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Addendum #1

Project Name:	New Residential Housing Facility for the Bridges Project. Southern Hills Drive / NE State Spur 1C @ US Highway 6 & 34 Hastings NE.
Project No.:	10087
Issued:	March 28, 2012
Bid Date:	3:00pm, Thursday, April 5th , 2012
Bid Opening:	State Building Division – Suite 400
Location:	521 South 14th Street, Lincoln, NE 68508-2707

This Addendum is issued to all known bidders before receipt of proposals. This Addendum is to authorize the use of the following information in preparing proposals for the above named project. The bidder **must** enter the number of this Addendum on the **Proposal Sheet.**

1.1 GENERAL CLARIFICATIONS

A. A list of plan holders as of this date can be found at A & D Technical Supply, http://www.adtechplans.com

B. Geotechnical Report. Information regarding the Geotechnical Report for this project is included with this addendum. See Modifications to the Specifications, Section 312001.

1.2 MODIFICATIONS TO THE DRAWINGS

A. Revise the extent of impact resistant gypsum wallboard. The plans indicate that impact resistant gypsum wallboard (092900.B) is to be installed throughout the interior of the houses. The extent is to be changed to the following:

1. Impact resistant gypsum wallboard (092900.B) is to be installed on the walls of the bedrooms, bedroom closets and the hallway adjacent to the bedrooms. All other locations are to have standard strength gypsum wallboard (092900.A).

B. SHEET E401-ELECTRICAL DETAIL AND SCHEDULES

1. Security System devices and head-in equipment are to be by alternate in lieu of being a part of the base bid. Refer to sketch sheet ES-1 for security equipment to be added by alternate bid.

C. SHEET E402-SECURITY DETAILS

1. Security System devices and head-in equipment are to be by alternate in lieu of being a part of the base bid. Refer to sketch sheets ES-2 and ES-3 for security equipment to be added by alternate bid.

1.3 MODIFICATIONS TO THE SPECIFICATIONS

A. TABLE OF CONTENTS
1. The following are to be deleted as these sections are not a part of the specifications: 321313, 329300.
2. 312001 – Geotechnical Report is listed but is not included in the specifications but can be viewed on-line. See language included in this addendum regarding the Geotechnical Report.

B. PROPOSAL FORM
1. Alternates have been incorporated into the documents requiring a new proposal form. See the enclosed revised Proposal Form.

C. SECTION 012300 – ALTERNATES
1. Alternates have been incorporated into the documents. See Section 012300 for a list of the alternates and the requirements of the specification section.

D. SECTION 042000 – UNIT MASONRY ASSEMBLIES
1. Refer to 2.4.6 Products. Sioux City Brick has been added as an acceptable manufacturer.

E. SECTION 071326 – SELF ADHERING SHEET WATERPROOFING
1. Refer to 1.2 SUMMARY, paragraph A. Delete subparagraphs 2, 3, and 4.
2. Refer to PART 2 PRODUCTS: Add Polyguard 650 as an approved substitution.

F. SECTION 072729 – AIR-BARRIER COATINGS
1. Refer to PART 2 PRODUCTS, Vapor-Permeable Air-Barrier Coatings, Products: TK Air Max 2104 VP is to be added as an acceptable substitution.

G. SECTION 230713 – DUCT INSULATION - Refer to page 5. Replace paragraph C, D, E, and F with the following:
C. Concealed, in attic space, rectangular, supply-air duct insulation shall be any of the following:
1. Mineral-Fiber Blanket: 3 Inches thick and 1.5-lb/cu. ft nominal density.
D. Concealed, in attic space, rectangular, return-air duct insulation shall be any of the following:
1. Mineral-Fiber Blanket: 3 Inches thick and 1.5-lb/cu. ft nominal density.

H. SECTION 260519 – BUILDING WIRE AND CABLE
1. Refer to 1.02 REFERENCE STANDARDS. Add the following:

P. ASTM B800 - Standard Specification for 8000 Series Aluminum Alloy Wire for Electrical Purposes - Annealed and Intermediate Tempers.
Q. ASTM B801 - Standard Specification for Concentric-Lay-Stranded Conductors of 8000 Series Aluminum Alloy Wire for Subsequent Covering of Insulation.

