New Mexico State University
Department ICT

Communications Cable Plant and Construction Specification
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Document Usage Statement

To: Architect, Consultants and Contractors
Re: Standards of Design for Communication Cable Plant Design and Construction Specification

Intended Use

This is a general design specification for use in designing and installing the information transport systems infrastructure for New Mexico State University. Designers and Architects will need to select sections of this specification as required for their project. Not all chapters and sections will apply to every project. When designing a communications system, Designers and Architects will need to consider all chapters for inclusion unless it is deemed outside the scope of the project by NMSU-ICT.

General Notes for Designers and Architects:
- At each phase of project design a complete set of project drawings and manuals will be furnished to NMSU-ICT for review and comment. (Materials can be printed or electronic.)
- NMSU-ICT will submit project requirements, recommendations and estimates 2 weeks after receiving materials.

These notes will be on all special systems drawings.

- NMSU ICT – Networking Engineering Services personnel will be responsible for all copper and fiber optic data and phone cable terminations, cable plant certification testing and documentation.
- All copper cable for use in the data, phone and video systems will be “Owner Furnished and Contractor Installed.”
- All necessary active equipment for the data, phone and video will be supplied and installed by NMSU-ICT personnel.

Errors and omissions shall be reported to NMSU ICT – Network Engineering Services for correction.

End of Section
SECTION 07 7100
ROOF SPECIALTIES FOR - COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Roof Penetrations
1. Roof penetrations should be considered for all new buildings, and as a retrofit for existing buildings. Roof penetrations will be primarily used to provide a pathway for wireless (dish, GPS, antenna, etc) locations, and shall be coordinated with NMSU-ICT.
2. Provide one 2” penetration for smaller buildings, and at least two - 2” penetrations for larger buildings. These penetrations shall have a pathway to the nearest network room.
3. Roof penetrations shall be a gooseneck conduit to prevent water infiltration. The penetration shall be properly sealed with a waterproofing material.
4. Roof penetrations may be horizontal from penthouse areas to surrounding flat roof spaces. The penetrations shall be angled downward towards the exterior providing a minimum 0.5 inch pitch. The penetration shall be properly sealed with a waterproofing material.
5. Roof penetrations and sealing shall be made by a certified roofing contractor. The contractor shall follow the latest edition of the NRCA manual.
6. Roof penetrations shall not compromise existing roof warranties. Installation requirements may need to be modified to adhere to the roof warranty.

PART 2 PRODUCTS

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer’s warranty instructions.
B. Roof penetrations shall not compromise existing roof warranties. Installation requirements may need to be modified to adhere to the roof warranty.

End of Section

SECTION 07 84 13
FIRESTOPPING FOR - COMMUNICATIONS

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS

A. NMSU-ICT requires designers to reestablish the integrity of fire-rated walls, floors, ceiling, etc. when these barriers are either partially or fully penetrated by cables, conduit, and other penetrating elements. In many cases, fire stop penetration seals may be required to perform other safety or security function (e.g. environmental protection seals).

B. All fire stopping associated with the structured cable system shall comply with all NFPA Life Safety Code #101, 6-2.3.6, “Penetrations and Miscellaneous Openings and Fire Barriers” and NEC 300.21, “Fire Stopping” regulations and standards.

C. IMPROANT: All conduits must be installed per NMSU-ICT Standard Specification so the contractor, can perform the fire stopping.

D. All vertical penetrations consisting of conduit, sleeves, slots, etc. shall be fire stopped at both sides of the penetration, or as specified by a UL-tested assembly by the manufacturer.

E. All horizontal penetrations consisting of conduit, sleeves, slots, etc. shall be fire stopped at both sides of the penetration, or as specified by a UL-tested assembly by the manufacturer.

F. Designers shall incorporate the use of STI EZ-Path products for all cable penetration of 8 or more cables for new penetrations.

G. Individual cable penetrations into plenum air return areas not enclosed in conduit shall be fire stopped.

H. Openings made in concrete floors shall be fire stopped using a tested system. Thickness or depth of fire stop materials shall be as recommended by the material manufacturer and backed by formal ASTM E-814 tests.

I. Plenum air return ceiling penetrations for conduit and cables shall be sealed with a system appropriate for the substrate and level of protection required.

J. The methods of fire stopping any roof penetrations shall be the same as those for floor and ceiling assemblies.

K. All metal conduits with or without wire/cable inside shall be fire stopped.

L. Designers shall not specify a fire stop system by UL reference, as installers will have to determine the appropriate system per manufacturer’s field guide. The designer shall account for this requirement in determining pathways and cost estimates.

1.02 PROJECT CONDITIONS

A. Fire stopping at NMSU is done by the Contractor. All conduits must be installed per NMSU Standard Specifications so the Contractor, can perform the fire stopping.

1.03 SUBMITTALS

A. Schedule of Fire stopping: List each type of penetration, fire rating of the penetrated assembly, and fire stopping test or design number.

B. Product Data: Provide data on product characteristics.
C. Manufacturer’s Certificate: Certify that products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE
A. Fire Testing: Provide fire stopping assemblies of designs which provide the specified fire ratings when tested in accordance with methods indicated.
B. Installer Qualifications: Company specializing in performing the work of this section and:
C. Approved by Factory Mutual Research un FM Standard 4991, Approval of Fire stop Contractors, or meeting any two of the following requirements:
D. With minimum 3 years documented experience installing work of this type.
E. Able to show at least 5 satisfactorily completed projects of comparable size and type.
F. Licensed by authority having jurisdiction, when applicable.
G. Approved by fire stopping manufacturer.

1.05 ENVIRONMENTAL REQUIREMENTS
A. Comply with fire stopping manufacturer’s recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
B. Provide ventilation in areas where solvent-cured materials are being installed.

1.06 FIRESTOPPING ASSEMBLIES
A. Fire stopping: Any material meeting requirements.
B. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E-814 that has F rating equal to fire rating of penetrated assembly and minimum T rating of ½ hour and that meets all other specified requirements.

1.07 MATERIALS
A. Any material types required by the manufacturer for the fire stop conditions, such as sealants, mortar, compound, putty, sheets, sprays, intumescent wrap, collars, pillows, and forming material.
B. Any materials required for the proper installation of listed fire stop assemblies, such as retaining collars, wire mesh, metal sheets, etc.
C. Manufacturers
   1. Specified Technologies, Inc
      1. EX-Path fire stop assemblies
      2. SpecSeal Intumescent Composite Sheets
      3. SpeSeal fire stop products
   2. Nelson Fire stop Products
   3. Hilti USA
   4. Other acceptable manufacturers offering equivalent products, pre-approved by NMSU-ICT.
1.08 PREPARATION
A. Clean substrate surfaces of dirt, grease, oil, loose material, or other matter which may affect bond of fire stopping material.
B. Remove incompatible materials which may affect bond.

1.09 INSTALLATION
A. Install materials in manner described in fire test report and in accordance with manufacturer’s instructions, completely closing openings. The Contractor shall provide and install fire stop material as specified by the current manufacturer field manual or by manufacturer provided engineered solutions.
   1. Do not cover installed fire stopping until inspected by authority having jurisdiction.
   2. Install labeling as follows, labels shall be pre-printed and include:
      1. Name of installer of fire stopping material & company name.
      2. UL System ID.
      3. F and T ratings
      4. Date of fire stopping installation.
      5. Number and cable-type description of cables in pathway, if applicable.
      6. Nelson/STI/Hilti detail number and NMSU identifier. One location may have multiple labels (e.g. fire stop around sleeve penetration and fire stop within sleeve around cables).
   3. Contractors shall provide and install STI EX-Path products for all cable penetrations of 8 or more cables. Contractors may not split cable bundles to avoid this requirement.
   4. Cable bundles planned to penetrate a fire-rated wall and entering the same space within 10 feet of each other shall be consolidated into a single penetration, unless one or both penetrations are membrane penetrations (one side of the wall partition only).
   5. All floor penetrations shall be fire stopped. All hallway sleeves shall be fire stopped. All conduits ending at a hallway cable tray shall be fire stopped. All wall penetrations by cable tray shall be fire stopped. Penetrations into and within the utility tunnels shall be fire stopped. All other penetrations determined by the AHJ as needing fire stopping shall be fire stopped.
   6. The contractor shall use only personnel certified by the manufacturer for installation of fire stop products. The contractor shall submit the name(s) of certified fire stop installers with copies of documentation verifying the training with bid documents. The Contractor shall, at their expense, replace entirely any fire stop system installed by an uncertified installer.
   7. The contractor shall contact a manufacturer to address configurations not in the field manual. (Specified Technologies, 800-992-1180; Hilti USA, 800-879-8000; Nelson Fire stop, 800-331-7325). The Contractor shall provide written documentation for all engineered solutions not found in the manufacturer’s field manual.
8. The contractor shall correct any fire stop systems determined to be incorrectly installed by NMSU-ICT, third-party inspectors, or the local AHJ as specified by the manufacturer.

9. The Contractor, at their expense, shall replace up to 6 fire stop locations removed by NMSU-ICT for installation inspection. The Contractor shall repair/replace any fire stop material removed to restore the integrity of the system (pliable fire stop putty and mineral wool may be reused if removed intact and if indistinguishable from new material).

10. All conduits at the entrance facility entering the OSP may be fire stopped. Conduits in maintenance holes and hand boxes do not need to be fire stopped but shall be plugged.

11. Fire stop material shall be installed per the manufacturer’s specifications.

12. Contractors shall use the appropriate fire stop system given the nature of the penetration.

13. Contractors shall completely remove and restore any fire stop material disturbed by pulling new cables through existing fire stopped openings. Restoration shall be with new, unused material. Mineral wool may be reused if removed intact without impacting the physical characteristics of the material.

End of Section

08 00 00 DIVISION 08 – OPENINGS

08 71 53 – Security Door Hardware

08 74 11 – Electrical Locking Control *not accurate

08 74 13 – Card Key Access Control Hardware

08 74 16 – Keypad Access Control Hardware

08 74 19 – Biometric Identity Access Control Hardware

09 00 00 DIVISION 9 – FINISHES

SECTION 09 67 17

FLOOR COATINGS for – COMMUNICATIONS

PART 1 GENERAL

End of Section

SECTION 09 69 00

ACCESS FLOORING for – COMMUNICATIONS

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS

A. Raised floors may be installed. The use of raised floors is preferred to in-floor conduits.
B. Specify cable supports every two feet, when not in continuous tray.
C. Specify the use of cable tray under raised floor panels. All cables shall be routed in a cable tray or other support structure designed for use with raised floors.
D. In large computer rooms, raised floors may be used to route power to computer equipment. Overhead cable cabling systems provides a more manageable solution for the low voltage cabling.

1.02 SUBMITTALS

A. Product Data: Provide product literature and materials list.
B. Warranty: Submit manufacturer warranty and ensure that forms have been completed in NMSU institution name and registered with manufacturer.

1.03 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. All cables shall be installed in cable tray or other support structure installed for use with medium and high height raised floors.

End of Section
D. Screen material shall be matte white with a black border. Screen material shall have a gain of approximately 1.0.
E. Screens shall be ceiling mounted. Screens shall be motorized with a manual switch located near the instructor console/podium.

PART 2 PRODUCTS

2.01 MATERIALS

2.01 MANUFACTURERS

A. Da-Lite Screen Company.
B. Draper, Inc.

PART 3 EXECUTION

3.01 INSTALLATION

A. Contractors shall install screens according to manufacturer’s specifications.
B. Contractors will make sure screen can be fully extended without hitting marking boards.

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PART 1 GENERAL

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End of Section

SECTION 21 13 01
FIRE SUPPRESSION FOR – COMMUNICATIONS

PART 1 GENERAL

1.01 REFERENCES

A. See Section 27 11 00 – Communications Equipment Room Fittings

End of Section

26 00 00 DIVISION 26 – ELECTRICAL

26 33 53.01 – Static Uninterruptable Power Supply for - Communications

SECTION 27 00 00
COMMUNICATIONS GENERAL

PART 1 GENERAL

1.01 PURPOSE

A. This specification is intended to define the standards, criteria and assumptions to be used in the design, documentation, and specification of a network infrastructure to support NMSU communications. This specification shall form the basis for the design.
B. This specification is based on the NFPA 70 (NEC), IEEE C2 (NESC), ANSI/TIA/EIA Telecommunication Standards, and BICSI (TDMM and CO-OSP). The requirements within those documents are not superseded by this document unless specifically stated. As required, NEC and NESC code requirements cannot be superseded by this document at any time. ANSI/TIA/EIA standards and BICSI methodologies may be superseded, as specified, or be made stricter by this document. Not all codes, standards and methodologies are specifically addressed by this document. The absence of an specific reference to an element of these codes, standards and methodologies does not relinquish the compliance with those elements.

C. Unauthorized deviations from this specification may require re-design, re-construction, or re-installation of ISP/OSP elements at the Designer’s/Contractor’s expense. Designer and Contractors shall get prior approval to deviate from this specification or from the ANSI/TIA/EIA standards and BICSI methodologies. Contractors cannot deviate from NEC and NESC requirements.

D. “Codes” refer to the NFPA 70 (National Electrical Code) and IEEE C2 (National Electric Safety Code). “Standards” refer to ANSI, ASTM, and UL standards. “Methodologies” refers to BICSI manuals for telecommunication s design and CO-OSP. “Specification” refers to NMSU Standards of design for Communication Cable Plant Design and Construction Specification. This is stated for clarification and not as all-inclusive definitions.

E. Like standards and codes the document uses the word “shall” to indicate mandatory requirements and “may” or “should to indicate optional components. Conflicts within this document are to be resolved by NMSU ICT – Network Engineering Services prior to application of the specification by a Contractor.

1.02 DEFINITIONS

A. Cable Plant Infrastructure Elements

1. Information Transport System: Any copper, optical or wireless whose purpose is to move any type of information. This may include data, video, voice, fire alarm, security, access control, and other low voltage networks. The Information Transport System is not limited to NMSU owned cabling, but includes copper, fiber and wireless, and equipment owned by outside providers carrying NMSU information. Pathways are not limited by NMSU ownership, but include those owned by the city of Las Cruces and other third parties. The Information Transport System may be referred to as “the network” within this document. Elements of the Information Transport System. To be handled uniquely within the overall Information Transport System will be specifically addressed (e.g. fire alarm cabling and building automation). This term replaces the telecommunication network in any code, standard, or methodology.

2. Inside Cable Plant: That part of the Information Transport System running within a building. This document does not apply to inside Cable Plant elements passing through any element of the outside cable plant pathway. It includes the workstation outlet assembly, cabling to the workstation from the network rooms, backbone cabling within a building,
backbone cabling running between physically contiguous buildings that does not pass through Outside Cable Plant elements, network racks and hardware (router, switches, firewalls, etc), patch panels, any punch blocks not terminating cable from outside the building, fiber distribution panels not terminating optical fiber from outside the building, patch cords, and cross-connect wires/cables. The Inside Cable Plant will be referred to as “ISP” within this document. The ISP is managed by NMS-ICT.

3. Outside Cable Plant: That part of the Information Transport System running between buildings, from a building to a definable exterior point, between definable exterior points, or from a non-NMSU source to a NMSU building or definable exterior point. It includes the termination hardware at both ends of the cable, including protection modules, telecommunication punch blocks, fiber distribution panels, interior splices for outside to inside optical fiber transition, and any other initial device into which an outside cable attaches. The Outside Cable Plant does not include backbone cable running between physically contiguous buildings unless the cabling enters and OSP pathway element (e.g. OSP conduit, maintenance holes, etc). The Outside Cable Plant includes underground cabling and aerial cabling. The Outside Cabling Plant may be referred to as “OSP” within this document and the phrase and abbreviation are used interchangeably. The Communications OSP at NMSU is managed by NMSU-ICT.

