 - i. Audible notification appliances
 - j. Visual notification appliances
 - k. Air handling systems shutdown control
 - l. Smoke exhaust systems startup control
 - m. Magnetic door holder release
 - n. Sprinkler supervisory switches and tamper switch supervision
 - o. Fire pump supervision
2. Fire alarm shop drawings shall be reviewed and approved by the design engineer.
3. The final shop drawings shall also be transmitted to the State Fire Marshall’s office for review in accordance with the State Fire Marshall’s Plans Review and Submittal Requirements, the latest edition. Proof of submission is necessary so that work can commence. Due to staffing, the Fire Marshall may not be able to review the drawings on a timely basis and therefore, the Design engineer’s review and approval will be sufficient to start work.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

4. The contractor will coordinate with ITS prior to start of work on any new or existing fire alarm system in order to alert SRS and UNM agencies.
5. Contractor shall advise building occupants that a fire alarm system may be out of service.
6. The architect must consider the location of future furnishing when locating fire alarm/notification devices. Consideration must be given to furnishings obstructing the devices.
7. All fire protection systems will receive a 100% device/operational test, performed by the installing contractor and witnessed by a UNM representative. The test will include activation of each pull station, smoke detector, flow/tamper switch, alarm notification device and connection through the fire alarm panel to Campus Police dispatch.
8. Be sure to require that the “alarm” contractor coordinate work in this section with all related trades. Work and/or equipment provided in other sections and related to the fire alarm system shall include, but not be limited to:
 - a. Sprinkler waterflow and supervisory switches shall be furnished and installed by the plumbing contractor or fire alarm contractor, and wired by the fire alarm contractor.
 - b. Duct smoke detectors shall be furnished, wired and connected by the fire alarm contractor. The
 - c. HVAC contractor shall furnish necessary duct opening and installation of the duct smoke detectors. Air handling and smoke exhaust system fan control circuits and status contacts to be furnished by the HVAC control equipment contractor or as shown on the contract drawings specifically for this project.
 - d. Elevator recall control circuits to be provided by the elevator control equipment.
 - e. The sprinkler system control equipment contractor shall provide wet pipe flow and tamper switches, dry pipe/deluge sprinkler system release valve control circuits and supervision contacts.
 - f. Emergency generator supervision contacts to be provided by the emergency generator control equipment.
 - g. Fire Pump supervision contact to be provided by the fire pump control equipment.
 - h. Wiring, cabling and conduit shall conform to the specifications set forth in Division 26.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

9. Warranty. Manufacturer shall guarantee the system equipment for a period of one (1) year from the date of final acceptance of the system. The contractor shall guarantee all wiring and raceways to be free from inherent mechanical or electrical defects for one (1) year from date of acceptance of the system. Upon completion of the installation of fire alarm system equipment, the electrical contractor shall provide to the architect a signed written statement substantially in form as follows: "The undersigned, having engaged as the Electrical Contractor on the (name of project) confirms that the fire alarm system equipment was installed in accordance with the wiring diagrams, instructions and directions provided to us by the manufacturer."
10. Circuiting Guidelines. Each circuit shall complete as shown on drawings, but device loading is not to exceed 80% of loop capacity, in order to leave for space for future devices.
11. Manufacturers. Notifier, EST, Simplex, Fire Lite, Pyrotronics or approved substitute.

28 31 13 Fire Detection and Alarm Control, GUI and Logic Systems

Main fire alarm panel location shall be indicated and appropriate.

All FA systems will be the addressable type. Each device will report in as a separate address. The contractor will be responsible for programming the address according to the needs of UNM Alarms.

This theory of operation is provided for the designers information:

- a) Actuation of any manual fire alarm station or automatic detector will sound all audio/visual alarms and trip the master fire alarm panel.
- b) Actuation of automatic detectors in the elevator lobbies, shaft, or equipment room will sound all audio/visual alarms, trip the master fire alarm panel, and activate the elevator controls as directed by the elevator installer.
- c) Activation of a HVAC unit smoke detector will sound all audio/visual alarms, trip the master fire alarm panel and shut down the HVAC unit through the temperature control system.
- d) Actuation of a sprinkler flow switch will sound all audio/visual alarms and trip the master fire alarm panel.
- e) Closure of any sprinkler system valve or the PIV valve will report as a supervisory signal.
- f) Closure of HVAC "dampers" will report as a supervisory signal.