2. Refer to 2.02.H.1 Branch Circuits. Should read as follows:

1. Branch Circuits: 12 AWG or 14 AWG as noted on the drawings

3. Refer to 2.03.D.1 Single Conductor Building Wire, Insulation. Add the following to Sub paragraph D.:

2. Aluminum Building Wire (only where specifically indicated or permitted for substitution): Type XHHW-2.

4. Refer to 2.05 Wiring Connectors. Add the following to Sub paragraph C.:

3. Aluminum Conductors: Use compression connectors for all connections.

I. SECTION 260537 – BOXES
1. Refer to 3.02 INSTALLATION. Delete the following paragraphs: Paragraph A, S, T, U, V and W.

J. SECTION 262416 – PANELBOARDS
1. Replace this section with the SECTION 262416 included with this addendum.

K. SECTION 262726 – WIRING DEVICES
1. Replace this section with the SECTION 262726 included with this addendum.

L. SECTION 270513.43 – CABLE SERVICES
1. Add SECTION 270513.43 included with this addendum.

M. SECTION 271001 – STRUCTURED CABLING
1. Add SECTION 271001 included with this addendum.

N. SECTION 280500 – COMMON WORK RESULTS FOR ELECTRONIC SECURITY
1. Add SECTION 280500 included with this addendum.

O. SECTION 281300 – ACCESS CONTROL SYSTEM
1. Add SECTION 281300 included with this addendum.

P. SECTION 282300 – ELECTRONIC VIDEO SURVEILLANCE SYSTEM
1. Add SECTION 282300 included with this addendum.

Q. SECTION 312001 – GEOTECHNICAL REPORT
1. A geotechnical exploration report is available and describes the recommended overexcavation and necessary backfill in each building location.
2. The Geotechnical Report can be viewed on line at A & D Technical Supply, http://www.adtechplans.com

End of Addendum #1

PROPOSAL FORM

The following proposal shall be filled out by each bidder:

Date:

_____

Proposal of:

_____

Name

(a Corporation organized and existing under the laws of the State of

_____)

or

(an Individual trading as:

_____)

TO: State of Nebraska Building Division.

PROJECT: New Residential Housing for the State of Nebraska - Bridges Project.
Southern Hills Drive / NE State Spur 1C @ US Highway 6 & 34 (Hastings NE)**.**

The undersigned in compliance with your Invitation for Bids for construction of the New Residential Housing Facility for the Bridges Project, having examined the plans and specifications with related documents and the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of labor, hereby proposes to furnish all labor, materials and supplies and to construct the project in accordance with the Contract Documents, at the prices stated below. The prices are to cover all expenses incurred in performing the work required under the contract documents of which this proposal is a part.

I (or We) acknowledge receipt of the following addendum or addenda:

_____

The Contractor shall indicate herein the number of consecutive calendar days anticipated to complete the project after commencing work.

_____ calendar days

BASE PROPOSAL

For all work described in the specifications and shown on the plans for the project, I (or we) agree to perform all work for the sum of

_____Dollars

($_____)

(Amount shall be shown in both written form and figures. In case of discrepancy between the written amount and the figures, the written amount will govern.)

ALTERNATES

A. **Alternate No. One:** Add security system devices and head-in equipment as indicated on Sheets ES-1, ES-2, and ES-3 included with Addendum 01..

Add _____ Dollars

B. **Alternate No. Two:** Delete crushed rock base and gravel roadway surfacing, under this alternate, all Crushed Concrete Base and Gravel Roadway Surfacing will be provided under a separate contract

Deduct _____ Dollars

C. **Alternate No. Three:** Provide air cooled heat pump equipment with an EER rating of 11.

Deduct _____ Dollars

D. **Alternate No. Four:** Provide Marflex 5000, cold-fluid applied modified asphaltic waterproofing membrane, with a dry film thickness of 60 mils.

Add/Deduct _____ Dollars

NOTE: The contact will be awarded on a lump sum basis. Number of Calendar Days and ability to perform the work will also be taken into consideration.

A Bidder's Bond, Cashier's Check or Certified Check shall be submitted with this bid document. Each bid must be accompanied by a certified check, cashier's check or a bidder's bond in the amount of five percent (5%) of the total amount of the bid, made payable to the Nebraska State Building Division.

Upon receipt of notice of the acceptance of the bid, the State of Nebraska will issue a formal contract in the form attached and I (or we) will execute said contract within ten (10)) days and deliver Surety Bonds for labor and materials payment and for the faithful performance of this contract.