1.03 DESIGN REQUIREMENTS

A. Major building renovations should include improvement to the building network infrastructure. When needed to provide service to a renovated area, renovations to entrance facilities may be necessary prior to the planned renovation.

B. In many building, OSP cable is placed in violation of current codes, standards, methodologies, and specifications. Renovations of a part of a building may require correcting these violations.

End of Section

SECTION 27 05 00

OPERATION AND MAINTENANCE OF COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.01 RELATED SECTIONS

A. Section 27 01 10 – Operation and Maintenance of Structured Cabling and Enclosures
B. Section 27 01 20 – Operation and Maintenance of Data Communications
C. Section 27 01 30 – Operation and Maintenance of Voice Communications
D. Section 27 01 40 – Operation and Maintenance of Audio-Video Communications
E. Section 27 01 50 – Operation and Maintenance of Distributed Communications and Monitoring

1.02 DEFINITIONS

A. See Section 27 00 00 – Communications General

1.03 SYSTEM DESCRIPTION

A. Data Communications
B. Voice Communications
C. Audio-Visual Communications
D. CCTV Communications

PART 2 PRODUCTS

UNDER DEVELOPMENT

PART 3 EXECUTION

UNDER DEVELOPMENT

End of Section

SECTION 27 05 00

COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 GENERAL

UNDER DEVELOPMENT

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

1.03 DEFINITIONS

1.04 QUALITY ASSURANCE

1.05 PROJECT MANAGEMENT

1.06 PROJECT CONDITIONS

PART 2 PRODUCTS

NOT APPLICABLE

PART 3 EXECUTION

NOT APPLICABLE
SECTION 27 05 01

MINOR COMMUNICATIONS DEMOLITION

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Verify that abandoned wiring and equipment serve only abandoned facilities. Beginning of demolition means contractor accepts existing conditions.
B. Coordinate utility service outages with NMSU.
C. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Obtain permission from NMSU–ICT at least 2 weeks before partially or completely disabling system.
D. Existing Data Network System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage.
   1. Obtain permission from NMSU-ICT/NOC at least 2 weeks before partially or completely disabling system.
E. Existing Fire Alarm System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage.
   1. Obtain permission from NMSU-ICT at least 2 weeks before partially or completely disabling system.
F. Existing Video System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage.
   1. Obtain permission from NMSU-ICT at least 2 weeks before partially or completely disabling system.
G. Remove, relocate, and extend existing installations to accommodate new construction.
H. Remove abandoned wiring to source of supply.
I. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors and patch surfaces.
J. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing then is abandoned and removed. Provide blank cover for abandoned outlet(s) which are not removed.
K. Repair adjacent construction and finishes damaged during demolition and extension work.
L. Dispose of all hazardous material in accordance with federal, state/district, and local requirements.

End of Section

SECTION 27 05 13
COMMUNICATION SERVICES

PART 1 GENERAL
1.01 SYSTEM DESCRIPTION
   A. All WAN services are provided by NMSU-ICT.

1.02 DESIGN REQUIREMENTS

End of Section

SECTION 27 05 13.13
DIALTONE SERVICES

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS
   A. Designers shall note dial tone services are provided by NMSU via Aastra Telephony Switch System for NMSU Main Campus.
   B. Designers shall coordinate with NMSU ICT for all dial tone services which are not located on Main Campus.

End of Section

SECTION 27 05 13.23
T1 SERVICES

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS
   A. Designers shall note T-1 services are provided by NMSU-ICT and local Service Providers.
   B. Designers shall coordinate with NMSU ICT for all T1 services.

End of Section
SECTION 27 05 13.33

DSL SERVICES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall note in all specifications DSL services are provided by NMSU ICT on Main Campus.
B. Designers shall coordinate with NMSU ICT for all DSL services which are not located on Main Campus.

End of Section

SECTION 27 05 13.43

CABLE SERVICES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall coordinate with NMSU ICT for Campus Cable Services.

End of Section

SECTION 27 05 13.53

SATELLITE SERVICES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall coordinate with NMSU ICT for Satellite Services.

End of Section

SECTION 27 05 26

GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.01 RELATED SECTIONS

A. Section 33 82 43 Grounding and Bonding for Communications Distribution (OSP).
1.02 DESIGN REQUIREMENTS
A. Establishing a suitable network grounding system is critical in grounding network equipment. A network ground is always required. Refer to ANSI-J-STD-607-A standard.

B. Any design of new cable to a building shall generate upgrades to all cable plant elements in the area to address any violations to current codes. This may include the design of lightning protectors, grounding bus bars, and bonding backbones.

C. The telecommunications grounding system shall have a single point of attachment at the main electrical grounding electrode conductor. Other attachments to the system are made (to electrical service panels, cold water pipes, etc.), but those only serve as supplemental connections and shall not be considered primary connections.

D. Bus bars
   1. The designer shall specify a TMGB at the entrance facility or the main electrical room. The designer shall specify a TGB for all other network rooms.
   2. The TMGB shall be bonded to an appropriately sized Bonding Conductor for Telecommunication (BCT) and TBB with two-hole lugs or exothermic welds. Exothermic welds are preferred for the bonds.
   3. Specify a TMGB with insulated mounting brackets.
   4. Specify a TGB with insulated mounting brackets.
   5. Specify the position of the TMGB/TGB such that it is protected from physical damage from moving equipment, foot traffic, floor cleaning, etc.

E. Conductors
   1. The designer shall size the BCT and TBB according to the current NEC publication. The TBB and BCT shall be the same size cable.
   2. The designer shall size and specify the TBB as a continuous cable from the TMGB to the farthest network room. The designer shall specify the use of pigtails to connect TGBs to the TBB. Pigtails shall attach to the TBB with irreversible compression connector (H-tap) or exothermic weld. The designer will specify that the TBB is not to be cut, with both ends bonded directly to the bus bar. The end of the TBB farthest from the TMGB may be bonded directly to the TGB.
   3. Network bonding relies on short direct paths that have minimum resistive and inductive impedance. Designers shall specify the following:
      1. Bonding conductors shall be routed with minimum bends or changes in direction.
      2. Bonding connections shall be made directly to the points being bonded.
      3. Unnecessary connections or splices in bonding conductors shall be avoided, but when necessary, use an approved connection and position it in an accessible location.
   4. Bus bars may be bonded to structural steel as a telecommunications bonding backbone. Steel within buildings is not necessarily structural steel and, therefore, properly bonded to the building ground. Impedance testing shall be required to
confirm potential steel within entrance facilities and network rooms as being properly grounded and available for use as a grounding conductor.

5. Structural steel, used as lightning down-conductors, shall not be used as a TBB.

6. Where possible, design a conductor from the Entrance Facility bus bar to structural steel within the same room or one within close proximity. Bonds to structural steel shall be exothermic welds. Vertical structural steel used as lightning down-conductors shall not be bonded to the telecommunications bonding system. In this instance, other structural steel (e.g. horizontal members) may be bonded to the Entrance Facility bus bar.

7. The designer shall specify grounding equalizer as required by BICSI methodologies for multiple TBBs.

F. Bonding

1. The designer shall specify bonding all telecommunications bus bars to any electrical service panel, structural steel, and cold water pipes within the network room or entrance facility.

2. Specify all necessary grounding hardware to properly ground the equipment in the network room per codes, standards, methodologies, and specifications.

3. Self-tapping screws, or any other type of screw, shall not be specified to form bonds or attach grounding hardware. All specified bonds shall be irreversible compression connectors exothermic welds, or bolts.

4. Specify the bonding of the Entrance Facility bus bar to an appropriately sized TBB with a two-hole lug or an exothermic weld.

PART 2 PRODUCTS

2.01 MATERIALS

A. Bus bars

1. Chatsworth Grounding Bus bar, 12” TMGB (40153-012) for small network rooms.


3. Harger TMGB kit, 12” (GBI14412TMGB) for small rooms.

4. Harger TMGB kit, 20” (GBI14420TMGB).

5. Harger TMGB kit, 24” (GBI14424TMGB).

B. Conductors

1. Bare copper conductor, stranded.

2. Insulated copper conducted, insulated, green with yellow stripe, stranded or solid.

C. Exothermic Welds

1. Erico Cadweld products.

2. Continental Industries, Thermoweld products.

D. Connectors

1. Two-lug connectors UL-listed, irreversible compression.


3. Exothermic weld connectors, UL-listed.
E. Stand-off Insulators
   1. Chatsworth
   2. Harger
F. Other materials as needed to form a complete grounding system.

PART 3 EXECUTION
3.01 INSTALLATION
   UNDER DEVELOPMENT

End of Section

SECTION 27 05 28
PATHWAYS FOR COMMUNICATION SYSTEMS

PART 1 GENERAL

1.01 REFERENCES
   A. See current BICSI TDMM, Chapter 4 Horizontal Distribution Systems.

1.02 DESIGN REQUIREMENTS
   A. Communications cable shall be pulled through a combination of open space, conduits, and cable trays. These conduits and cable trays shall be used to route cabling between the building Network rooms and to each work area location. The pathway shall be designed to provide the capacity to properly install high performance UTP and Fiber Optic cabling for present and future use.

   B. In most cases, cabling shall be installed within building provided conduit and cable tray. In instances where conduit or cable tray is not used, it is imperative that all new cable be installed be appropriately supported so that no cable rests directly on ceiling tile, mechanical ductwork, or other structures. Cables shall be neatly routed and bundled above the drop ceilings in bundles containing fifty(50) cables or less, and be properly supported to minimize pair distortion. The use of cable tray is most desired. High performance sling-type supports may be used for adds/moves/changes or low cable count pathways. High performance J-hook supports may be used for 8 or fewer cables.

   C. The support wire and rods for the suspended ceilings shall not be used for cabling support. Cables shall not be laid directly on ceiling tiles or rails. Cables placed in hangers in the ceiling area shall be a minimum of 6 inches away from light fixtures, ventilation ducts, sprinkler system or plumbing piping, motors or any other electrical devices. The cable shall not be run in parallel with any high voltage electrical wiring. The maximum separation between support points for all cabling shall be five (5) feet.
D. All cable pathway material elements shall be certified by the manufacturer for a high performance twisted pair installation, when applicable. In all cases, support products shall be approved for the support of Category 6 or higher cables, including optical fiber.

E. When existing sleeves between floors are not adequate, design for a core and sleeve. Specify sealing the new holes as required.

F. Specify a nylon pull string in all cable trays, conduits, inner-ducts, raceways, and sleeves. Secure the pull string in a neat professional manner within outlet boxes and raceways.

G. Specify the necessary hardware to ensure the minimal bend radius as cables enter/exit conduits, sleeves, and cable trays. Specify bushings for all stub-out conduits, sleeves, etc. as necessary. Sharp edges and points are to be avoided on all pathway elements, including “all-thread” support rods.

H. Electrical non-metallic tubing (inner duct or “smurf tube”) shall only be used in hard ceiling areas.

I. Designers and Contractors shall use specified AMP NetConnect UTP cable for pathway sizing (e.g. Category 6, CMP, O.D. 0.230 inches).

End of Section

SECTION 27 05 28.01

UNDERCARPET CABLES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The use of under carpet cable should only be used as a last resort. The use of furniture poles and poke-thrus should be considered before designing an under carpet system.

B. Any under carpet cable installed will necessitate the use of AMP hardware. Special attention shall be given to cable placement with respect to under carpet electrical cables, if used, and to primary traffic patterns.

C. Use AMP Under Carpet Cabling System Layout and Planning Manual. All parts will be AMP NetConnect.

End of Section

SECTION 27 05 28.02

SYSTEMS FURNITURE
PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Communication cables in modular furniture must be routed in internal pathways dedicated to communication cables.

B. Design all modular furniture pathways to support a maximum of 50% cable fill. Designers shall consider this value at the tightest point in the pathway. The designer shall consider the projection of modular outlets into the raceway space and their impact on the overall raceway cross-section.

C. Modular furniture may be cabled from consolidation points or MUTOAs. Modular furniture may be cabled directly to Network Rooms. Where the installation of modular furniture is intended to be long-range installation, the designer should cable all work areas directly to the network rooms.

D. Surface mount raceways installed beneath the work surface may be used.

E. All modular furniture specified by the designer shall allow the use of AMP faceplates and AMP “SL Series” inserts.

End of Section

SECTION 27 05 28.10

CONDUITS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Design all enclosed pathways to support a maximum of 50% cable fill.

B. A minimum of three (3) 4” EMT sleeves shall be specified between stacked communications rooms. Sleeves shall extend 1 - 3” above and below the floor and be no farther than 4” from the wall. In a larger building, follow BICSI guidelines (40,000 sq. ft. rule) for additional penetrations based on total square footage serviced.

C. Non-stacked network rooms, conduits shall be designed with sweeping radii having no more than two (2) 90 degree bends between pull points. The inside radius of the conduit bends shall never be less than 10 times the internal diameter of the conduit. Pull boxes cannot be used in place of a 90 degree bend.

D. Conduits used as stub-outs shall be sized and installed to accommodate six (6) Category 6 UTP cables.

E. Cables in mechanical spaces or lab environments requiring more stringent physical protection of cables shall be run in conduit.

F. All empty conduits shall be specified with pull string (200lbs. or equivalent).

G. All conduits shall be fire stopped.
H. The use of condulets (e.g. LBs) is prohibited.
I. A minimum of one (1) 4” conduit is required between network rooms on the same floor of a building. If cable tray or other support structure connects the two rooms, a dedicated conduit is not required.
J. Flexible metallic tubing (“Greenfield”) shall not be used within the horizontal cable system.
K. OSP cables shall be installed within rigid metallic conduit or intermediate metal conduit over the entire pathway, if extending 50 feet or more from the Entrance Facility.
L. OSP cable shall not be run in electrical metallic tubing (EMT), unless the total length of the cable within the building is below 50 feet and the conduit is used for mechanical protection or as a sleeve between the floor with the entrance point and the next floor in either direction.
M. Minimum conduit size for work area outlets is 1 inch unless otherwise specified.
N. All conduits shall be reamed free of burrs and bushed.

SECTION 27 05 28.11
SURFACE METALLIC RACEWAYS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The Designer shall use raceway systems available in multiple sizes with all of the required components such as, raceways, high performance twisted pair rated fittings (tees and elbows) and junction boxes. All raceway used shall be compatible with AMP Ivory colored faceplates and SL inserts.
B. The use of dual channel raceway (power and communications) is allowed. All products shall be UL-Listed for their application. Proper connectors and fittings shall be specified to ensure separation of utilities.
C. Adhesive backing is not the preferred method of attachment and should only be used when fasteners cannot be used.
D. Surface mount boxes shall be available in single or dual gang configurations. Boxes shall be UL-Listed and match the color of the faceplates and raceway. The faceplate shall attach directly to the surface mount box without requiring the use of any adapters.
E. All surface-mount raceways shall be designed to maintain required copper and fiber bend radii. All surface-mount raceways shall anticipate the future installation of up to four (4) UTP cables and/or 2-strand optical fiber cable per work area outlet location. Raceways must be sized accordingly and include the use of fiber-ready corners.
F. Designers and Contractors shall not exceed 50% cable fill.

End of Section
SECTION 27 05 28.12
SURFACE NONMETALLIC RACEWAYS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The Designer shall use raceway systems available in multiple sizes with all of the required components such as, raceways, high performance twisted pair rated fittings (tees and elbows) and junction boxes. All raceway used shall be compatible with AMP Ivory colored faceplates and SL inserts.