28 31 23 Fire Detection and Alarm Annunciation Panels and Fire Stations

1. Remote annunciator(s) shall be shown.
2. The manufacturer must have received prior approval of their fire alarm system before their system will be considered for use. Prior approval submittal shall include system operation description, equipment cut sheets, and typical wiring diagrams.

**THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS**

Physical Plant Department-Engineering & Energy Services Division

3. Applicable Codes and Standards. All equipment shall be UL listed for its intended use. Installation of equipment and operation of, shall comply with NFPA 72, the National Electric Code, all other local codes and authorities having jurisdiction.
 4. Circuit Identification Nameplates. All circuit breakers related to the fire alarm system shall have a red marking, be identified as "Fire Alarm Circuit Control".
 5. Include in the technical requirements that an allowance of \$10,000 (or a quantity of 20% of those shown
 6. on drawings) for additional contractor furnished fire alarm signals beyond those required by the
 7. Documents or approved shop drawings. The installation shall occur after initial testing and in areas where
 8. Signals can not be heard properly. The system's capacity and battery system shall be sized to
 9. Accommodate the extra (20%) devices.
 10. Specify spare parts for the system. The spare parts shall directly interchange with the corresponding components as furnished in the installed systems. Spare parts and accessories shall be suitably packaged and identified by nameplate, stamping or tagging. Provide the following spare parts and accessories.
 - a) 1 spare pull station
 - b) 1 spare horn/strobe
 - c) 1 spare "module"
 - d) 1 spare of each type of smoke detector installed (ion, photo)
 - e) 1 heat detector
 11. The contractor shall furnish a list of all other spare parts and accessories which the manufacturer recommends to be stocked for maintenance of the system.
- 28 31 33.13 Fire Detection and Annunciation Interfaces to Remote Monitoring Central Station Dialer. Furnish and install digital alarm dialer, which is compatible with the UNM central station alarm reporting system, (911Notifier or approved equal).
- Tests.
- a) The entire fire alarm system shall be tested and adjusted under the supervision of a factory-trained representative of the manufacturer. Any defects shall be corrected at once and the test re-conducted.
 - b) After the completion of the installation and supplier's testing, the entire system, devices, wiring, and equipment shall be completely tested in the presence of the architect's representative, Fire Department, and owner. If the system fails to pass this inspection, the contractor shall be liable for all additional re - inspection and re - testing expenses. The Fire Marshall must approve the entire Fire Alarm System before it will be accepted.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

28 31 46 Smoke Detection Sensors

The minimum detection and protection requirements for storage, custodial and trash rooms will be smoke detection and wet pipe fire sprinkler systems connected to the fire alarm panel.

28 31 43 Fire Detection Sensors

Smoke/fire duct detectors shall be shown and coordinated with mechanical and not double specified (i.e., by both MECH and ELECT).

28 31 53 Fire Alarm Initiating Devices

Fire sprinkler system monitoring shall be shown.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 31 – EARTHWORK

31 01 00 Maintenance of Earthwork

Protect excavation from surface water

31 06 00 Schedules for Earthwork

Over excavation, placement of engineered fill, and compaction to 95% shall be clearly specified.

31 06 20 Schedules for Earth Moving

31 06 20.16 Backfill Material Schedule

1. Is backfill material and lift depths specified (8-inches minimum)
2. The architect's written approval is required for use of spoils as backfill. If written approval is not received, acceptable imported fill material is required.

31 06 40 Schedules for Shoring and Underpinning

Remove excavation support/shoring to a minimum depth of 48" below finish soil grade

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 01 00 Operation and Maintenance of Exterior Improvements

32 01 80 Operation and Maintenance of Irrigation

1. Protect existing irrigation systems and restore immediately if damaged. Hand watering is required if irrigation is unavailable for any reason. Coordinate requirements with PPD- Grounds & Landscaping prior to start of work.
2. Indicate that new irrigation and/or sleeves shall be installed beneath sidewalk prior to concrete placement.