Respectfully submitted,

By _____

_____

Title

_____

Business Address

SEAL: If bid is by Corporation

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. One: Security System – Devices and Head-In Equipment.

1. Base Bid: Provide wiring only for security system as indicated on the plans as indicated on Sheets E401 and E402 and as specified in Sections 280500, 281300 and 282300.
2. Alternate: Add security system devices and head-in equipment as indicated on Sheets ES-1, ES-2, and ES-3 included with Addendum 01.

B. Alternate No. Two: Gravel Roadway Base and Surfacing.

1. Base Bid: Provide all Crushed Concrete Base and Gravel Roadway Surfacing as indicated on Sheets C310, C320, C330 and C340.
2. Alternate: Delete crushed rock base and gravel roadway surfacing, under this alternate, all Crushed Concrete Base and Gravel Roadway Surfacing will be provided under a separate contract.

C. Alternate No. Three: Reduce EER ratings of Air Cooled Heat Pump Equipment.

1. Base Bid: Air cooled heat pump equipment scheduled on Sheet M401 are indicated to have EER ratings of 12.5 and 13.5.
2. Alternate: Provide air cooled heat pump equipment with an EER rating of 11.

D. Alternate No. Four: Liquid Applied Waterproofing.

1. Base Bid: Self Adhering Sheet Waterproofing system as specified in Section 071326.
2. Alternate: Marflex 5000, cold-fluid applied modified asphaltic waterproofing membrane, with a dry film thickness of 60 mils.

END OF SECTION 012300

SECTION 262416

PANELBOARDS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Load centers.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.

B. NECA 407 - Standard for Installing and Maintaining Panelboards; National Electrical Contractors Association.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

D. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association.

E. NFPA 70 - National Electrical Code; National Fire Protection Association.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations.

H. UL 67 - Panelboards.

I. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.

J. UL 943 - Ground-Fault Circuit-Interrupters.

K. UL 1699 - Arc-Fault Circuit-Interrupters.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
   4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
   5. Notify Architect/Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.4 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
   1. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.

C. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

D. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Panelboard Keys: six of each different key.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Eaton Corporation; Cutler-Hammer Products: www.eaton.com.

B. General Electric Company: www.geindustrial.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

D. Siemens: www.siemens.com

E. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier, where possible.

2.2 ALL PANELBOARDS

A. Provide products listed and labeled by testing firm acceptable to the authority having jurisdiction as suitable for the purpose indicated.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet.
   2. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
      b. Panelboards Containing Fusible Switches: Between -22 degrees F and 104 degrees F.

C. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating as indicated on the drawings.
   2. Listed series ratings are acceptable only where specifically indicated.
   3. Label equipment utilizing series ratings as required by NFPA 70.

D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
   2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

G. Conductor Terminations: Suitable for use with the conductors to be installed.

H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Indoor Clean, Dry Locations: Type 1.
   2. Boxes: Galvanized steel unless otherwise indicated.
      a. Provide wiring gutters sized to accommodate the conductors to be installed.
   3. Fronts:
      a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.

b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
c. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.

2.3 LOAD CENTERS

A. Load centers are acceptable .

B. Description: Circuit breaker type load centers listed and labeled as complying with UL 67; ratings, configurations, and features as indicated on the drawings.

C. Bussing:
1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Bus Material: Aluminum or copper.

D. Circuit Breakers: Thermal magnetic plug-in type.

E. Enclosures:
1. Provide surface-mounted or flush-mounted enclosures as indicated.
2. Fronts: Provide hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
3. Provide circuit directory label on inside of door or individual circuit labels adjacent to circuit breakers.

2.4 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
2) 14,000 rms symmetrical amperes at 480 VAC.
b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
3. Conductor Terminations:
a. Provide mechanical lugs unless otherwise indicated.
b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
6. Provide the following circuit breaker types where indicated:
a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
b. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Combination type listed as complying with UL 1699.
7. Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.
8. Provide listed high intensity discharge lighting rated circuit breakers with HID marking for all branch circuits serving HID lighting.
9. Do not use tandem circuit breakers.
10. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
11. Provide the following features and accessories where indicated or where required to complete installation:

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install panelboards securely, in a neat and workmanlike manner in accordance with NECA 1 (general workmanship), NECA 407 (panelboards), and NEMA PB 1.1.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required supports in accordance with Section 260529.

E. Install panelboards plumb.

F. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

G. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.