B. The use of dual channel raceway (power and communications) is allowed. All products shall be UL-Listed for their application. Proper connectors and fittings shall be specified to ensure separation of utilities.

C. Adhesive backing is not the preferred method of attachment and should only be used when fasteners cannot be used.

D. Surface mount boxes shall be available in single or dual gang configurations. Boxes shall be UL-Listed and match the color of the faceplates and raceway. The faceplate shall attach directly to the surface mount box without requiring the use of any adapters.

E. All surface-mount raceways shall be designed to maintain required copper and fiber bend radii. All surface-mount raceways shall anticipate the future installation of up to four (4) UTP cables and/or 2-strand optical fiber cable per work area outlet location. Raceways must be sized accordingly and include the use of fiber-ready corners.

F. Designers and Contractors shall not exceed 50% cable fill.

End of Section

SECTION 27 05 28.13
COMMUNICATIONS SYSTEMS FURNITURE POLES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Utility poles shall be approved for power and communications cabling, with separate pathways. Architectural columns should be considered in place of standard utility poles.

B. Utility poles shall have pre-manufactured knock-outs for work area outlets. Work area outlets shall be installed flush or with minimal profile. Surface-mount boxes shall not be used on utility poles.

C. All utility poles shall be compatible with AMP faceplates and/or SL Series inserts.
PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Cable tray shall be single tiered and shall be installed to allow 12 inches of open space above and to one side of the tray along the entire length. Cable tray shall be installed a minimum of 6 inches from any source of EMI. Actual dimensions of cable tray shall be determined by the volume of cable planned for installation at the time of construction and account for future growth. The cable tray shall not be filled more than 50% of its capacity. Cable tray shall extend into the communications room 6 inches and its lowest point shall not be less than 8 foot 6 inches.

B. Cable tray shall only be installed in corridors, hallways, and communication rooms and not above offices, conference rooms, restroom, etc. Cable tray shall not have any vertical obstructions (e.g. wall studs, pipes) passing through the cable tray.

C. A minimum of two (2) 4” inch conduits shall be used in place of a cable tray when installation involves passing over inaccessible ceilings or passing through fire rated barriers. Additional conduits may be required as cable tray volume dictates.

D. Specify appropriate manufacturer hardware and parts to attach the tray to permanent building structure (concrete column or deck, structural steel, or other immovable structures capable of supporting the cable tray.)

E. Continuous support elements shall be bonded to ground to TMGB/TGB with a ground wire. Sections may be bolted together or tied together with grounding jumpers, if the support structure is approved by the manufacturer as a grounding conductor.

End of Section

End of Section

SECTION 27 05 28.15

HORIZONTAL COMMUNICATIONS BOXES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Outlet Boxes
   1. The designer shall specify oversize (4-11/16”h x 4-11/16” w x 2-1/2” d) outlet boxes for work area outlet boxes with a single gang raised cover. Work area outlet boxes with cable counts exceeding six (6) cables shall use a double gang raised cover. No work area outlet box will contain more that twelve (12) cables.
2. Work area outlet boxes on opposite sides of a fire-rated wall shall not share the same stud space.
3. Work area outlet box elevations shall be designed in accordance with ADA requirements.
4. All outlet boxes shall be trimmed neatly and interior shall be free of debris and dust.

B. Poke-Thrus
1. In-floor conduit systems are allowed and are preferred over poke-thru penetrations, especially for work areas in spaces without utility poles.
2. The use of poke-thrus shall be limited as much as possible. Where necessary, UL-tested, pre-fire stopped products shall be used. All poke-thru devices shall be compatible with AMP SL Series inserts.

C. Floor Boxes
1. Floor Boxes shall be sized to accommodate up to 6 UTP cables. It is likely AC power will be required in these boxes as well. The Designer shall specify a box that can house communications cable in openings designed for communications outlets. Communication outlet openings shall be compatible with AMP SL Series inserts and faceplates.

D. Pull and Junction Boxes
1. Design pull boxes as necessary. Pull boxes are not to be used to change direction of a conduit or cable run. All cables shall pass through pull boxes.
2. Pull boxes are required for long conduit runs. Place pull boxes every 98 feet (30 meters) or less and after two (2) 90 degree bends or 180 degrees of total bend.
3. Size pull boxes according to BICSI methodologies.

End of Section

SECTION 27 05 28.16
UNDERFLOOR DUCTS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall specify under floor ducts using manufacturers design manual. All ducts shall be steel duct with corrosion-resistant finish. Multi-level ducts system shall be specified if multiple utilities are being installed. Design shall not exceed 50% fill ratio of under floor duct system. Use tightest point to calculate fill ratio.
B. All under floor duct systems shall be compatible with AMP SL Series faceplates and inserts.
C. All ducts and junction boxes shall be leveled and with gasketed covers to prevent water and dust penetration.
D. All under floor duct systems shall be grounded and bonded under provisions of the NEC.

End of Section

SECTION 27 05 28.29
HANGERS AND SUPPORTS FOR COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The Designer may specify the use of single-style hangers, provided they have metal components to hold the sling closed and to secure the sling to the support structure. All plastic supports are not acceptable.
B. Designs slings to be spaced at 4 foot to 5 foot intervals. The interval must vary in a single run to prevent a standing wave induction on the cable.
C. The Designer may specify the use of other J-hook style hangers, provided they are metal. Design supports to be spaced at 4 foot to 5 foot intervals.
D. Specify appropriate hardware and parts to attach the supports to the permanent building structure (concrete columns or deck, structural steel, or other immovable structures capable of supporting the cable supports). Parts shall be specifically designed and where possible UL-Listed for their final installed configuration.
E. Design for eight (8) or fewer cables to be supported with J-hooks. Support more than eight (8) Category 6 cables with slings or tray.
F. Specify cable supports above concealed ceilings using a rigid support to a structural element, or by attaching directly to a structural element.
G. Specify all J-hooks to use manufacturer provided bars to “close” J-hooks and not use cable ties.

End of Section

SECTION 27 05 43
UNDERGROUND DUCTS AND RACEWAYS FOR COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS
A. New construction or other circumstances may require the relocation of existing OSP elements. Relocation of OSP elements requires improving those elements to meet current codes, standards, methods, and specifications.

B. During the relocation of OSP elements, services provided by or through the elements shall be minimally impacted. Service outages are to be minimal and during off-hours. Extra effort may be required to accommodate the serviced users (e.g. using half-taps on a replacement voice backbone cable). All service outages must be pre-approved by NMSU-ICT personnel.

C. The location of pathways shall be coordinated with NMSU-ICT early in the design process. Pathways should anticipate future campus growth with respect to placement and sizing. Pathways are likely to be oversized for a given project where the pathway is in a growth area or may have a foreseeable future use.

D. Where possible, new conduits installed along the same pathway as an existing pathway shall be installed as part of the existing duct bank. This physical arrangement minimizes the campus area occupied by network duct banks. Designers may design intercepting and accessing these existing pathway elements. Designers may expose the existing duct bank and use its vertical side to frame the space for the new conduits.

E. Security devices (alarms, sensors, cameras, etc) may require dedicated cabling to specific, non-standard locations. These devices will be designed as required and may run independent of other pathways and requirements of this document. NMSU-ICT, NMSU PD, NMSU FD and OFS shall approve all pathway designs involving security or life-safety cabling.

F. Underground Pathways

1. Underground conduit structures are pathways used for placing communications cable between access point such as HHS, HBs and building entrances. Cable pathways shall be underground unless approved by NMSU-ICT. Special pathways may require concrete-encased conduit or with the installation of a concrete cap.

2. The conduits and fittings shall be 4” ID PVC SCH 40. The conduits shall have bell ends and shall be joined with the appropriate adhesive for this type of conduit providing a permanent and watertight seal.

3. All buildings shall have a minimum of two (2) 4 inch conduits installed accessing the entrance facility. One (1) conduit shall have three (3) 1-1/4” inner-ducts installed with 3/8” or greater polyester Mule tape pull string.

4. Additional building conduits may be specified by NMSU-ICT for anticipated future growth or redundancy.

5. All underground conduit structures shall be installed with clearances required by the NESC.

6. Underground pathways shall be designed for minimal depth of 30 inches to the top of the pathway elements, where possible. Deviations from this shall be pre-approved by NMSU-ICT. Pathways may gradually slope up to enter HBs or HHS.
7. Design underground conduit elevations so that a slope exists at all points of the run to allow drainage. A drain slope towards the HB or HH of no less than one percent grade is desirable.

8. Refer to the current BICSI CO-OSP manual for conduit bend radii. Curved sections shall be pre-manufactured. Curved segments shall have a minimum of 15 foot radii. Sweeps to enter utility tunnels may be less. Any sweep below 15 foot radius shall be pre-approved by NMSU-ICT.

9. Match sod and/or landscape of the same origin as the surrounding area.

10. Horizontal conduits shall end flush with the interior surface of the wall. Vertical conduit ending shall be designed such that they extend a minimum of 4” above the finished floor. Cut the conduits square with the conduit. Bushings shall be installed on conduit ends.

11. Provide #10 AWG copper, green insulated tracer wire for all underground conduit pathways.

G. Existing Duct banks
1. Designers may use conduits and/or inner-ducts within existing duct banks as directed by NMSU-ICT.
2. When designing optical fiber in a 4” conduit without existing inner duct or cable, design for three (3) 1 1/4” OD inner-ducts, orange.
3. Designers shall specify ribbed inner duct.
4. Specify 3/8” Mule tape in all inner-ducts.
5. Seal used conduits with a non-hardening, removable sealant. Expanding foam products designed specifically for duct sealing may be used on conduits considered to be at capacity by NMSU-ICT.

H. Tunnels
1. As a pathway, the tunnels are available for use from building with existing tunnel access. The tunnel shall not be penetrated by minor pathways. Major pathways may penetrate the tunnel when designed to maintain the integrity of the tunnel structure.
2. Designers may need to address past poor practices within the tunnels in order to use them. This could involve the installation of support mechanisms for new cabling and existing cabling in the same area.
3. When selecting products for installation, the designer should ensure products meet requirements to ensure protection of the network cable plant.

I. Direct Buried
1. Direct-buried pathways shall not be used. All pathways shall include the use of conduit.

End of Section
UTILITY POLES FOR COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. See Section 33 81 19 for design requirements.

End of Section

SECTION 27 05 53
IDENTIFICATION FOR - COMMUNICATIONS SYSTEMS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Future NMSU standard.

End of Section

SECTION 27 06 00
SCHEDULES FOR COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. All schedules for communications shall be coordinated with the appropriate NMSU-ICT personnel.

End of Section

SECTION 27 06 10
SECTION SCHEDULES FOR STRUCTURED CABLING ENCLOSURES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall coordinate with NMSU ICT. NMSU ICT will specify and provide enclosures according to project.
SECTION 27 06 20
SCHEDULES FOR DATA COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall coordinate with NMSU ICT. NMSU ICT will specify and provide according to project.

End of Section

SECTION 27 06 30
SCHEDULES FOR VOICE COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall coordinate with NMSU ICT. NMSU ICT will provide features and upgrades to the system as necessary.

End of Section

SECTION 27 06 40
SCHEDULES FOR AUDIO-VIDEO COMMUNICATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall coordinate with NMSU ICT. NMSU ICT will specify and provide according to project.

End of Section

SECTION 27 06 50
SCHEDULES FOR DISTRIBUTED COMMUNICATIONS AND MONITORING

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS

A. Designers shall coordinate with NMSU ICT. NMSU ICT will specify and provide according to project.

1.02 SYSTEM DESCRIPTION

A. Auto back scheduled for phone system to execute every evening.

End of Section

SECTION 27 08 00
COMMISSIONING OF COMMUNICATIONS

PART 1 GENERAL
UNDER DEVELOPMENT

PART 2 PRODUCTS
UNDER DEVELOPMENT

PART 3 EXECUTION
UNDER DEVELOPMENT

End of Section

SECTION 27 10 00
STRUCTURED CABLES

PART 1 GENERAL

1.01 DEFINITIONS

A. Building Distributor (BD): A room from which intra-building backbone cables distribute to floor distributors. May also be a floor distributor (FD) if horizontal cables terminate within. May also be an equipment room (ER) if PBX or core network electronics are present.

B. Building: All structures that include an OSP element that are not defined as spaces. These may include structures not normally occupied, such as storage a shed and athletic fields.

C. Entrance Facility (EF): A room into which inter-locking backbone cables enter. Cables may or may not terminate in this room. Most often, an EF is the BD.

D. Equipment Room (ER): A room containing voice and data electronics. Reserved for rooms with enough electronics to impact space and cooling requirements (rooms with PBX hardware or core network electronics).

E. Floor Distributor (FD): A room into which horizontal cable terminates. May be any of the above rooms as well. An FD with minimal switches to support the horizontal cables only is usually not considered and equipment room.

F. Network Room (NR): A generic term for any of the above terms. The preferred term, unless a more specific term is needed to better define specific requirements for the room.
SECTION 27 11 00

COMMUNICATIONS EQUIPMENT ROOM FITTINGS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Network Room sizing shall be based on BICSI “Size guidelines” chart. (e.g. 5000 sq ft room will be 10ft X 8ft, 5000sq ft to 8000sq ft room will be 10ft X 9ft, >8000sq ft room will be 10ft X 11ft). In all cases any building >5000sq ft shall have a minimum Network Room size of 10ft X 8 ft. Buildings <5000sq ft can use BICSI specified shallow rooms. Buildings < 1000sq ft can use cabinets. Use of shallow rooms or cabinets will be considered and approved by NMSU-ICT.

B. Network Rooms shall be provided on each floor. All Network Rooms shall be stacked vertically.

C. Each Network Room shall have all walls covered with ¾” AC grade or better, void free plywood with the grade A surface exposed. Plywood shall be mounted securely to wall from finished floor to a height of 8’. Plywood will have two (2) coats of fire intumescent paint, color white.

D. Each Network Room shall have a minimum of three (2) dedicated 120V-20AMP quad outlets installed on separate walls, 18” above finished floor. It would be preferred that these outlets be split between two or more load centers. One (1) duplex 120V-15AMP convenience outlet shall be installed near room entrance.

E. If fire protection is provided sprinkler heads shall have wire cages installed and troughs to prevent accidental discharge and prevent accidental operation.

F. Equipment not related to the support of the Network Room such as piping, duct work, and power shall not be located in or pass through the Network Room.

G. In cases where cable runs will exceed 90 meters a second Network Room shall be installed.

H. Network Rooms shall be entered through common space and not be a pass through to another room.

I. Shared use of Network Rooms is not allowed.

J. Network Rooms shall have independent cooling provided with thermostat located within the room. Cooling calculations (BTUs) will be provided to Designer when cable counts are completed. Cooling units will be installed so that no condensate will drip on equipment or cables.

K. Network Rooms shall have a minimum ceiling height of 10 feet above finished floor. Under no circumstances shall a drop ceiling be installed.

L. Light Fixtures, fan control units, etc shall not be installed below 8 foot 6 inches.

M. Lighting switch must be located inside Network Room next to entrance.
N. Network Room installation of ladder rack, racks, UPSs, patch panels, wire management, cable termination, active equipment, power strips punch down blocks, and equipment grounding shall be completed by NMSU-ICT personnel.

O. Installation of zone cabinets shall be done according to manufactures recommendations and be sized for 50% capacity when project is completed.