32 01 90 Operation and Maintenance of Planting

32 01 90.33 Tree and Shrub Preservation

1. Trees to remain positively protected to drip line with sturdy fencing
2. Existing trees to remain must be protected to drip line. Other landscaping features shall be protected.
3. All disturbed features shall be restored unless specified otherwise.

32 10 00 Bases, Ballasts and Paving

1. Indicate that concrete paving, sidewalks and brick pavers shall be replaced in full panel sizes with colors and patterns to match what was removed and/or existing. Remove existing concrete to the nearest joint, score, or edge. Straight saw-cut edges are required. Random cuts or patches are not allowed. Score joints shall be at no more than six (6') foot intervals or match existing. Expansion joints shall be at no more than twenty (20') foot intervals.
2. Sidewalks less than 6' wide, or work within a walkway 4' wide to 6' wide – Provide and install 6" X 6" - W2.9 X W2.9 wire mesh centered on slab. Slabs shall be of four (4") inch thick 4000 psi concrete.
3. Sidewalks 6' wide or greater, or work within a walkway 6' wide or greater – Provide and install #3 Rebar at 12" on center each way centered on slab. Provide and install #3 rebar along edges of slab, provide 2" cover. Slabs shall be of 6" thick 4000 psi concrete.

32 11 00 Base Courses

32 11 13 Subgrade Modifications

Subgrade under sidewalks shall be scarified to a depth of eight (8") inches and recompact to minimum of 95% maximum density as determined by ASTM D 1557. Any soft or 'spongy' areas shall be removed and replaced with structural fill as described herein.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

31 30 00 Earthwork Methods

31 35 00 Slope Protection

Avoid steeply sloped site development.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 33 – UTILITIES

33 01 00 Operation and Maintenance of Utilities

1. If utility shutdowns are required, the contractor shall obtain approval not less than 10 days prior.
2. Indicate that existing utilities must be disconnected and capped at locations identified on the drawings or removed. Record actual disconnection locations on as-built drawings.
3. Spotting and locating existing utilities and underground installations shall comply with the NMSA 1978 (New Mexico Excavation Law) and the requirements of the UNM General Conditions. In addition to one-call, include that utility locating is also the responsibility of contractor and is delegated by the documents. Also, utility locating by other parties does not relieve the contractor of this responsibility. Be sure these requirements are clearly indicated. Verify with UNM that the Project Manual and drawings are clear and do not issue conflicting requirements.

33 06 00 Schedules for Utilities

1. Proper pipe-bedding material shall be specified. Bed pipe continuously along entire length, scoop out for bells & fittings. Proper depth of backfill around pipe shall be specified. Backfill to be compacted beneath pipe haunches before additional backfill is added
2. Check to make sure that new utility lines are in compliance with UNM Utility Master Plans.
3. Clearly indicate the utility point of connection to the building, including size, routing and shutoff valves where appropriate for steam and condensate, chilled water, domestic water, fire sprinkler service, fire department siamese connections, sanitary sewer, storm sewer, etc.
4. Specify that an approved warning tape shall be installed above utilities, twelve (12") inches beneath finished grade. Specify that a magnetic traceable warning tape or tracer wire shall be provided with appropriate test connection points for all wet lines.

33 09 00 Instrumentation and Control for Utilities

1. Building boundary metering of all utility demand and consumption is required. Monitoring of both instantaneous and cumulative consumption shall be available through the building DDC system. In selected cases, metering and monitoring of individual HVAC units may be required.
2. Refer to the UNM-PPD Utilities Division Metering Equipment Guideline for detailed metering specifications.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

33 10 00 Water Utilities

All design calculations shall be based on a system static pressure of 65 psi.