H. Mount floor-mounted power distribution panelboards on properly sized 3 inch high concrete pad.

I. Provide grounding and bonding in accordance with Section 260526.

J. Install all field-installed branch devices, components, and accessories.

K. Set field-adjustable ground fault protection pickup and time delay settings as indicated.

L. Provide filler plates to cover unused spaces in panelboards.

M. Identify panelboards in accordance with Section 260553.

3.3 FIELD QUALITY CONTROL

A. Test GFCI circuit breakers to verify proper operation.

B. Test AFCI circuit breakers to verify proper operation.

C. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.4 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

3.5 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 262726
WIRING DEVICES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Wall switches.

B. Receptacles.

C. Device plates and box covers.

1.2 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association.

B. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.

C. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association.

D. NFPA 70 - National Electrical Code; National Fire Protection Association.

E. UL 20 - General-Use Snap Switches.

F. UL 498 - Attachment Plugs and Receptacles.

G. UL 514D - Cover Plates for Flush-Mounted Wiring Devices.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Notify Architect/Engineer of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

1.4 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.5 DELIVERY, STORAGE, AND PROTECTION

A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cooper Wiring Devices: www.cooperwiringdevices.com.

B. Hubbell Incorporated: www.hubbell-wiring.com.

C. Leviton Manufacturing Company, Inc: www.leviton.com.

D. Pass & Seymour, a brand of Legrand North America, Inc: www.legrand.us

E. Source Limitations: Where possible, for each type of wiring device furnish products produced by a single manufacturer and obtained from a single supplier.

2.2 ALL WIRING DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

B. Finishes
1. Device Color: Ivory unless otherwise indicated or required by code; brown in dark brick, wood paneled or dark-finished walls.

2.3 WALL SWITCHES

A. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

B. Acceptable products are for residential grade device types.

C. Standard Switches: 20A,and 15 amp 120 V AC. Use 20A for mechanical equipment disconnects and use 15 amp for lighting loads.

2.4 RECEPTACLES

A. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

B. Acceptable products are for residential grade device types.

C. Straight Blade Receptacles: 15A 125V.

2.5 WALL PLATES

A. All Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
2. Screws: Metal with slotted heads finished to match wall plate finish.

B. Cover Plates: Type 302 or 304, satin finished stainless steel, minimum thickness 0.03 inches.

C. Weatherproof Cover Plates: Cast aluminum, weatherproof while in use, suitable for the device installed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify that conditions are satisfactory for installation prior to starting work.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.3 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130.

B. Coordinate locations of outlet boxes provided under Section 260537 as required for installation of wiring devices provided under this section.
   1. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
   2. Where multiple devices are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
   3. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer or by using screw-actuated pressure plate. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Provide GFI receptacles with integral GFI protection at each location indicated. Do not use feed-through wiring to protect downstream devices unless otherwise indicated.

I. Install wiring devices plumb and level with mounting yoke held rigidly in place.

J. Install wall switches with OFF position down.

K. Install dimmers such that derating is not required.

L. Install vertically mounted receptacles with grounding pole on bottom.

M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

O. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas and above accessible ceilings.

3.4 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

C. Test each receptacle to verify operation and proper polarity.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.5 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.6 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 270513.43

CABLE SERVICES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section includes master antenna television systems (MATV) using a community antenna television cable (CATV) service or Satellite Earth-Station System as the signal source.

1.2 RELATED SECTIONS

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

B. When included as a part of this specification, the following contain related requirements:
   1. Section 27 1001 Structured Cabling (short spec)

1.3 RELATED DOCUMENTS:

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

1.4 DEFINITIONS:

A. CATV: Community antenna television.

B. CCTV: Closed-circuit television.

C. MATV: Master antenna television.

D. NTSC: National television system committee.

E. RF: Radio frequency.

1.5 SUBMITTALS:

A. Product Data: Include detailed manufacturer's specifications for each component specified. Include data on features, ratings, and performance.

B. Shop Drawings: For television equipment. Include plans, eleva-tions, sections, details, and attachments to other Work.
   1. Design Calculations: Calculate requirements and perform structural analysis for installed products including selec-tion of seismic restraints, signed and sealed by the quali-fied professional engineer responsible for their prepara-tion.
   2. Include dimensioned plan and elevation views of components and enclosures, and details of control panels. Show access and workspace requirements.
   3. Wiring Diagrams: Power, signal, and control wiring. Dif-ferentiate between manufacturer-installed and field-installed wiring.