End of Section

SECTION 27 11 13
COMMUNICATIONS ENTRANCE PROTECTION

PART 1 GENERAL

1.01 INSTALLATION

A. Communication entrance protection provided and installed by NMSU-ICT.

PART 2 PRODUCTS

2.01 MATERIALS

A. Entrance protection; Porta 25 pair in and out module protection.

SECTION 27 11 16
COMMUNICATIONS CABINETS, RACK, FRAMES, AND ENCLOSURES

PART 1 GENERAL

1.01 INSTALLATION

A. Communications cabinets, racks, frames, and enclosures provided and installed by NMSU-ICT.

End of Section

SECTION 27 11 19
COMMUNICATIONS TERMINATION BLOCKS AND PATCH PANELS

PART 1 GENERAL

1.01 INSTALLATION
A. Communications termination blocks and patch panels provided and installed by NMSU-ICT.

PART 2 MATERIALS
A. Siemon 66m termination block for Category 3 use, related to telephone cable.

End of Section

SECTION 27 11 23
COMMUNICATIONS CABLE MANAGEMENT AND LADDER RACK

PART 1 GENERAL

1.01 INSTALLATION
A. Communications cable management and ladder rack within network rooms will be provided and installed by NMSU-ICT.

End of Section

SECTION 27 11 26
COMMUNICATIONS RACK MOUNT POWER PROTECTION AND POWER STRIPS

PART 1 GENERAL

1.01 INSTALLATION
A. Communications rack mount power and power strips provided and installed by NMSU-ICT.

End of Section

SECTION 27 13 00
COMMUNICATIONS BACKBONE CABLING

PART 1 GENERAL

UNDER DEVELOPMENT

PART 2 PRODUCTS

UNDER DEVELOPMENT

PART 3 EXECUTION

UNDER DEVELOPMENT
SECTION 27 13 13

COMMUNICATIONS COPPER BACKBONE CABLING

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The Information Transport System backbone cabling system shall be designed to conform to the requirements if ANSI/EIA/TIA-568-B. In conformance with this standard, the cabling system shall be designed in a hierarchical start topology.

B. Copper cables from BETs to termination wall fields are considered intra-building backbone cables.

C. Copper backbone cables shall be Category 3 multi-pair copper cable, 24 AWG riser-rated. This non-plenum cable shall consist of solid copper conductors insulated with expanded polyethylene covered by a PVC skin, be conformance tested to meet EIA/TIA 568A for Category 3 cables, be UL tested and UL Listed as CMR. The sheath shall have improved frictional properties, allowing it to be pulled through conduit without the use of lubricants. The cable shall be available in 25, 50, 100, 150, 200, 300, 400, 600, 900, 1200, 1500, and 1800 pair counts.

D. For all cables specify riser or plenum rated as required. Plenum-rated cables may be used, if Network Rooms are not “stacked” and horizontal pathways between rooms are necessary and pass through plenum spaces.

E. Designers, unless otherwise specified or noted, size backbone/tie cables based on 1.5 pairs per horizontal voice cable plus 20 percent spare. Round up to next available pair sizing when doing calculations.

F. Designers shall specify cable will be “Owner Provided Contractor Installed Terminations by NMSU Personnel.”

G. Designers shall specify 25 ft of slack on each end.

PART 2 MATERIALS

A. Seal Pic style cable.

B. Airecore style cable

End of Section

SECTION 27 13 13.13

COMMUNICATIONS COPPER CABLE SPLICING AND TERMINATIONS
PART 1 GENERAL

1.01 INSTALLATION

A. All copper cable splicing and terminations to be completed by NMSU-ICT.

End of Section

SECTION 27 13 23

COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The information Transport System backbone cabling system shall be designed to conform to the requirements if ANSI/EIA/TIA-568-B. In conformance with this standard, the cabling system shall be designed in a hierarchical start topology.

B. The Designer shall specify a minimum of two (2) non-plenum or plenum Corning MIC fiber optical cables to be installed by contractor. Cables shall be provided by owner for contractor installation. Cables will not exceed 5/8 inch diameter.

C. Designers shall specify 40 foot of slack at each end. Fiber optic cable shall be terminated by NMSU-ICT personnel.

End of Section

SECTION 27 13 23.13

COMMUNICATIONS OPTICAL FIBER SPLICING AND TERMINATIONS

PART 1 GENERAL

1.01 INSTALLATION

A. All splicing and terminations to be completed by NMSU-ICT personnel.

End of Section

SECTION 27 13 33

COMMUNICATIONS COAXIAL BACKBONE CABLING

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS

A. Currently, the coaxial backbone distribution system on NMSU Main campus is being phased out. Designers shall not anticipate using this infrastructure.

B. Designers shall use the inter-building and intra-building fiber optic backbone distribution as the new coaxial distribution system.

C. All coaxial hardware, (i.e. splitters, amplifiers, etc) shall be installed in Network Rooms.

End of Section

SECTION 27 13 33.13
COMMUNICATIONS COAXIAL SPICING AND TERMINATIONS

PART 1 GENERAL

1.01 INSTALLATION

A. All coaxial cable splicing and terminations to be completed by NMSU-ICT.

End of Section

SECTION 27 15 00
COMMUNICATIONS HORIZONTAL CABLEING

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designers shall specify that all cable used for data and voice cables are “Owner Provided Contractor Installed Terminations by NMSU Personnel.”

B. For all cables, the Designers shall specify riser or plenum rated as required. The contractor shall install the appropriate cable type, plenum or non-plenum for the given environment. For a mixed environment, the Designer can specify plenum cable entirely to simplify the installation.

C. Horizontal cable shall be installed in a star topology. Each WAO shall be cabled directly to a floor distributor. The horizontal cable shall be pulled to a room on the same floor as the WAO. Exceptions may be made for certain areas. Cables that must be routed through floors (poke-thrus, conduits, floor boxes, etc) and utilize ceiling space on the level below may be routed to the Network Room on the lower floor. This is a deviation from BICSI methodologies.

D. All WAO cable installation shall be in strict accordance with the methodologies contained in the latest BICSI Telecommunications Methods Manual, unless specifically noted by this document.
or other NMSU documentation specific to the project. This includes, but is not limited to cable attachments, fire stopping, cable routing, pulling tension, and EMI protection methods.

E. All cables shall be installed by the contractor and be labeled uniquely at each end.

F. All cables shall have 18 inches of slack at the WAO and 20 feet of slack at the Network Room.

G. All cables shall be one continuous piece without splices.

H. All cables shall not exceed 295 feet (90 meters) between the WAO and Network Room.

I. During renovations or MAC work, cables shall be installed within existing conduit, wire-ways or spaces when possible, and terminate at WAO locations. While the pathways should be re-used where possible, cabling components with the exception of faceplates shall be new. Existing faceplates with sufficient room for additional cable may be used.

J. Data and voice cables shall be defined by color and consistent throughout the building. Standard data cables shall be blue, white and yellow. Standard voice cables shall be white. Security and life safety cables shall be red or placed in red conduit.

K. It is the responsibility of the Designer to determine before the design submission if plenum rated (CMP, MPP) cable is required for any part of this installation. Specify cables rated for plenum as riser use as required by the NEC.

L. Designer shall specify one (1) Category 3 cable to each emergency phone location. This cable will terminate in the Network Room in keeping with other voice cables.

M. Specify placement of horizontal cables in cable trays in a random overlapping fashion. Cable ties in the cable tray shall not be used. Plastic or metal cable ties shall not be used, except to secure inner duct.

N. Specify all horizontal cable free of surface damage, kinks, twists, and visible anomalies. Any cable damaged during installation will be replaced at contractor’s expense.

O. All horizontal cables shall be installed per manufacturer instructions to ensure a certified channel solution.

End of Section

SECTION 27 15 13
COMMUNICATIONS COPPER HORIZONTAL CABELING

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. For all cables, the Designers shall specify riser or plenum rated as required. The contractor shall install the appropriate cable type, plenum or non-plenum, for the given environment. For a mixed environment, the Designer can specify plenum cable entirely to simplify the installation.

B. A typical WAO will be three (3) Category 6 and one (1) RG-6 cables.
C. All horizontal data and voice cable shall be “Owner Provided Contractor Installed Terminations by NMSU Personnel.”

End of Section

SECTION 27 15 23
COMMUNICATIONS OPTICAL FIBER HORIZONTAL CABLE

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS

A. For all cables, the Designers shall specify riser or plenum rated as required. The contractor shall install the appropriate cable type, plenum or non-plenum, for the given environment. For a mixed environment, the Designer can specify plenum cable entirely to simplify the installation.

B. Optical fiber (fiber-to-the-desktop) shall terminate in each Network Room. The Designer will use Corning MIC Riser or Plenum 2-strand fiber for all calculations. The use of LC or SC connectors and grade of fiber will be specified by NMSU-ICT.

C. Fiber to the desktop shall be “Owner Provided Contractor Installed Terminations by NMSU Personnel.”

End of Section

SECTION 27 15 33
COMMUNICATIONS COAXIAL HORIZONTAL CABLE

PART 1 GENERAL
1.01 DESIGN REQUIREMENTS

A. For all cables, the Designers shall specify riser or plenum rated as required. The Contractor shall install the appropriate cable type, plenum or non-plenum, for the given environment. For a mixed environment, the Designer can specify plenum cable entirely to simplify the installation.

B. Use Belden, part number 5339Q5, for pathway sizing calculations.

C. Horizontal cable shall not exceed 295 feet (90 meters). Installation to remote locations in excess of 90 meters may be allowed with a de-rated capacity. Such installation must be approved by NMSU-ICT.

D. The contractor shall make use of pathways and maintain clearances from EMI sources (e.g. power 6 inches, fluorescent lights 12 inches, transformers 36 inches).

E. The contractor shall not install cable in common cable hangers with speaker cables.
F. All horizontal video cable shall be “Owner Provided Contractor Installed Terminations by NMSU Personnel.”

End of Section

SECTION 27 15 43

COMMUNICATIONS WORK AREAS, FACEPLATES, AND CONNECTORS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The typical Work Area Outlet (WAO) installation in an office environment shall incorporate two (2) Category 6 8P8C cables for data and one (1) Category 3 8P6C cable for voice. Each cable shall be designated with a different colored cable (blue data 1, white data 2, white for voice).
   1. WAOs located in raceway shall not contain more than 4 cables per outlet location.
   2. WAOs in floor boxes shall not contain more than 4 cables per outlet location.
   3. WAOs with < 6 cables may use single or double gang ring.
   4. WAOs with 7 to 12 cables will require double gang ring.
   5. WAOs shall not contain more than 12 cables.
   6. Optional coaxial (RG-6) cable may be added if required.
B. WAOs for wall phone and video locations are allowed.
C. WAOs for computer only installations are allowed. Calculate 1.5 data cables per work station round up to even number (2 work station X 1.5 = 3, install 4 data cables at WAO).
D. WAO outlet boxes shall be 4” high x 4” wide x 2 ½” deep (minimum).
E. WAOs need to be located within 8 feet of work station placement. This distance can be increased if total horizontal run is less than 295 feet (90m).
F. If VOIP system being installed and additional Category 6 cable (yellow) may be installed.
G. All WAOs shall comply with ADA requirements for placement. WAOs for video only applications may be mounted higher than ADA requirements.

End of Section

SECTION 27 16 00

COMMUNICATIONS CONNECTING CORDS, DEVICES, AND ADPATERS

PART 1 GENERAL

1.01 INSTALLATION
A. All connecting cords, devices, and adapters to be installed by NMSU-ICT. The project designer shall note this in all specifications.

End of Section

SECTION 27 20 00
DATA COMMUNICATIONS

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION

A. NMSU-ICT specifies, installs, and manages the data communications network. Devices connected to NMSU-NET must be approved by the appropriate NMSU-ICT personnel. These devices include:
   1. Firewalls.
   2. Routers, CSU/DSU, Multiplexers, Codec’s, and Modems.
   4. Switches and Hubs

1.02 DESIGN REQUIREMENTS

A. Data communications design shall be performed by NMSU-ICT-NOC/NES personnel.
B. Data Communications equipment are provided by NMSU-ICT at additional project expense. The equipment shall be configured and installed by NMSU-ICT personnel. The project Designer shall note this in all specifications.

End of Section

SECTION 27 21 33
DATA COMMUNICATION WIRELESS ACCESS POINTS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. A single surface-mount or recessed box shall be specified at locations for wireless node connectivity. Each access point location shall contain two (2) data wires for connectivity. The locations may be specified on the wall below the suspended ceiling as a surface-mount box or
as a standard faceplate. Locations concealed above the ceiling shall be specified as a surface-mount box.

B. NMSU-ICT personnel will specify outlet locations during building design process.

C. Wireless access points may be enclosed in an unmarked plastic box with a screw cover. Wireless access points above drop ceilings to not need be enclosed.

D. Wireless access points may be concealed in a heated plastic box with latch cover for outdoor installations.

E. Wireless Access Points are provided by NMSU-ICT at additional expense project expense. The equipment shall be configured and installed by NMSU-ICT personnel.

End of Section

SECTION 27 30 00

VOICE COMMUNICATIONS

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION

A. NMSU ICT operates the Main Campus Aastra Telephony Switch.
B. NMSU ICT owned and operated IP voice switches.
C. Designers shall contact NMSU ICT for clarification concerning locations not on main campus. Branch locations and remote offices may have different voice communications systems. This applies to all sections and sub-sections of 31 00, 32 00, 33 00, 34 00, and 35 00.

1.02 DESIGN REQUIREMENTS

A. Items concerning Designer should note that all voice communications will be specified by NMSU ICT.

End of Section

SECTION 27 32 00

VOICE COMMUNICATIONS TELEPHONE SETS, FACSIMILES, AND MODEMS

PART 1 GENERAL

1.01 INSTALLATION

A. Telephone handsets are provided by Telecommunications at additional project expense. The designer shall note this in all specifications.
End of Section

SECTION 27 32 16
WIRELESS TRANSCEIVERS

PART 1 GENERAL

1.01 INSTALLATION

A. Wireless Transceivers provided by NMSU-ICT-TNS at additional project expense. The designer shall note this in all specifications.

End of Section

SECTION 27 32 23
ELEVATOR PHONES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designer shall specify one (1) Category 3 cable be installed between the Network room and elevator machine room for use by the elevator installers.

B. The cable shall be installed within conduit or solid raceway within the elevator machine room. The cable shall not be exposed within the room. The conduit may end up to 12 inches from the elevator equipment. Coordinate pathway installation with the elevator contractor.

C. Leave 20 foot coil of cable at the end of the pathway to be terminated by the elevator contractor. No faceplate or box need be installed at this location.

D. Label the cable where it enters the room using a hang tag on the pathway.

E. Designer shall specify elevator phone to be provided by project.

PART 2 PRODUCTS

2.01 MATERIALS


End of Section

SECTION 27 32 26
RING-DOWN EMERGENCY PHONES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Indoor Emergency Phones
   1. The cable shall be installed within conduit or solid pathway. The cable shall not be exposed beyond the primary pathway elements.

B. Outside Emergency Phones
   1. The cable shall be installed in OSP conduit per section 27 05 43 - Underground Ducts and Raceways for Communication Systems.
   2. All OSP cables to emergency phones shall terminate on a lighting protection block within the nearest building.
   3. No faceplate or box need be installed at phone locations.

C. Designer shall note that emergency phone will be provided by project.

PART 2 PRODUCTS

2.10 MATERIALS

A. GAI-Tronics Emergency Wall Mount Aluminum Phone with Auto Dial and Help Button.

End of Section
SECTION 27 32 29
FACSIMILE AND MODEMS

PART 1 GENERAL
1.01 Design Requirements
   A. Designers shall note all devices will be analog and compatible with NMSU Aastra Telephony Switch.