33 11 00 Water Utility Distribution Piping

1. Specify lined ductile iron pipe (DIP) for domestic supply piping.
2. . Pipe to be delivered with factory-installed end caps, which remain in place until pipe is installed and until necessary to remove to install next piece of pipe. No damaged components are to be installed. Pipe lining to be intact.
3. Plastic piping is to be protected from sunlight
4. Only mechanical joint restraint fittings and valves are acceptable. No joint restraint gaskets accepted
5. Corrosion protective encasement for direct-buried piping (PE film) is required
6. Specify non-rising stem, resilient seat, mechanical joint gate valves, 250 psig
7. Specify tees, not tapping sleeves
8. Bury valves four (4') feet below grade so that valve stem extensions are avoided.
9. Conduct piping pressure tests before joints are covered. Pressure test piping at not less than 1 ½ times working pressure for 2 hours. Piping pressure tests to be witnessed and signed off on by the designated construction observer.

33 11 19 Fire Suppression Utility Water Distribution Piping

All design calculations shall be based on a system static pressure up stream of the backflow preventer of 65 psi.

Specify lined ductile iron pipe (DIP) for fire supply piping Corrosion protective encasement for direct-buried piping (PE film) is required.

Specify non-rising stem, resilient seat, mechanical joint gate valves, 250 psig.

Specify tees, not tapping sleeves.

All unoccupied spaces will be protected with a smoke detector and sprinkler head regardless of the protection requirements of the rest of the building. Both systems will be connected to the buildings fire alarm system. A heat detector (no higher than 135°) may be substituted where appropriate and with approval, i.e. steam production from the custodial sink, areas with blowing dust, etc.

Drains and test connections shall be grouped in a reasonable fashion for ease of testing and control of discharged water. Hose connections will be provided.

33 12 00 Water Utility Distribution Equipment

33 12 13 Water Service Connections

Coordinate connection to the existing water main with the Utilities Division or City of Albuquerque, as appropriate.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

33 12 13.13 Water Supply Backflow Preventer Assemblies

Backflow preventers shall be installed where needed. Provide required hot box backflow protection for domestic, fire and irrigation water as required.

33 12 33 Water Utility Metering

Indicate a building water meter and location. Be sure it is coordinated with the building EMS and Utility Division specifications. Refer to the UNM-PPD Utilities Division Metering Equipment Guideline for detailed metering specifications.

33 12 19 Water Utility Distribution Fire Hydrants

Specify fire hydrant location and verify adequate access.

Insure that Fire Department Siamese connections are properly located and accessible.

33 13 00 Disinfecting of Water Utility Distribution

NMED Certified Technicians must supervise the sanitizing of new connections to UNM's drinking water utility system. Use AWWA C651 procedure or alternate for purging & disinfection BAC-T tests by independent labs.

33 40 00 Storm Drainage Utilities

Include all site surface drainage structures, inlets, etc. in the project.

Indicate the site surface drainage course(s). Provide adequate drainage away from the building: including but not limited to roof drains, landscaped areas, drive pads, sidewalks

Indicate required subsurface drainage: drop inlets, drain inlets, manholes, storm sewers, etc.

Indicate finished floor elevations relative to grade at building. Avoid setting elevations too low.

Indicate an adequate water-harvesting plan consisting of swales, retention facilities, volume control, overflow considerations, etc. Roof drains should direct water into plantings or be used for other beneficial uses whenever possible before discharge to the storm disposal system.

Indicate new and existing inverts and grades

Avoid situations requiring a sump pump

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

33 50 00 Fuel Distribution Utilities

33 51 00 Natural-Gas Distribution

1. Connect to UNM system if at all possible
2. Avoid installing new gas piping in the utility tunnel.
3. Piping and shut-offs to comply with code.

33 51 33 Natural-Gas Metering

Refer to the UNM-PPD Utilities Division Metering Equipment Guideline for detailed metering specifications.

33 60 00 Hydronic and Steam Energy Utilities

33 61 00 Hydronic Energy Distribution

1. Chilled water shall be supplied at 42°F. and shall return at not less than 58°F.
2. System chilled water pressure is adequate to satisfy most building circulation requirements (no building chilled water pumps are required).
3. Design chilled water differential pressure at the buildings is 15 psig.
4. Winter months' cooling requirements must be able to be met with 50°F chilled water supply as the central plant hydronic economizer cycle is used.

33 61 33 Hydronic Energy Distribution Metering

Refer to the UNM-PPD Utilities Division Metering Equipment Guideline for detailed metering specifications.