C. Coordination Drawings: Plans drawn to scale and coordinating lo-cations of television equipment. Show the following:
   1. Ceiling suspension assembly members.
   2. Method of attaching hangers to building structure.
   3. Location of items requiring installation coordination in-cluding lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and other architectural fea-tures.

D. Samples: Full size, for each outlet and finish plate, for colors and textures required.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

F. Field Test Reports: Indicate and interpret test results for com-pliance with performance requirements of installed systems.

G. Maintenance Data: For television equipment and components to in-clude in maintenance manuals specified in Division 1. In addi-tion to requirements specified in Division 01 Section "Contract Closeout" or in Division 26 Section “Common Work Results for Electrical,” include the following:

1. Detailed operating instructions covering operation under both normal and abnormal conditions.
2. Routine maintenance requirements for system components.
3. Lists of spare parts and replacement components recommended to be stored at the site for ready access.

H. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE:

A. Installer Qualifications: An experienced installer who is an au-thorized representative of the television equipment manufacturer, for both installation and maintenance of units required for this Project, to supervise installation of the system.

B. Testing Agency Qualifications: Testing agency that is a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
1. Testing Agency's Field Supervisor: Person currently certi-fied by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies, to supervise on-site testing specified in Part 3.

C. Product Options: Drawings indicate size, profiles, and dimen-sional requirements of television equipment and are based on the specific system indicated. Other manufacturers' products comply-ing with requirements may be considered. Refer to Division 1 Section "Substitutions" or Division 26 Section “Common Work Re-sults for Electrical.”

D. Electrical Components, Devices, and Accessories: Listed and la-beled as defined in NFPA 70, Article 100, by a testing agency ac-ceptable to authorities having jurisdiction, and marked for in-tended use.

E. Comply with NFPA 70.

F. Comply with 47 CFR 15, 17, and 76.

1.7 PROJECT CONDITIONS:

A. Environmental Limitations: System components are equipped and rated for the environments where installed.
1. Service Conditions for Outdoor Equipment: Rate equipment for continuous operation under the following environmental conditions, unless otherwise indicated:
a. Temperature: Minus 22 deg F to plus 122 deg F.
b. Relative Humidity: 5 to 100 percent.
c. Weather: Enclosure housings to prevent entry of moisture due to melting ice build-up or driven rain or snow.
2. Service Conditions for Indoor Equipment: Rate equipment for continuous operation under the following environmental conditions, unless otherwise indicated:
a. Temperature: 32 deg F to 122 deg F.
b. Relative Humidity: 0 to 95 percent.

1.8 COORDINATION:

A. Coordinate Work of this Section with requirements of CATV service provider.

B. Coordinate layout and installation of television equipment and suspension system components with other construction that pene-trates ceilings or is supported by them, including light fix-tures, HVAC equipment, fire-suppression-system components, and partition assemblies.

C. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork re-quirements are specified in General Construction specifications.

1.9 WARRANTY:

A. Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run con-current with, other warranties made by Contractor under require-ments of the Contract Documents.

B. Special Warranty for Television System and Components: Written warranty, signed by manufacturer and Installer agreeing to correct system deficiencies and replace compo-nents that fail in materials or workmanship within speci-fied warranty period when installed and used

according to manufacturer's written instructions. This warranty shall be in addition to, and not limiting, other rights Owner may have under other provisions of the Contract Documents.

C. Special Warranty Period: 2 years from date of Substantial Completion.

1.10 EXTRA MATERIALS:

A. Furnish extra materials described below, before installation be-gins, that match products installed and that are packaged with protective covering for storage and identified with labels de-scribing contents. Provide not less than one of each item listed below. Deliver extra materials to Owner.
1. Fuses: One for every 10; each type and rating.
2. Splitters: One for every 10 installed.
3. MATV Attenuators: One for every 10; each type used.
4. Cable: 100 feet; each type used.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. MATV System Components:
a. Blonder Tongue Laboratories, Inc.
b. Channell Company.
c. General Instrument Corp.; Jerrold Div.
d. RMS.
e. CE Labs.
f. Drake.
g. Multiplex Technology, Inc.
h. Pico Macom, Inc.
2. Satellite Earth-Station Systems:
a. Anderson Manufacturing, Inc.
b. Blonder Tongue Laboratories, Inc.
c. Channel Master, Inc.
d. Chaparral Communications, Inc.
e. Comtech Antenna Systems, Inc.