End of Section

SECTION 33 00
VOICE COMMUNICATIONS MESSAGING

PART 1 GENERAL
1.01 System Description
   A. Voice Mail and Auto Attendant are operated by NMSU ICT. System is VM CallExpress System.
   B. Interactive Voice Response is operated by NMSU ICT. System is Phonetic IVR.

End of Section

SECTION 34 00
CALL ACCOUNTING

PART 1 GENERAL
1.01 System Description
   A. NMSU ICT operates the Toll Fraud Equipment and Software and Telemanagement Software using the Pinnacle System.

End of Section

SECTION 27 35 00
CALL MANAGEMENT

PART 1 GENERAL
1.01 System Description

A. NMSU ICT operates the Call Management system which provides the following services using the Extend 911 System
   1. Digital Voice Announcers.
   2. Automatic Call Distributors.
   3. Call Status and Management Displays.

End of Section

SECTION 27 40 00

AUDIO – VIDEO SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

1.03 REFERENCES

1.04 SYSTEM DESCRIPTION

A. NMSU-ICT is responsible for providing audio and visual services to the NMSU community. This includes video, audio, and control wiring distribution system within and between buildings. This includes determining suitability of proposed uses, compliance with appropriate codes and standards, periodic removal and/or replacement of components and extensions or additions to the distribution system.

B. NMSU-Video Services will work with all NMSU entities to assist in the design of boardrooms, classrooms, theaters, auditoriums, conference rooms, stadiums, arenas, restaurants, and bars and shall be consulted during the project design.

C. To facilitate the provisioning of audio-video systems NMSU-ICT-Video Services shall be provided preliminary floor plans for new building and/or remodel projects. Coordination between building occupants will determine audio-video needs or requirements.

D. The preliminary plans, marked to show service locations and space requirements will be returned to OFS for inclusion in final plans.

1.05 DESIGN REQUIREMENTS

A. Lighting/Electrical
   1. Hard switches for dimmable lights should have sliders to control dimming.
   2. Dimmable fluorescent lights shall be equipped with quiet 1% dimming ballast.
   3. If zone lighting is divided into four zones: main classroom lighting (student seating area), whiteboard, projection area (lights which project on writing surface), and instructor console/podium.
4. Install duplex 110-volt AC outlet front and center of room.

B. HVAC
1. Do not locate diffusers near projection screen or writing surface; this is to avoid conflicts with the mounting of the audio-video equipment in the ceiling. Care should be taken to avoid drafts on projection screens.
2. Locate above ceiling mechanical equipment needing routine service in a location outside the classroom. This allows service without disrupting the calls.
3. Disruptive noise must be avoided. Noise related to the HVAC system must be mitigated.

C. Network and Campus Cable
1. Install WAO with 2 data cables next to power outlet front and center of room.

D. Doors/Room Security

E. Windows
should not allow outdoor light to washout screen images. Install window shades to prevent this. Window shade switch should be located next to console/podium.

F. Acoustics
1. General classrooms shall be NC 30 or less.
2. Auditorium or large lecture halls shall have a NC 25 or less.
3. Boardroom/Conference rooms shall have a NC 25 or less.
4. Individual equipment such as fans, ductwork, and diffusers shall have a rating not exceeding NC 25 throughout the load range.
5. Walls should have a minimum sound transmission class (STC) of 50. The rear wall of large classrooms, auditoriums, and lecture halls should have an acoustically absorbent finish. Side walls in large auditoriums and lecture halls should not be parallel and they should have a rough or textured surface. Noise levels should not exceed NC 25–30.

G. Closets
1. If closets are installed for portable audio-video equipment room furnish room with 110-volt duplex power outlet and lights. Room should be sized according to amount of audio-video equipment needing to be stored (typical size room is 80 square feet).

H. MEDIASITE: Audio-Visual rooms designated as a media site will have additional infrastructure requirements. Marked up prints with requirements will be returned to appropriate OFS Project Manager.
1. Data cable to each ceiling mic.
2. Two data cables for each camera.
3. Data cable for vaddio sensor.

PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION

3.01 INSTALLATION

End of Section

SECTION 27 41 13
ARCHITECTURALLY INTEGRATED AUDIO-VIDEO EQUIPMENT

PART 1 GENERAL
1.01 SECTION INCLUDES
1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS
2.01 MATERIALS

PART 3 EXECUTION
3.01 INSTALLATION

End of Section

SECTION 27 41 16
INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT

PART 1 GENERAL
1.01 SECTION INCLUDES
1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS
2.01 MATERIALS

PART 3 EXECUTION
3.01 INSTALLATION

End of Section
SECTION 41 16.25
INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT FOR RESTAURANTS AND BARS

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

1.03 REFERENCES

1.04 SYSTEM DESCRIPTION

1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION

3.01 INSTALLATION

End of Section

SECTION 27 41 16.28
INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT FOR CONFERENCE ROOMS

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

1.03 REFERENCES

1.04 SYSTEM DESCRIPTION

1.05 DESIGN REQUIREMENTS

I. Each conference room shall be connected to the appropriate network room with a standard WAO located at the instructor console and/or podium.

J. Each projector location shall have a WAO with 2 data cables.

K. Each console and/or podium location shall have a WAO installed to the project location. Install 3 data cables with 18" slack at both ends. WAO shall be finished out with double gang ring.

L. Each project location shall have a 110-volt duplex outlet.
M. Supply appropriately sized projection screen with mechanical or motorized projection screen for films, slides, or video projection. Bottom of screen shall be 4 feet above finished floor when screen is extended.

N. Place screen control switch on console side. Install screen control switch in podium, if podium is moveable install switch on room entrance side of screen.

O. Install room light switch next to console. Install light switch in podium, if podium is moveable install light switch on room entrance side of screen. Some instances it would be possible to turn off lights in front of classroom only.

P. Sound amplification systems shall be designed and built into conference room when needed.

Q. Projector, speaker, console and podium locations shall be determined during the design process. Marked up prints with requirements will be returned to appropriate OFS Project Manager.

PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION

3.01 INSTALLATION

End of Section
SECTION 27 41 16.51
INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT FOR CLASSROOMS

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

1.03 REFERENCES

1.04 SYSTEM DESCRIPTION

1.05 DESIGN REQUIREMENTS

A. Each classroom shall be connected to the appropriate network room with a standard WAO located at the instructor console and/or podium.
B. Each projector location shall have a WAO with 2 data cables.
C. Each console and/or podium location shall have a WAO installed to the project location. Install 3 data cables with 18” slack at both ends. WAO shall be finished out with double gang ring.
D. Each projector location shall have a 110-volt duplex outlet.
E. Supply appropriately sized projection screen with mechanical or motorized projection screen for films, slides, or video projection. Bottom of screen shall be 4 feet above finished floor when screen is extended.
F. Place screen control switch on console side. Install screen control switch in podium, if podium is moveable install switch on room entrance side of screen.
G. Install room light switch next to console. Install light switch in podium, if podium is moveable install light switch on room entrance side of screen. Some instances it would be possible to turn off lights in front of classroom only.
H. Sound amplification systems shall be designed and built into classrooms when needed.
I. Projector, speaker, console and podium locations shall be determined during the design process. Marked up prints with requirements will be returned to appropriate OFS Project Manager.

PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION

3.01 INSTALLATION

End of Section

SECTION 27 41 16.61
INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT FOR THEATERS

PART 1 GENERAL

1.01 SECTION INCLUDES
1.02 RELATED SECTIONS

1.03 REFERENCES

1.04 SYSTEM DESCRIPTION

1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION

3.01 INSTALLATION

End of Section

SECTION 27 41 16.62

INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT FOR AUDITORIUMS

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

1.03 REFERENCES

1.04 SYSTEM DESCRIPTION

1.05 DESIGN REQUIREMENTS

A. Each auditorium shall be connected to the appropriate network room with a standard WAO located at the instructor console and/or podium.
B. Each projector location shall have a WAO with 2 data cables.
C. Each console and/or podium location shall have a WAOs installed to connect the podium and projection room. Use 1 ¼” conduit (minimum). Install 1 ¼” conduit between projection room and each projector with a WAO box. Install 3 data cables with 18” slack at both ends. WAO shall be finished out with double gang ring.
D. Each project location shall have a 110-volt duplex outlet.
E. Supply appropriately sized projection screen with mechanical or motorized projection screen for films, slides, or video projection. Bottom of screen shall be 4 feet above finished floor when screen is extended.
F. Place screen control switch on console side. Install screen control switch in podium, if podium is moveable install switch on room entrance side of screen.
G. Install room light switch next to console. Install light switch in podium, if podium is moveable install light switch on room entrance side of screen. Some instances it would be possible to turn off lights in front of auditorium only.

H. Sound amplification systems shall be designed and built into auditorium.

I. Projector, speaker, console and podium locations shall be determined during the design process. Marked up prints with requirements will be returned to appropriate OFS Project Manager.

J. Control booth/room requirements.
   1. Shall be located at rear of room. The room shall have controls for sound, light, and projector control from a console and/or podium. Lighting in the control booth/room shall be incandescent and on a dimmer switch. Height from floor to the top of the projection shelf shall not exceed 42 inches.
   2. Control booth/room shall have 2 – 2” conduits to nearest network room.
   3. Control booth/room power shall be determined by equipment requirements. Minimum of 1 – 20AMP, quad AC, power outlet.
   4. Control booth/room shall be 10’ 6” X 12’.
   5. Aperture for projector will be determined by equipment requirements.

PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION

3.01 INSTALLATION

End of Section

SECTION 27 41 16.63

INTEGRATED AUDIO-VIDEO SYSTEMS AND EQUIPMENT FOR STADIUMS AND ARENAS

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED SECTIONS

1.03 REFERENCES

1.04 SYSTEM DESCRIPTION

1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION
3.01 INSTALLATION

End of Section

SECTION 27 41 19
PORTABLE AUDIO-VIDEO EQUIPMENT

PART 1 GENERAL
1.01 SECTION INCLUDES
1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS
2.01 MATERIALS

PART 3 EXECUTION
3.01 INSTALLATION

End of Section

SECTION 27 41 23
AUDIO-VIDEO ACCESSORIES

PART 1 GENERAL
1.01 SECTION INCLUDES
1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS
2.01 MATERIALS
PART 3 EXECUTION

3.01 INSTALLATION

End of Section

SECTION 27 42 00
ELECTRONIC DIGITAL SYSTEMS

PART 1 GENERAL
1.01 SECTION INCLUDES
1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS
2.01 MATERIALS

PART 3 EXECUTION
3.01 INSTALLATION

End of Section

SECTION 27 42 13
POINT OF SALE SYSTEMS

PART 1 GENERAL
1.01 SECTION INCLUDES
1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS
SECTION 27 42 16
TRANSPORTATION INFORMATION DISPLAY SYSTEMS

PART 1 GENERAL
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1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS

PART 2 PRODUCTS
2.01 MATERIALS

PART 3 EXECUTION
3.01 INSTALLATION

End of Section

SECTION 27 42 19
PUBLIC INFORMATION SYSTEMS

PART 1 GENERAL
1.01 SECTION INCLUDES
1.02 RELATED SECTIONS
1.03 REFERENCES
1.04 SYSTEM DESCRIPTION
1.05 DESIGN REQUIREMENTS
PART 2 PRODUCTS

2.01 MATERIALS

PART 3 EXECUTION

3.01 INSTALLATION

End of Section

SECTION 27 50 00
DISTRIBUTED COMMUNICATIONS AND MONITORING SYSTEMS

PART 1 GENERAL

1.01 Related Sections

A. Section 27 51 00, Distributed Audio-Video Communications Systems and all subsections.
B. Section 27 52 00, Healthcare Communications and Monitoring Systems and all subsections.
C. Section 27 53 00, Distributed Systems and all subsections.

1.02 DESIGN REQUIREMENTS

B. Designer should integrate any distributed communications into the structured cabling network.

End of Section

SECTION 28 00 00
ELECTRONIC SAFETY AND SECURITY

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS
UNDER DEVELOPMENT

End of Section

SECTION 28 13 00
ACCESS CONTROL

PART 1 GENERAL
1.01 SYSTEM DESCRIPTION

A. Security Access System
   1. Selected Exterior doors: Control access to building.
   2. Selected Building Areas: Control access into specific areas.

1.02 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles of project.
C. Installer Qualifications: Company specializing in installing the products specified in this section with minimum three years documented experience.
D. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Security Access System:
   1. Blackboard, Inc. – NMSU Main campus.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Cable provided by NMSU for Contractor use.

End of Section

SECTION 28 16 00

INTRUSION DETECTION

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION

A. Intrusion Detection System: Protect building and selected areas from intrusion during SECURE hours.

1.02 SUBMITTALS
A. See NMSU Architect’s Office requirements for Administrative Requirements, for submittal procedures.
B. Shop Drawings: Indicate system wiring diagram showing each device and wiring connection.
C. Product Data: Provide electrical characteristics and connection requirements.
D. Test Reports: Indicate satisfactory completion of required tests and inspections.
E. Manufacturer’s Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.
B. Manufacturers Qualifications: Company specializing in installing manufactures products specified in this section with minimum three years documented experience.
C. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and indicated.

1.04 MAINTENANCE SERVICE

A. Furnish service and maintenance of intrusion detection system for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Intrusion Detection System:
   1. Honeywell, Inc; ADEMCO products
   2. Tyco

2.02 ALARM CONTROL PANEL

A. Control Panel: Modular construction with flush or surface wall-mounted enclosure.
B. Power Supply: Adequate to serve control panel modules, remote detectors, and alarm signaling device. Include battery-operated emergency power supply with capacity for operating system in standby mode for 24 hours.
C. System Supervisor: provide electrically-supervised system, with supervised alarm initiating and alarm signaling circuits. Component or power supply failure places system in alarm mode.
D. Initiating circuits: Supervised zone module with alarm and trouble indication.
E. Signal Circuits: Supervised zone coded signal module, sufficient for signal devices connected to system; occurrence of single ground or open condition, places circuit in trouble mode and does not disable that circuit from transmitting alarm.

F. Remote Station Signal Transmitter: Electrically supervised, capable of transmitting alarm and trouble signals over telephone lines to central station receiver.

G. Auxiliary Relays: Provide sufficient SPDT auxiliary relay contacts for each detection zone to provide accessory functions specified.

H. Occupied/Unoccupied Selector: _____.

I. Entry and Exit Time Delays: _____.

J. Alarm Sequence of Operation: Actuation of intrusion detecting device places system in alarm mode, which causes the following operations:
   1. Sound and display local alarm signaling devices with non-coded signal.
   2. Transmit zone-coded signal to central station.
   3. Indicate location of actuated device on control panel and on remote annunciator panel.
   4. Alarm Reset: Key-accessible reset function resets alarm system out of alarm if alarm initiating circuits have cleared.

2.03 INITIATING DEVICES

A. Magnetic Switches
B. Proximity Switches
C. Motion Detectors
D. Glass Break Detectors
E. Duress Switches
F. Shock Sensors
G. Security Screens
H. Outdoor Motion Sensors
I. Photo Electric Beam Detectors
J. Passive Magnetic Field Sensor
K. Micro Phonic Sensor
L. Optical Fiber Cable Sensor
M. Radar Sensor

2.04 SIGNAL DEVICES

A. Alarm Bells: NFPA, electric vibrating, 8 inch (200 mm) bell with operating mechanism behind dome. Sound Rating: 81dB at 10 feet (3 M).
B. Sirens
C. Speakers
D. Piezo/Buzzer
E. Visual Devices
PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Use 18AWG minimum size conductors for detection and signal circuit conductors. Install wiring in conduit.