33 63 00 Steam Energy Distribution

Steam shall be supplied to buildings at a pressure of 40 psig. However, the pressure reducing station shall accommodate (with adjustment) future supply pressures up to 110 psig.

33 63 33 Steam Energy Distribution Metering

Refer to the UNM-PPD Utilities Division Metering Equipment Guideline for detailed metering specifications.

33 70 00 Electrical Utilities

1. Identify the location of primary switch and transformer.
2. Ensure that the location is suitable for maintenance and minimizes impact on appearance.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

3. Provide adequate working clearances, access and drainage.
4. An enclosure shall be provided where required.
5. Pad-mount transformer(s) shall have 12.47kV delta-wye connection.

6. Transformer(s) shall be provided with surge arresters.
7. Spare conduit stubout(s) shall be indicated.
8. Primary equipment designation(s) shall be obtained from UNM PPD and shown correctly
9. Power connection points shall be identified, both at vaults and building.

10. UNM has a dual-radial distribution system. Two primary circuits and adequate conduits shall be specified. Vaults shall be provided where needed.
11. Bollards shall be specified
12. Perimeter ground counterpoise shall be detailed for transformer and switch.
13. Perimeter ground counterpoise shall be detailed for building and properly interconnected.
14. Power and alarm conduit and wiring to sprinkler controls, hot boxes and backflow preventers shall be indicated.
15. Paint color of exterior equipment and devices shall be suitable for environment, (i.e., match building colors for exposed devices). Factory "Desert Tan" finish required for transformer and primary switch.
16. PIV and supervisory tamper switch locations shown shall be along with tie to fire alarm system.

33 71 00 Electrical Utility Transmission and Distribution

33 71 19 Electrical Underground Ducts and Manholes

1. In all PVC conduit/ductbank runs, all bends over 30 degrees and all stub-ups shall be in wrapped rigid conduit and properly grounded.
2. Removal of abandoned conduit that is underground must be indicated.
3. Coordinate with UNM-PPD to determine the extent of removal work.

33 71 73 Electrical Utility Services

33 71 73.33 Electric Meters

1. UNM required electric meter shall be a Square D POWERLOGIC CM3350/ECC21 connected at main secondary electrical service.
2. Exact requirements shall be reviewed and approved by UNM PPD.
3. All metering shall be connected thru the building DDC system.
4. Refer to the UNM-PPD Utilities Division Metering Equipment Guideline for further metering specifications.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

33 73 00 Utility Transformers

If the transformer contains a secondary CB, modifications to neutrals and grounds shall be specified.

33 73 13 Liquid-Filled Utility Transformers

Existing oil-filled transformers may contain PCB's. Determine through SRS if transformers in the project contain PCB's and if so, properly and legally dispose of them and provide UNM-SRS with the appropriate legally-required documentation.

33 77 00 Medium-Voltage Utility Switchgear and Protection Devices

The correct power switch shall be specified including manufacturer and configuration.

33 79 00 Site Grounding

Only approved exothermic or pressure type ground connections shall be specified.

33 79 93 Site Lighting Protection

1. If system is required, it must be shown.
2. If system certification is required then UL or LPI certification must be specified.

33 80 00 Communications Utilities

Please refer to the UNM ITS Design Guidelines and Guide Specifications available at <http://its.unm.edu/communications/designguidelines/> for complete specifications pursuant to this section. The items included herein are only intended as a partial summary and shall not be considered to supersede anything in the ITS Design Guidelines.

33 81 00 Communications Structures

33 81 26 Communication Underground Ducts, Manholes and Handholes

Telecom ductbank and vaults shall be indicated.

33 82 00 Communications Distribution

1. Telephone service tie-in point shall be shown.
2. Data service tie-in point shall be shown and the location coordinated with UNM ITS
3. Conduit stubouts into building shall be shown.
4. Cable TV service tie-in point shall be shown, if desired or required.

THE UNIVERSITY OF NEW MEXICO
DESIGN STANDARDS
Physical Plant Department-Engineering & Energy Services Division

DIVISION 40 – PROCESS INTEGRATION

Combustion Equipment - Provide SRS with manufacturer specifications, including air emission rates, at least 4 months before construction to allow time to obtain the required air quality permit prior to equipment installation.