2.2 TELEVISION SYSTEMS:

A. Components: Modular plug-in, heavy-duty, industrial- or commer-cial-grade units.

B. Equipment: Silicon-based, solid-state, integrated circuit de-vices.

C. Power Supply Characteristics: Devices shall be within specified parameters for ac supply voltages within the range of 105 to 130 V.

D. Protect signal cables and connected components against transient-voltage surges by suppressors and absorbers designed specifically for the purpose.

E. RF and Video Impedance Matching: Signal-handling components, in-cluding connecting cable, shall have end-to-end impedance-matched signal paths. Match and balance devices used at connections where it is impossible to avoid impedance mismatch or mismatch of balanced circuits to unbalanced circuits.

2.3 MATV COMPONENTS:

A. Distribution and trunk amplifiers, couplers, splitters, connectors, taps and outlets shall be the standard product of one manufacturer to constitute a fully compatible, complete and operational system.

B. Signal-Path Adaptation Components: Units consistent with speci-fied levels of overall system performance. Include the following where necessary for indicated functional requirements whether shown in system diagrams or not:
1. Modulators.
2. Demodulators.
3. Processors.

4. Descramblers.
5. Decoders.
6. Converters.

C. Preamplifiers: Coaxial-down-lead-broadband or single-channel type, inherently protected against lightning and voltage surges and enclosed in weatherproof housings. Use antenna cable for power supply from external source.

D. Head-End Equipment: Include filters, processors, broadband and single-channel amplifiers combining networks, power supplies, and other equipment as required to provide specified performance. House units in standard 19-inch electronic equipment cabinet.

E. Signal Traps: Packaged filters tuned to interference frequencies encountered in Project.

F. Attenuators: Fixed to balance signal levels.

G. Terminating Resistors: Enclosed units rated 0.5 W and matched for coaxial impedance.

H. Outlets: Flush, female type with metallic parts of anodized brass, beryllium copper, or phosphor bronze.
1. Wall Plates: Match materials and finish of power outlets in the same space.
2. Attenuation: Less than 0.1 dB.
3. Voltage Standing Wave Ratio: Less than 1.15 to 1.

2.4 AMPLIFIERS:

A. Distribution Amplifiers:
1. 31 dB amplifier to be Blonder-Tongue BIDA 86A-30P or ap-proved equal.
2. 43 dB amplifier to be Blonder-Tongue BIDA 86A-43P or ap-proved equal.

B. Trunk Amplifiers:
1. 36 dB amplifier to be Motorola BLE87S/H** or approved equal.

2.5 SIGNAL TRANSMISSION COMPONENTS:

A. Cable: Coaxial cable elements have 75-ohms nominal impedance.

B. Cable: Coaxial cable elements have 75-ohms nominal impedance and are 100 percent factory-sweep tested to meet or exceed require-ments of NFPA 70, Articles 725, 800, and 820. Cables run in enivironmental air spaces are listed for use in plenums.
1. Satellite Antenna Cable: RG-11/U; cellular-polyethylene dielectric, tinned-copper braid shield with 100 percent shielding factor, No. 18 AWG solid copper conductor; and PVC jacket.
2. CATV Indoor Trunk Cable: RG-11/U; cellular-polyethylene dielectric, foil shield and aluminum braid shield with 60 percent minimum shielding factor, No. 14 AWG solid copper-clad-steel conductor; and PVC jacket.

C. Connectors: AV coaxial connectors to be 75-ohm self-terminating type "F" connector compression-style fittings.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine pathway elements intended for cable. Check raceways, ca-bles trays, and other elements for compliance with space alloca-tions, installation tolerances, hazards to cable installation, and other conditions affecting installation.

B. Examine roughing-in for antenna to verify actual locations of ca-ble connections before antenna installation.

C. Examine walls, floors, roofs, equipment bases, and roof supports for suitable conditions where television equipment is to be in-stalled.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

A. Outdoor Installation: Comply with ANSI C2, "National Electrical Safety Code."

B. Install surge suppressors where ac-power-operated devices are not protected against voltage transients by integral surge suppres-sors specified in UL 1449. Install surge suppressors at the de-vices' power-line terminals. Comply with Section 26 2700 “Low Voltage Distribution Equipment.”

C. Support and anchor antenna towers, masts, and mountings.
   1. Concrete Foundations: Reinforced concrete complying with General Construction specification.
   2. Steel Anchorage Components: Galvanized-steel shapes and plates complying with General Construction specification.