3.02 FIELD QUALITY CONTROL

A. Perform field inspection and testing for each device and function.
B. Test in accordance with NFPA 72.

3.03 MANUFACTURER’S FIELD SERVICES

A. Provide the services of the manufacturer’s technical representative to prepare and start systems.
B. Include services of technician to supervise installation, adjustments, final inspections, system testing, and NMSU personnel training.

3.04 DEMONSTRATION

A. Demonstrate normal and abnormal modes of operation, and required responses to each.
B. Provide 4 hours of instruction each for two persons.
   1. Conduct instruction at project site with manufacturer’s representative.

End of Section

SECTION 28 23 00

VIDEO SURVEILLANCE

PART 1 GENERAL

1.01 SYSTEM DESCRIPTION

A. Description: Provide video communication between points of surveillance indicated on drawings and central monitoring station.
   2. Distribution: Category 5E or Category 6 cable. Cable category used shall be specified by NMSU-ICT.
B. Coordinate all video surveillance with NMSU-PD.

1.02 SUBMITTALS

A. See Architect’s Office about Administrative Requirements, for submittal procedures.
B. Shop Drawing: Indicate electrical characteristics and connection requirements, including system wiring diagram.
C. Product Data: Provide drawings showing electrical characteristics and connection requirements for each component.
D. Manufacturer’s Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
E. Project Record Documents: Record actual locations of cameras and outlet locations.
F. Operation Data: Instructions for starting and operating system.
G. Maintenance Data: Routine trouble shooting procedures.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.
B. Manufacturer Qualifications: Company specializing in installation of manufactures products specified in this section with minimum three years documented experience.
C. Supplier Qualifications: Authorized distributor of specified manufacturer and minimum three years documented experience.
D. Installer Qualifications: Authorized installed of specified manufacturer with service facilities within 100 miles of project.
E. Products: Furnish products listed and classified by Underwriters Laboratories, Inc as suitable for purpose specified and indicated.

PART 2 PRODUCTS

2.01 COMPONENTS

A. Axis – indoor/outdoor applications.
B. Sony – indoor/outdoor applications.
C. Pelco – outdoor applications.

2.02 ACCESSORIES

A. Enclosures, mounts, and power injectors approved by manufacturer for model of camera being installed.
PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Contractor shall coordinate connector types for optical fiber at time of installation.
C. Install each camera location with cable runs not to exceed 90 m (295 ft), unless fiber optic cable is being used.

3.02 INTERFACE WITH OTHER PRODUCTS

A. Interface installation of video surveillance with security access and intrusion detection systems.

3.03 MANUFACTURER’S FIELD SERVICES

A. Provide services of manufacturer’s technical representative to prepare and start systems and supervise final wiring connections and system adjustments.

3.04 ADJUSTING

A. Adjust manual lens irises to meet lighting conditions.

3.05 DEMONSTRATION

A. Demonstrate system operation and provide four hours of instruction with manufacturer’s training personnel.
B. Conduct walking tour of project with NMSU-ICT and NMSU-PD personnel and briefly describe function, operation, and maintenance of each component.

End of Section
A. See specific elements within this document for safety and restrictions information. Contractors shall bear all responsibility and cost to locate existing underground utilities including, but not limited to, electricity, natural gas, water, steam, and condensate, chilled water, sewer, storm drainage, and telecommunications. Most of these utilities are owned and maintained by NMSU. In many cases, utilities have used plastic pipe without metallic (detectable) elements. Contractors shall have all underground utilities clearly marked prior to any excavation.

B. All contractors shall contact New Mexico One Call, Inc. at 1-800-321-ALERT to locate all utilities.

C. Contractors shall contact NMSU immediately if unmarked utilities are discovered. Contractors shall stop all work in the area until the utility can be identified by NMSU. Contractors may be required to call OFS or other locator to trace the utility to an identifiable point. Contractors shall contact NMSU personnel if a utility is damaged in any way.

D. Areas of the campus may be restricted from heavy equipment, including but not limited to backhoes, concrete trucks, utility and work trucks, and other full-sized vehicles. Contractors shall contact NMSU OFS for specific restrictions based on the location of the work area.

E. During construction of all pathways, NMSU PD shall determine if closures of NMSU-controlled rods or spaces are possible at proposed dates and times. When on non-NMSU property, Contractors shall coordinate all activities with interested parties.

F. Information from NMSU on underground utility placement does not waive contractors from confirming the presence and location of all underground utilities in the work area.

G. Contractors shall provide all necessary equipment to safely excavate and construct conduit/duct pathways. Contractors shall comply with all federal, state, and NMSU regulations regarding work in this environment. Appropriate personal protective equipment is required and shall be the responsibility of the contractors.

H. Contractors shall provide all necessary equipment to safely excavate and construct tunnel penetrations. Contractors shall comply with all federal, state, and NMSU regulations regarding excavation and working in this environment. Personal protective equipment is required and shall be the responsibility of the contractors.

1.02 DESIGN REQUIREMENTS

A. In general, underground pathways shall be at a minimal depth of 30” to the top of the pathway elements, where possible. Deviations from this specification must be pre-approved by NMSU ICT. Pathways may gradually slope up to under 30” deep to enter hand holes or hand boxes.

B. All digging and trenching shall be in accordance with codes and requirements established by all applicable local, state, federal agencies and departments.

C. All trenching and digging shall be subject to the control and approval of NMSU.

D. Contractors shall protect from direct damage during construction and damage resulting from construction all surrounding environments, including, but not limited to, existing roadways, sidewalks, curbing, trees and shrubs, open grass areas, and planting beds. Contractors shall use planking and ramps as needed to protect these areas.
E. Contractors shall provide and install all necessary barriers to prevent unauthorized entry into the construction area. Contractors shall provide temporary walkways to divert pedestrian traffic safely around the construction area. Contractors shall contact NMSU Safety Office for approval of all temporary walkway locations.

F. Contractors shall restore, repair, rebuild, or replace any item including, but not limited to, adjacent property, existing fences, trees and shrubs, roadways and curbs, sidewalks and surface utilities and parts damaged during construction. Damaged items shall be restored, repaired, rebuilt or replaced to their original condition and to the satisfaction of NMSU. NMSU may waive this requirement for specific items if within the construction area and/or if scheduled for eventual demolition or replacement and at NMSU discretion.

G. Contractors shall secure all necessary permits, as required. Contractors shall contact NMSU to ascertain the existence of established permits covering this work.

H. Contractors shall coordinate construction schedules and all work on the construction site with NMSU. Other contractors may be working in the area. Contractors shall coordinate construction schedules with any general contractor or construction manager hired by NMSU when working as a subcontractor or when required by NMSU.

I. Contractors shall provide a detailed photographic survey of all pathways and areas to be disturbed prior to construction. Contractors shall deliver a set of photographs to NMSU prior to construction.

J. Contractors shall locate and stake all pathways and spaces to be installed. Contractors shall confirm with NMSU and the project engineers all staked pathways and spaces. Contractors shall notify NMSU of any discrepancies in the site plan and the existing conditions.

K. Contractors shall protect, support, and maintain all existing utilities in the work area as they are encountered during excavation. Shallow utilities to light posts or other devices may be temporarily re-routed or disconnected if pre-approved by NMSU.

L. Contractors shall install erosion control measures as needed to minimize erosion and to prevent soil run-off from the construction area.

M. Contractors shall provide and install bracing, shoring, and sheathing as necessary to protect personnel and surrounding conditions. Contractors shall adhere to all local, state, and federal requirements for safe excavations.

N. Contractors shall hand remove and stack all paving bricks and marble pavers in the construction pathway for re-installation later. Contractors shall remove granite or other stone or brick curbing pavers in the construction pathway for re-installation later.

O. Contractors shall saw cut all paved area encountered during excavations. Cuts shall be neat and straight.

P. Contractors shall remove all material excavated including soil, rubble, debris, or other materials encountered during excavation. Contractors may store excavated material on site at the discretion of NMSU and at a location designated by NMSU. Contractors shall not anticipate storing excavated material on site. Excavated material from duct bank trenches may be left near the trench to be used as backfill, if adhering to later backfilling specifications. Contractors
shall properly dispose of any material taken from the construction are per local disposal requirements.

Q. Contractors shall remove only the material necessary to safely install duct banks as specified. Contractors shall contact NMSU immediately if the trench or hole bottom is wet, unstable, or otherwise unable to support the infrastructure to be installed.

R. Contractors shall provide pumps, as necessary, to keep water out of excavation. Contractors shall direct effluent towards the nearest storm drain only if the effluent is free from dirt and debris. Otherwise, the effluent shall be diverted to an area free from vehicular and pedestrian traffic and other construction areas.

1.02 RESTORATION

A. Contractors shall contact NMSU prior to any backfilling which will conceal an installed pathway element to enable NMSU to document and photograph the pathway.

B. Contractors may backfill in stages, when necessary to complete trenching and duct bank installation.

C. Contractors shall use pre-excavation photographs to restore the existing conditions, including brick walkway placement and pattern. Contractors shall restore brick walkways in the same pattern and arrangement as originally installed.

D. Contractors shall provide and install a level layer of compacted aggregate over each encased duct bank. The bed shall extend 1 foot above the surface of the duct bank. The first 6 inches of the aggregate shall be compacted to not less than 95% density compared to maximum laboratory test by weight per ASTM D1557-64T, method A. The second 6 inches of the aggregate bed shall be compacted to not less than 85% density compared to maximum laboratory tests by weight per ASTM D1557, method A.

E. Contractors shall remove all remaining excavated material from the construction area.

F. Contractors shall remove any erosion control devices no longer needed, not including those in and around seeded areas.

G. Restoration of disturbed landscaping shall be to the satisfaction of NMSU OFS Grounds.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate

1. Crushed stone or gravel fill

2. Percent composition by dry weight as determined by laboratory sieves (U.S. Series)


<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Passing Sieve</th>
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<tbody>
<tr>
<td>1-1/2 inches</td>
<td>100%</td>
</tr>
<tr>
<td>1 inch</td>
<td>90 – 100%</td>
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<tr>
<td>#4</td>
<td>0 – 5%</td>
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</tbody>
</table>
B. Lesser-grade material
   1. This backfill may be removed from the original excavation. All backfill materials shall be free from boulders, large rock, asphalt, concrete, bricks, wood blocks, or roots and other debris.

C. Top Soil
   1. High quality, able to support productive plant growth.
   2. Free from weeds, grass, stones, roots, or similar substances.

D. Sod
   1. Same origin as the surrounding area.

E. Grass Seed
   1. Mix approved by NMSU OFS Grounds Department.

F. Erosion Control
   1. Contractors shall provide all materials necessary to minimize erosion and soil run-off to the satisfaction of NMSU.
   2. Contractors shall provide all materials to prevent erosion of seeded areas.

End of Section

SECTION 33 81 19
COMMUNICATION UTILITY POLES

PART 1 GENERAL

1.01 SAFETY AND RESTRICTIONS

A. Contractors shall provide all necessary equipment to safely work on utility poles. Contractor shall comply with all federal, state, and NMSU regulations regarding working in this environment. Personal protective equipment is required and shall be the responsibility of the contractors.

B. Contractors shall coordinate with NMSU OFS to gain access to NMSU utility poles. Contractors shall provide advance notice for this access. Contractors shall coordinate with utility companies to gain access to non-NMSU utility poles.

C. NMSU PD shall determine if closures of NMSU-controlled roads or spaces are possible at proposed dates and times. When on non-NMSU property, Contractors shall coordinate all activities with interested parties and/or city officials.

D. Contractors must receive approval from NMSU OFS prior to any trimming of NMSU trees to clear aerial pathways.

E. Contractors must receive approval from NMSU OFS for building attachments from aerial pathways prior to installation.

F. Contractors shall follow all pole owner-specific safety requirements.
1.02 DESIGN REQUIREMENTS

A. Utility pole shall have very limited use. New utility poles shall not be installed. Certain fringe areas with existing poles may utilize them, if pre-approved by NMSU OFS. Areas of the campus beyond the contiguous core may use existing poles, if pre-approved.

B. Aerial pathways follow the same general guidelines as utility poles previously mentioned. In addition, inter-building, aerial cabling shall not be permitted. The type of installation in certain fringe area may be allowed, if pre-approved. Areas of the campus beyond the contiguous core may use aerial pathways, if pre-approved by NMSU. Underground pathways will always be preferred, unless limited by existing conditions.

C. Refer to the current BICSI CO-OSP manual for transverse loads on poles (kg/m per lb/ft of span length).

D. Pole height should provide sufficient space for the maximum number of attachments that will be made during the service life of the pole line. The attachment space shall include the space between the top of the pole, as well as the highest and lowest attachments. For pole line supporting cable, 457 mm (18 inches) should be provided at the top of the pole and 305 mm (12 inches) for each cable attachment.

E. As long as the last section is less the 30.5 m (100ft), a slack span design may be used when it is not possible to terminate an aerial run with a dead-end guy. By using less than normal stringing tension in the final span, guying on that end can be omitted. Situations that may require the use of a slack span design include space deficiencies and right-of-way problems.

F. Pole to building slack span construction shall be used for cables under 300 pair. For cables 300 pair or greater, select and alternate route into the building.

G. Refer to the latest edition of the NESC for typical attachment clearances.

H. Mid span clearances should be at least 75 percent of the clearance required at the pole. Consult the latest edition of the NESC.

I. Refer to the current NESC for the required radial clearances from antennas, signs, pole structures, storage tanks, and chimneys.

J. When installing multiple strands on a pole line, the designer should design separate guys and anchors for each strand. One guy may be used when the distance between two strands is 610 mm (24 inches) or less.

K. Generally, all corner poles should be guyed except when a pole line supporting 6M or 6.6M has less the 910 mm (36 inches) of pull, or when a pole line supporting 10M strand has less than 610 mm (24 inches) of pull.

PART 2 PRODUCTS

2.10 MATERIALS

A. All materials used shall be manufactured for the specific purpose in which they are to be used.
B. When available, materials shall meet or exceed any available ANSI or ASTM standard for manufacture and installation.

C. All materials used shall meet or exceed any requirements for use as established by El Paso Electric, city of Las Cruces, or any other third-party owner for leased pole installations.

PART 3 EXECUTION

3.01 INSTALLATION

A. Aerial pathways shall only be used when existing poles are in place and available. Poles may be NMSU-owned or available for lease from local utilities.

B. Contractors shall obtain permits, lease agreements, and any other required documentation for NMSU use of non-NMSU pole. All documentation shall be in the name of NMSU and shall be submitted to NMSU prior to installation.

C. Contractors shall adhere to requirements of the utility pole owner when using non-NMSU poles. Owner requirements that violate the standards, and methodologies listed shall be approved by NMSU prior to pole use. NMSU may eliminate a specific pole as a pathway based on unacceptable owner requirements.

End of Section

SECTION 33 81 26

COMMUNICATIONS UNDERGROUND DUCTS, TUNNELS, AND HANDBOXES

PART 1 GENERAL

1.01 SAFETY AND RESTRICTIONS

A. Tunnels

1. NMSU tunnels are not classified as permit-required confined spaces. Personal protective equipment is strongly recommended and shall be the responsibility of the Contractors. Conditions may be excessively hot, cramped, and/or damp.

2. Contractors shall coordinate with NMSU OFS Co-Gen to gain access to the tunnels. Contractors shall provide advanced notice for this access. Space restrictions may prohibit access, if other utility contractors are in the area. Ongoing utility work and emergency repairs may prevent access. Delays in installation scheduled because of inaccessibility to the tunnels may be accepted by NMSU project managers and should be brought to their immediate attention. NMSU OFS shall determine priorities in the event of overlapping work areas.