D. Wiring Method: Conceal wiring except in unfinished spaces.

E. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufac-turer's limitations on bending radii. Provide and use lacing bars and distribution spools.

F. Pulling Cable: Do not exceed manufacturer's recommended pulling tensions. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during in-stallation and replace it with new cable.

G. Exposed Cable: Install parallel to building lines, follow sur-face contours, and support the cable according to manufacturer's written instructions. Do not run adjacent and parallel to power or data cables.

H. Equalizing Video Signals: Where system performance may be de-graded in certain operating modes, revise component connections and install video distribution amplifiers and attenuators as re-quired to provide a balanced signal across the system.

I. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

J. Grounding: Provide independent signal circuit grounding recom-mended by manufacturer.

3.3 IDENTIFICATION:

A. Identify system components, wiring, cabling, and terminals ac-cording to Section 27 0553.01 “Identification for Communications Systems.”

3.4 FIELD QUALITY CONTROL:

A. Testing: Owner will engage a qualified testing agency to perform field quality-control testing.

B. Testing: Engage a qualified testing agency to perform field quality-control testing.

C. Manufacturer's Field Service: Engage a factory-authorized ser-vice representative to inspect field-assembled components and equipment installation and supervise pretesting, testing, and ad-justing of television equipment.

D. Inspection: Verify that units and controls are properly in-stalled, connected, and labeled and that interconnecting wires and terminals are identified.

E. Pretesting: Align and adjust system and pretest components, wir-ing, and functions to verify that they comply with specified re-quirements. Replace malfunctioning or damaged items. Retest un-til satisfactory performance and conditions are achieved. Pre-pare television equipment for acceptance and operational testing as follows:
   1. CATV Sources: Connect the receiver to an agile demodulator or CATV set-top converter at the CATV service entrance to the facility.

F. Test Schedule: Schedule tests after pretesting has successfully been completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.

G. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.

H. Qualitative and Quantitative Performance Tests: Demonstrate re-ception quality of color-television program transmissions at each system outlet from each designated channel and source. Quality shall be equal to or superior than that obtained with performance checks specified below, using a

standard, commercial, cable-ready, color-television receiver. Level and quality of signal at each outlet and from each designated channel and source shall comply with the following Specifications when tested according to NCTA-02 or 47 CFR 76:

1. RF Video Carrier Level: Between 2 and 12 dB mV.
2. Relative Video Carrier Level: Within 3 dB to adjacent channel.
3. Carrier Level Stability, Short Term: Level does not change more than 0.5 dB during a 60-minute period.
4. Carrier Level Stability, Long Term: Level does not change more than 2 dB during a 24-hour period.
5. Broadband Frequency Response: More than the 54- to 220-MHz frequency range, signal amplitude is plus or minus 3 dB, maximum.
6. Channel Frequency Response: Across any 6-MHz channel in the 54- to 220-MHz frequency range, referenced to video carrier, signal amplitude is plus or minus 1 dB, maximum, unless otherwise indicated.
7. Carrier-to-Noise Ratio: 45 dB or more, unless otherwise indicated.
8. RF Visual Signal-to-Noise Ratio: 43 dB or more.
9. Cross Modulation: Less than minus 50 dB.
10. Carrier-to-Echo Ratio: More than 40 dB.
11. Composite Triple Beat: Less than minus 53 dB.
12. Second Order Beat: Less than minus 60 dB.
13. Terminal Isolation TV to TV: 25 dB, minimum.
14. Terminal Isolation between TV and FM: 35 dB, minimum.
15. Hum Modulation: 2 percent, maximum.
16. RF FM Carrier Level: 13 to 17 dB below video carrier level.
17. FM Frequency Response: More than the 88- to 108-MHz fre-quency range, signal amplitude is plus or minus 0.75 dB, maximum.
18. FM Carrier-to-Noise Ratio: More than 24 dB.

I. Record test results.

J. Retest: Correct deficiencies identified by tests and observa-tions and retest until specified requirements are met.

3.5 CLEANING:

A. Clean installed items using methods and materials recommended by manufacturer.

B. Clean MATV system components, including antennas and supports, head-end equipment, distribution components, and outlets.

C. Clean CCTV system components, including camera-housing windows, lenses, and monitor screens.

3.6 DEMONSTRATION:

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain television equipment.