3. Generally, work in tunnels is between 8:00 am to 5:00 pm, during normal business days. Off hour times and dates will need to be coordinated with NMSU OFS Co-Gen.
B. Maintenance Holes
   1. Maintenance holes shall not be installed.

C. Hand holes and Hand boxes
   1. NMSU hand holes and hand boxes are not classified as permit-required confined spaces. Personal protective equipment is strongly recommended and shall be the responsibility of the Contractors.
   2. Contractors shall coordinate with NMSU ICT to gain access to hand holes and hand boxes. Contractors shall provide advance notice for this access.

1.02 DESIGN REQUIREMENTS

A. Communications Underground Ducts, see Section 27 05 43 - Underground Ducts and Raceways for Communications.
B. Tunnels
   1. NMSU has an existing tunnel structure below parts of the main contiguous campus. These tunnels have been used extensively for Information Transport System cabling and are available for additional installations. Site conditions within the tunnels vary by location. Designers should contact NMSU OFS for tunnels conditions.
   2. The tunnels supply high voltage power, steam/condensate, chilled water and domestic water to a variety of buildings. Space may be very limited for installation beyond existing cable locations within the tunnel.
   3. Oversight of the NMSU tunnels is the responsibility of OFS. All installations shall be approved and coordinated with OFS. All designs requiring new tunnel penetrations shall be approved in advance by OFS.
   4. Penetrate tunnel walls in such a position to allow broad sweep of cables into the tunnel space while minimizing interference to the passage and access to adjacent utilities. Vertical (roof) penetrations may be allowed in certain instances for small duct banks.
   5. All duct banks abutting a tunnel shall be concrete encased for a minimum of ten (10) horizontal feet from the tunnel.
   6. When abutting a duct bank to a tunnel wall, provide dowel holes in the exterior surface of the tunnel for reinforcing bars. These bars shall extend into the tunnel will without penetrating the wall and be embedded in the concrete duct bank. Dowel holes are not required for reinforcing bars when penetrating the roof of the tunnel.
   7. Shape the concrete in such a way as to slope water away from the duct bank-tunnel seam. Alternately, purge the area around the seam as to slope water away.
8. Specify waterproofing material to provide a permanent, waterproof, water coating. Designs may include a protective membrane, sprayed/brushed product, or any combination. The specified product shall be manufactured for the explicit, but not necessarily exclusive, purpose of waterproofing concrete.

9. Design for waterproofing material to the sides and top of a horizontal duct bank extending no less than 4 feet from the tunnel wall. Specify a waterproofing material to the tunnel wall extending a minimum of 18 inches (wrapping over and onto tunnel roof if required) from the duct bank. The waterproofing shall be applied to all surfaces except the bottom of the duct bank where poured on aggregate bed.

10. Design for waterproofing material to all sides of a vertical duct bank extending no less than 6 vertical feet from the tunnel roof. Specify a waterproofing material to the tunnel roof extending 18 inches (or to the edge of the tunnel roof) from the duct bank, and to any curved part of the duct bank within 6 feet of the roof. The waterproofing shall be applied to all surfaces.

11. Existing Support Structures
   1. Use existing pathways and support mechanisms within tunnels, when possible. These include exiting raceways, chases, and support cable strands. All cable installations shall be supported off the tunnel floor.

12. New Open Support Structures
   1. Support structure shall be designed to minimally impact open space and access to other utilities within the tunnels. Support structures shall be placed against, or as close as possible, to walls and ceilings. All cable installation shall be supported off the tunnel floor.
   2. These support structures shall be similar to the existing raceways. Designers shall specify turn out and cable turning fence parts as needed. These parts will be fiber optic friendly and have radii turns.

13. New Support Wires
   1. Designers may specify support wires onto existing or installed structures for the attachment of cables. Support wires shall be designed to minimally impact open space and access to other utilities within the tunnels. Support wires and any other support structure needed to install support wires shall be placed against, or as close as possible, to walls and ceilings.
   2. Support wires shall be 10M (minimum size) galvanized steel. They shall be supported every 8 feet (maximum interval). Messenger supported wiring shall be grounded per NEC Section 321-7, which considers them to be conductor enclosures per NEC Section 250-86. Grounding within the tunnels shall be coordinated with NMSU OFS Electric Shop.

14. Cable Lashing
1. When using existing support strands, attach cables directly to the support strand. Installations may wrap around a single existing cable and support strand provided the support strand bears the weight of the cable. New cables shall not add any strain to existing cables.

15. Vertical Exits
1. Cables leaving the tunnel beneath a building, vertically into the building, shall be supported by vertical backbone cable supports.

16. Nonmetallic Flexible Raceway (Inner-duct)
1. The use of nonmetallic flexible raceway (inner duct) intended to house a single cable within the tunnels shall be minimized. Inner-duct shall not be placed into existing or new enclosed raceways, including “open” raceways like Snake Tray. Inner-duct may be used to transition into and out of these raceways. Inner-duct may be used for mechanical protection when support wires are used for optical fiber cables. Inner-duct is not required within the tunnels in any location, unless specified by NMSU-ICT for a given installation.
2. Inner-duct shall be 1-1/4 inches OD or greater. Inner-duct may be corrugated or smooth walled. Smooth wall inner duct shall have interior longitudinal ribs. Inner-duct with a corrugated exterior shall not be used in the tunnels, except where needed for tight bends. Inner-duct within the tunnels shall be orange. Inner-duct may be non-plenum rated. All inner-ducts and connection parts (couplings, etc) shall be from a single manufacturer and shall be installed per the manufacturer’s instructions.
3. Fire alarm cable installations shall be designed in accordance with the NEC.
4. Voice communications cable shall not be in inner duct within the tunnels.

17. Splices
1. Cables may be spliced in the tunnels as needed to obtain necessary cable lengths and to branch cables as needed. Locations of splice cases are to be pre-approved by NMSU-ICT. Splice locations shall enable relatively easy access for future maintenance and installations. Splice cases shall be fully support of the tunnel floor.
2. Splice specifications are detailed in the specification.

C. Maintenance Holes
1. In general, the use of MHs should not be used as a design element.

D. Hand boxes and Hand holes
1. In general, HBs shall be incorporated, whenever possible. New HHs shall not be installed. Where possible, contractors shall use existing HBs over existing HHs. HBs and HHs shall not be used with duct banks exceeding 8 conduits.
2. Pathways using HBs shall not be designed to expose an HB to deliberate vehicular traffic. HBs may be placed within sidewalks and other walkways or areas otherwise restricted to
occasional traffic by NMSU light vehicles. HBs may be installed in grass and wooded areas. All locations shall be approved by NMSU-ICT.

3. Designers may use an existing HB to provide needed pathways. Designers shall not use an existing HH to provide needed pathways. A HH location may be used, if the HH is replaced by a new HB. An existing HB shall be upgraded with respect to integral parts and grounding as specified in the installation of a new HB. If a single new conduit is installed into a HB/HH, the entire HB/HH shall be addressed with respect to integral parts and grounding.

4. NES may require a HB or HH to be replaced entirely if incorporated into a new cable installation. Designers shall not assume existing HBs and HHs may be used. Installation of cable into existing conduits terminating in a HB or HH shall require a review of the HB/HH and its possible replacement.

5. HHs shall not be used to house splice cases. HBs may be used to house splice cases. This use for a HB is an acknowledged deviation from BICSI methodology. Designers may classify these HBs as splice enclosures. Designers may propose the use of a pedestal for this purpose.

6. Designers shall specify butterfly drawings indicating planned cable pathways, racking, location and type of splice case(s), entry configuration for a new HB and use of existing HB/HH, when and where appropriate. HBs shall be designed with cable racks (for large HB) and grounding as required. HBs should also have drainage provisions (e.g. drain holes, open bottom, sump-hole).

7. HBs shall not be:
   1. Larger than 1.2m (4.0 ft) in length by 1.2m (4.0ft) in width by 1.2m (4.0ft) height.
   2. Shared with electrical installations other than those used for network cabling/telecommunications.

8. Divided boxes may be considered by NMSU-ICT for specific applications (remotely located devices requiring power and communication cabling) and shall be pre-approved by NMSU-ICT.

9. Divided boxes shall not contain cable splices or any possible exposure to conductors within the communications side of the box. A separate “communications-only” HB shall be required to house necessary splices.

10. Horizontal penetrations of the box shall be made using knockout locations, when available. The sidewalls of the HB shall not be penetrated in other locations without pre-approval from NMSU-ICT. Conduits may “stub up” into the box. Conduits entering the box shall be within 2” of a sidewall.

11. Conduit entering a HB should be aligned on opposite walls at the same elevation. Some HBs are available with bottoms for drainage. When installed without bottoms, these HBs should be equipped with a 6 inch layer of small rock in the bottom to prevent mud from intruding into the HB.
12. Label and document all space elements in accordance with NMSU OSP Administrative Specification.

13. Specify a HB with sufficient rating to withstand the necessary load for the location. All new HBs shall be Strongwell UL-listed QUAZITE boxes. HBs shall be “PG” style, Tier 15 or greater. The use of other QUAZITE boxes shall be pre-approved by NMSU-ICT.

14. QUAZITE HB covers shall be HA-rated covers labeled “Communications” (covers shall be HH-rates for areas with anticipated vehicular traffic). Contact NMSU-ICT for determination of this need.

15. QUAZITE boxes and lids shall be standard gray. QUAZITE boxes and lids in grass or planting beds may be green. The use of other QUAZITE colors shall be pre-approved by NMSU-ICT.

16. Large boxes shall have two QUAZITE pulling eyes installed on the shorter sides of the box (or opposite sides of a square box).

17. Any HB designed to house a splice case shall be grounded. The HB shall have and 8 ft ground rod.

18. Compacted aggregate to be used to form a bed under HBs may be crushed stone, or gravel fill of the type specified below by the materials section.

19. Compacted aggregate shall not be sand or gravel dust.

20. HBs shall rest on a bed of gravel or crushed rock measuring six or more inches deep and extending six or more inches beyond the sides of the HB.

21. Specify 4” – 6” of gravel or crushed rock outside HBs prior to backfilling to grade.

22. HBs shall be installed with covers flush with the final grade. HBs shall match any slope in final grade. HBs may be installed with partially exposed side on steep grades. NMSU-ITC-NES shall pre-approve non-flush designs.

23. Using existing hand boxes
   1. NMSU-ICT shall approve the use of an existing HB. An existing HB may have to be replaced if the conditions of the HB are beyond remediation. NMSU-ICT shall determine the status of the HB. Replacement HBs shall be installed to the specification of the previous section.
   2. Existing conditions of conduits may not be able to be fully reconfigured to meet location specifications of the previous section. NMSU-ICT may allow deviations from conduit design specifications during design approval.
   3. If available for use, enter an existing HB horizontally through knockouts. If pre-manufactured knockouts are not available, enter the HB by sweeping under the sidewall and “stubbing up” into the box within 2” of a sidewall.
   4. HB sides 24” or greater without racking shall be retrofitted with appropriate racking. NMSU-ICT may waive this specification depending on the existing conditions.
   5. Ground rods shall be installed, as needed. Correct any improper or missing grounding within the HB.
6. Excavate within the HB such that 6” of gravel or crushed rock can be replaced into the box. The box shall be raised or lowered to existing grade as needed. This specification may be waived if existing conduit conditions block such modifications.

24. Using existing hand holes
   1. NMSU-ICT shall approve the use of an existing HH. Designers may have to specify replacement of an existing HH with a HB, if the conditions of the HH are unacceptable. NMSU-ICT shall determine the status of the HH. Replacement HBs shall be installed to the specifications of the previous section.
   2. Enter the HB by sweeping under the sidewall and “stubbing up” into the HH within 2” of a sidewall. NMSU-ICT may waive this specification depending on the existing conditions.
   3. Excavate within the HH such that 6” of gravel or crushed rock can be placed into the hole. The HH shall be raised or lowered to existing grade as needed. This specification may be waived of existing conduit conditions block such modifications.

PART 2 PRODUCTS

2.10 MATERIALS

A. Hand boxes
   1. Typical box sizes: 17” x 30”, 24” x 36”, 30” x 48”, 36” x 60”.
   2. QUAZITE brand hand box, PG-style, Tier 15 or greater.
   3. QUAZITE cover, HA rated, labeled “Communications”.
   4. Gray hand box and lid, green acceptable in grass.

B. Aggregate
   1. Crushed stone or gravel fill.

C. Concrete
   1. 3/8” maximum size.
   2. Nominal compressive strength: 3000 PSI at 28 days.

D. Steel reinforcing bars
   1. Size-standard size #5.

E. Cable Support Structures
   1. Cable raceway
      1. Manufacturers offering stainless or galvanized steel products.
   2. Steel support wires
      1. Size: 10M (3/8” dia), galvanized steel with mounting hardware.
3. Vertical cable supports
   1. Erico CADDY CableCat CAT600 series.
   2. Other manufacturers offering equivalent products.

4. Steel cable ties
   1. Panduit Stainless Steel System.
   2. Band-It steel strapping.
   3. Other acceptable manufacturers offering equivalent stainless or galvanized steel products.

PART 3 EXECUTION

3.01 INSTALLATION

A. Communications Underground Ducts
   1. See Section 27 05 43: Underground Ducts and Raceways for Communications.

B. Tunnels
   1. All space elements shall be labeled in accordance with the NMS-OSP Specifications (future requirement).
   2. Tunnel Penetrations
      1. Contractors shall penetrate tunnel walls in such a position to allow broad sweeps of cables into the tunnel space while minimizing interference to the passage and access to adjacent utilities. Vertical (roof) penetrations may be allowed in certain instances for small duct banks.
      2. All duct banks abutting a tunnel shall be concrete encased for a minimum of ten horizontal feet from the tunnel. The duct bank shall be constructed as specified by this document.
      3. All duct banks abutting to a tunnel wall, Contractors shall provide dowel holes in the exterior surface of the tunnel for reinforcing bars. These bars shall extend into the tunnel wall without penetrating the wall and be embedded in the concrete duct bank. Contractors are not required to provide dowel holes for reinforcing bars when penetrating the roof of the tunnel.
      4. Contractors shall core drill all penetrations. Contractors shall be responsible to consult structural engineers and to maintain the structural integrity of the tunnel at the point of penetration and the surrounding area. Any damage to the tunnel or its contents shall be repaired by the Contractors or by NMSU at the Contractor’s expense. Contractors may be liable for any costs or damages associated with loss of service resulting from tunnel damage.
      5. Contactors shall provide and install framing as necessary for pouring duct bank abutting the tunnel. Contractors shall remove this framing when the concrete has properly set.
6. Contractors shall shape the concrete in such a way as to slope water away from the duct bank-tunnel seam. Alternately, Contractors shall purge the area around the seam as to slope water away.

7. Contractors shall provide and install framing as necessary to prevent the penetration of concrete into the interior space of the tunnel. Contractors shall remove this framing after the concrete has properly set and backfilling is complete.

8. Contractors shall provide waterproofing material to provide a permanent, waterproof coating. Contractors may use a protective membrane, sprayed/brushed product, or any combination. The proposed product shall be manufactured for the explicit, but not necessarily exclusive, purpose of waterproofing concrete. Contractors shall submit manufacturer-produces product information sheets for proposed products to be used.

9. Contractors shall install, per manufacturer’s specification, a waterproofing material to the sides and top of a horizontal duct bank extending no less than 4 feet from the tunnel wall. Contractors shall install, per manufacturer’s specifications, a waterproofing material to the tunnel wall extending a minimum of 18 inches (wrapping over and onto tunnel roof if required) from the duct bank. The waterproofing shall be applied to all surfaces except the bottom of the duct bank where poured on aggregate bed.

10. Contractors shall install, per manufacturer’s specification, a waterproofing material to all sides of a vertical duct bank extending no less than 6 vertical feet from the tunnel roof. Contractors shall install, per manufacturer’s specifications, a waterproofing material to the tunnel roof extending 18 inches (or to the edge of the tunnel roof) from the duct bank, and to any curved part of the duct bank within 6 feet of the roof. The waterproofing shall be applied to all surfaces.

3. Existing support structures
   1. Contractors shall using existing pathways and support mechanisms within tunnels, when possible. These include existing raceways, chases, and support strands. All cable installations must be supported off the tunnel floor.
   2. Contractors may be asked to re-engineer an existing support structure to accommodate the current cabling as well as new cabling. If the existing support structure is inadequate for new installations, Contractors shall consult with NMSU-ICT as to the need for re-engineering of the structure.

4. New open support structures
   1. Contractors may install new open support structures as needed. Support structures shall be installed to minimally impact open space and access to other utilities within the tunnels. Support structures shall be placed against, or as close as possible, to walls and ceilings. Any supports or protrusions shall be rounded or padded to
minimize injury to people, if impacted. Final placement of support structures shall be pre-approved by NMSU-ICT. All cable installations shall be supported off the tunnel floor.

2. The Contractor shall provide and install cable tray products for cable support. Contractors shall use cable tray turn outs and cable turning fence parts as needed. Contractors shall not substitute connectors or cable tray products of various manufacture for the cable tray currently installed.

3. Cable tray products being installed must be pre-approved by NMSU-ICT.

4. Cables shall not be placed into open support structures in a loose and random fashion, when possible. Cables shall not be secured into an open support structure, unless required to remain in the structure, to support vertical rises, or to maintain bend radii.

5. Contractors shall use Panduit Stainless Steel System cable ties, Band-It steel strapping, or equivalent to connect to support wires. The cable ties are to be installed per manufacturer’s instructions. The locking mechanism shall be placed towards the wall or ceiling as to minimize its exposure to contact. All sharp corners or edges created by cutting excess length shall be rounded and smoothed.

5. New Support Wires

1. Contractors may install support wires onto existing or installed structures for the attachment of cables. Support wires shall be installed to minimally impact open space and access to other utilities within the tunnels. Support wires and any other support structure needed to install support wires shall be placed against, or as close as possible, to walls and ceilings. Any support structure needed to install support wires shall be rounded or padded to minimize injury to people, if impacted. Final placement of support structures shall be pre-approved by NMSU-ICT.

2. Support wires shall be 10M (minimum size) galvanized steel. They shall be supported every 8 feet (maximum interval). Messenger supported wiring shall be grounded per NEC 1999 Sections 321-7, which considers them to be conductor enclosures per NEC 1999 Section 250-86. Grounding within the tunnels shall be coordinated with NMSU-ICT.

6. Cable Lashing

1. When using existing support strands, Contractors shall attach cables directly to the support strand. Contractors shall not attach new cables directly to existing cables. Contractors may wrap around a single existing cable and support strand provided the support strand bears the weight of the cable. New cables shall not add any strain to existing cables.

2. Contractors shall use Panduit Stainless Steel System cable ties, Band-It steel strapping, or equivalent to connect to support wires. The cable ties are to be
installed per manufacturer’s instructions. The locking mechanism shall be placed towards the wall or ceiling as to minimize its exposure to contact. All sharp corners and edges created by cutting excess length shall be rounded and smoothed. Lashing may be tight, but shall not deform the cable.

3. Cables installed onto the open support structures shall not be lashed to the support structure. The following are exceptions to this specification: lashing required to keep the cable within the confines of the structure and lashing required to provide support for vertical cables.

7. Vertical Exits
1. Cables leaving the tunnel beneath a building, vertically into the building, shall be supported by vertical backbone cable supports. Equivalent products must be galvanized, have similar locking mechanism, and be pre-approved by NMSU-ICT.

8. Nonmetallic Flexible Raceway (Inner-duct)
1. Inner-duct shall not be placed into existing or new enclosed raceways, including “open” raceways like Snake Tray. Inner-duct may be used to transition into and out of these raceways. Inner-duct may be used for mechanical protection when support wires are used for optical fiber cables. Inner-duct is not required within the tunnels in any location, unless specified by NMSU-ICT for a given installation.
2. Fire alarm cable shall be installed in accordance with NFPA 70 National Electric Code.

9. Splices
1. Locations of splice cases are to be pre-approved by NMSU-ICT-TNS. Splice cases shall be fully supported off the tunnel floor.
2. Splice specifications are detailed later in this specification.

C. Hand boxes and Hand holes
1. Contractors shall label and document all space elements.
2. Hand boxes shall be installed per manufacturer’s instructions.
3. Hand boxes shall rest on a bed of gravel or crushed rock measuring six or more inches deep and extending six or more inches beyond the sides of the HB. Sand and gravel dust are not acceptable.
4. The contractor shall install 4” – 6” of ravel or crushed rock outside hand boxes prior to backfilling to grade. Sand and gravel dust are not acceptable.
5. Hand box color and lid type shall be coordinated with NMSU-ICT.
6. Hand boxes shall be installed with covers flush with final grade. Hand boxes shall match any slope in the final grade. Hand boxes may be installed with a partially exposed side on steep grades. NMSU-ICT shall approve non-flush installations.
7. Horizontal penetrations of the box shall be made using knockout locations, when available. The sidewalls of the hand box shall not be penetrated in other locations
without pre-approval from NMSU-ICT. Conduits mat “stub UP” into the box. Conduits entering this way shall be within 2” of a sidewall.

8. Using Existing Hand boxes
   1. NMSU-ICT must approve the use of an existing hand box. Contractors may have to replace an existing hand box, if the conditions of the hand box are beyond remediation. NMSU-ICT shall determine the status of the hand box. Replacement hand boxes shall be installed to the specifications of the previous section.
   2. Existing conditions of conduits may not be able to be fully reconfigured to meet location specifications of the previous section. NMSU-ICT may allow deviations from conduit placement specifications prior to installation.
   3. If available for use, Contractors shall enter an existing hand box horizontally through knockouts. If pre-manufactured knockouts are not available, the Contractors shall enter the hand box by sweeping under the sidewall and “stubbing up” into the box within 2” of a sidewall.
   4. Ground rods shall be installed, as needed. Contractors shall correct any improper or missing grounding within the hand box.
   5. Contractors shall excavate within the hand box such that 6” of gravel or crushed rock can be placed into the box. The box shall be raised or lowered to existing grade as needed. This specification may be waived if existing conduit conditions block such modifications.

13. New Hand holes
   1. New hand holes shall not be installed.

14. Using Existing Hand holes
   1. NMSU-ICT must approve the use of an existing hand hole. Contractors may have to replace an existing hand hole with a hand box, if the conditions of the hand hole are unacceptable. NMSU-ICT shall determine the status of the hand hole. Replacement hand boxes shall be installed to the specifications of the previous “New Hand boxes” section.
   2. Contractors shall enter the hand box by sweeping under the sidewall and “stubbing up” into the hand hole within 2” of a sidewall. NMSU-ICT may waive this specification depending on the existing conditions.
   3. Contractors shall excavate within the hand hole such that 6” of gravel or crushed rock can be placed in to the hole. The hand hole shall be raised or lowered to existing grade as needed. This specification may be waived if existing conduit conditions block such modifications.

End of Section
**COMMUNICATION VAULTS, PEDESTALS, AND ENCLOSURES**

**PART 1 GENERAL**

**1.01 DESIGN REQUIREMENTS**

A. Pedestals
   1. There is no specific safety information or restrictions for pedestals.
   2. Pedestals & Cabinets shall have very limited use at NMSU campuses. Contractors shall not use pedestals or cabinets without design approval from NMSU-ICT. Certain fringe areas or areas with concealment may utilize them, if pre-approved. Areas of the campus beyond the contiguous core may use pedestals, if pre-approved.
   3. Pedestals and cabinets shall be mounted on concrete pads. These housings may include: locking device or hasp, adjustable mounting racket/panel to secure taps, splitters, couplers, line extenders, amplifiers, interdiction device, mounting hardware, reels for cable storage, warning labels, grounding/bonding provisions, identification, manufacturer’s markings, cable knockouts and/or grommets.
   4. When selecting pedestals and cabinets, the designer should consider:
      1. Cable bend radii >15x cable diameter.
      2. Capacity to accommodate four cables for current and future requirements.
      3. Capacity to accommodate both inline and butt splice closures.
      5. Flood control provisions.
      7. Optical cable storage to permit moving the splice closure to a working location.
      8. Ventilation for environmental control and/or heat extraction (forced air fan optional).
      9. Resistance to rodent and insect intrusion.
      10. Environmentally controlled cabinets (fans, heaters, and thermostats included).
      11. Color options.
      12. Impact resistance (vandalism).
      13. Resistance to dust intrusion.
      14. Resistances to water spray.
      15. Chemical resistance.

B. Enclosures
   1. Direct buried enclosures shall not be used as a design element.

C. Vaults
   1. The use of vaults as a shared space with power has been common practice in the past at NMSU. Vaults as a pathway element shall not be used. The use of vaults requiring heavy machinery to gain entry must be avoided.

**PART 2 PRODUCTS**
2.01 MATERIALS

A. Pedestals
   1. Pedestal Manufacturers
      2. Other acceptable manufacturers offering equivalent products.

B. Enclosures
   1. Manufactures
      1. 3M Better Buried Products.
      2. Preformed Line Products REDDI Seal closures.
      3. Other acceptable manufacturers offering equivalent products.
      2. Buried closures shall use re-enterable encapsulate specified by the closure manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer’s instructions.
B. Pedestals
   1. New pedestals shall not be installed, except in exceptional circumstances, pre-approved by NMSU-ICT.
C. Enclosure, direct buried
   1. Direct buried enclosures shall not be used at NMSU.

End of Section

SECTION 33 82 23

OPTICAL FIBER COMMUNICATIONS DISTRIBUTION CABLING

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. The fiber optic backbone cabling system shall be designed in accordance with NMSU-ICT instructions.
B. End points shall be specified by NMSU-ICT.
C. The current design requirement for a building fiber optic feed cable is a 48 count single-mode cable. This cable will be provided and installed at additional project expense. Designers shall note this in all specifications.

End of Section

SECTION 33 82 23.13

OPTICAL FIBER SPLICING AND TERMINATIONS

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Fiber optic cable splicing shall be completed by NMSU-ICT personnel. Designers will note this in all specifications.

End of Section

SECTION 33 82 33

COAXIAL COMMUNICATIONS DISTRIBUTION CABLING

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. Designer shall not anticipate using the current infrastructure. The current infrastructure is being phased out and will use the fiber optic backbone for distribution.

End of Section

SECTION 33 82 43

GROUNDING AND BONDING FOR COMMUNICATIONS DISTRIBUTION

PART 1 GENERAL

1.01 RELATED SECTIONS

A. Section 27 05 26: Grounding and Bonding for Communication Systems (inside cable plant).

1.02 DESIGN REQUIREMENTS
A. Establishing a suitable network ground is critical in grounding network equipment. A network ground is always required. Refer to ANSI-J-STD-607-A standard.

B. The telecommunications grounding system shall have a single point of attachment at the main electrical grounding electrode conductor. Other attachments to the system (to electrical service panels, cold water pipes, etc.) only serve as supplemental connections and shall not be considered primary connections.

C. Without electrical service, specify a driven ground rod which is of ½” in diameter and 8 ft long. (Refer to NEC section 800-40.)

D. This specification does not address overall lightning protection of a structure, with respect to air terminals, surge arrestors on power lines, etc.

E. Outside cable plant
   1. New OSP elements shall have a grounding system installed at the time of construction. Existing OSP elements shall be retrofitted with a grounding system should the need arise.
   2. Cables and support strands on utility poles shall be grounded per code requirements. On NMSU-owned utility poles carrying network cable only, a grounding system may need to be designed for the poles. Design of new cables onto existing poles may require improvements to the existing grounding system to meet code requirements. The existence of a proper grounding system for utility poles cannot be assumed.
   3. Pedestals shall have a properly designed grounding system for all locations.
   4. Copper ground wire shall be green insulated. Designers may specify bare wire for larger size conductors. Conductors may be solid or stranded.

1.03 PROJECT CONDITIONS

A. Contractors shall not make modifications to the telecommunications grounding system without notifying OFS and NMSU-ICT in advance.

B. Contractors shall not attach grounding conductors to aerial (utility pole) grounding systems. Contractors shall notify the appropriate utility (or OFS for NMSU poles with an existing grounding system) to make connection. Contractors installing aerial grounding systems for a NMSU pole without an existing grounding system shall provide all connections at the pole and shall notify OFS of any other ungrounded cables in need of remedial grounding.

PART 2 PRODUCTS

2.01 MATERIALS

UNDER DEVELOPMENT

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all grounding components in compliance with NEC and NESC code requirements.

B. Install all grounding components in compliance with manufacturer’s instructions.

C. Entrance Facility Installations.
1. All OSP cables entering buildings shall be protected, with all conductive elements terminating in building entrance terminals or bonded directly to ground. All OSP cables shall be considered exposed.
2. Install BETs in accordance with manufacturer’s instructions.
3. NMSU-ICT personnel will make grounding connections when on main campus for underground communications cables.
4. Contractors will make grounding connections for all communications cables not on main campus, including aerial cables.

End of Section

SECTION 33 84 00

COMMUNICATIONS DEVICES

PART 1 GENERAL

1.01 DESIGN REQUIREMENTS

A. OSP devices include, but are not limited to, splice cases, cameras, kiosks, card readers, dialers, sensors, etc.
B. Electronic device design and installation are not controlled by this document with respect to the device itself. Location may be controlled by this document in that a pathway to the device may be required. Cabling to electronic devices is controlled by this document for that portion which resides in the outside plant.
C. Non-electric devices (e.g. splices) in the OSP are controlled by this document.

1.02 PROJECT CONDITIONS

A. There is no specific safety information for devices.
B. The location and orientation of OSP devices shall be strictly controlled by NMSU-ICT. Contractors shall confirm all proposed locations and orientations of OSP devices. Visible devices or visible elements of devices, including and supporting structure for OSP devices, shall be pre-approved by NMSU-ICT.
C. Restrictions on OSP devices are on a case-by-case basis without general campus specifications.

PART 2 EXECUTION

2.01 INSTALLATION

A. Proper installation of devices shall require remediation of any past improper installation procedures that would impact the proper installation of the device (e.g. proper grounding).
B. Install in accordance with manufacturer’s instructions.
C. Camera
1. Exterior surveillance cameras shall be installed as directed by NMSU Police Department.
2. Installation of poles or other support structures shall be pre-approved by NMSU-OFS. Any visible, overt installation structures shall be pre-approved by NMSU-OFS.

D. Dialer
   1. No general installation notes. Contact NMSU-ICT-TNS for application-specific instructions.

E. Emergency Telephone
   1. No general installation notes. Contact NMSU-ICT-TNS for application-specific instructions.

F. Kiosk
   1. No general installation notes. Contact NMSU-ICT-NOC for application-specific instructions.

G. Payphone
   1. No general installation notes. Contact NMSU-ICT-TNS for application-specific instructions.

H. Reader
   1. No general installation notes. Contact NMSU-ICT-TNS for application-specific instructions.

I. Wall Phone
   1. No general installation notes. Contact NMSU-ICT-TNS for application-specific instructions.

J. Electronic Signage
   1. No general installation notes. Contact NMSU-ICT for application specific instructions.

End of Section