1. Train Owner's maintenance personnel on procedures and schedules for troubleshooting, servicing, and maintaining equipment.
2. Demonstrate methods of determining optimum alignment and adjustment of components and settings for system controls.
3. Demonstrate programming and tuning of satellite receivers.
4. Review data in maintenance manuals. Refer to Division 1 Section "Operation and Maintenance Data" or Division 26 Section “Common Work Results for Electrical.”
5. Schedule training with Owner, through Architect/Engineer, with at least seven days' advance notice.
6. Conduct a minimum of six hours' training as specified in instructions to Owner's employees in Division 1 Section "Contract Closeout" or Division 26 Section “Common Work Re-sults for Electrical.”

3.7 ON-SITE ASSISTANCE:

A. Occupancy Adjustments: When requested by Owner within one year of date of Substantial Completion, provide on-site assistance in tuning and adjusting the system to suit actual occupied

condi-tions and to optimize performance. Provide up to two adjustments at Project site for this purpose, without additional cost.

END OF SECTION

SECTION 271001

STRUCTURED CABLING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 and related Division 26 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section describes the general telecommunications infrastructure requirements of these specifications and applies to all phases of the work specified, indicated on the drawings, or required to provide for the complete installation of telecommunications infrastructure for this project.

1.3 DEFINITIONS

A. Telecommunications Cables: Term includes horizontal and backbone copper, fiber optic, and coaxial cabling; copper and optical outside plant cables; copper audio/visual cables; CCTV cables; building environmental, automation, and security wiring systems.

B. Telecommunications Pathways: A cable distribution system consisting of raceways, cable trays, racks, and ladders; conduits; distribution rings and mechanical cable supporting devices.

1.4 WARRANTIES

A. The Contractor shall warrant all materials, workmanship, and equipment against defects for a period of one year after the date of substantial completion. The Contractor shall repair or replace, at no additional cost to the Owner, any item which may become defective within the warranty period. Any manufacturers' warranties concerning any item installed will run to the benefit of the Owner.

1.5 ABBREVIATIONS

A. The following abbreviations apply throughout this section:
   1. ASTM Specification: Standard specifications of the American Society for Testing Materials.
   2. EMI: Electromagnetic interference.
   3. FO: Fiber optic.
   4. IDC: Insulation displacement connector.
   5. LAN: Local area network.
   6. MM: Multimode.
   7. NEC: National Electrical Code, latest edition.
   8. PVC: Polyvinyl chloride.
   9. SM: Single mode.
   10. Underwriters or UL: Underwriters Laboratories, Inc.
   11. UTP: Unshielded twisted pair.

1.6 QUALITY ASSURANCE

A. Provide a minimum 15-year structured cabling application assurance warranty.

B. Comply with NFPA 70.

C. Comply with ANSI/TIA/EIA-568-B.1 Commercial Building Telecommunications Cabling Standard – Part 1 General Requirements.

D. Comply with ANSI/TIA/EIA-568-B.2 Commercial Building Telecommunications Cabling Standard – Part 2 Balanced Twisted-Pair Cabling Components.

E. Comply with ANSI/TIA/EIA-568-B.3 Optical Fiber Cabling Components Standard.

F. Comply with ANSI/TIA/EIA 569-A Commercial Building Standard for Telecommunications Pathways and Spaces.

G. ANSI/TIA/EIA-758 Customer-Owned Outside Plant Telecommunications Standard.

H. Comply with BICSI Telecommunications Distribution Methods Manual, current edition.

I. Comply with BICSI Customer-Owned Outside Plant Design Manual, current edition.

1.7 SUBMITTALS

A. Field quality-control test reports.

B. Construction record drawings including station outlet numbers.

C. Product data.

1.8 COORDINATION

A. Coordinate and schedule all construction work with the Owner and occupant prior to beginning work. Do not interrupt building activities without strict coordination with the Owner and occupant. Unscheduled appearance to work in the spaces without prior scheduling with the Owner is not allowed.

B. Coordinate layout and installation of voice and data communication cabling with Owner's telephone switch, telephone instrument, workstation, telecommunications and LAN equipment suppliers. Coordinate service entrance arrangement with local exchange carrier.

C. Coordinate installation of telecommunications cabling with the raceway installer. Verify raceways are installed according to current EIA/TIA standards before installing cable.

D. Coordinate with pathway installer to ensure that EIA/TIA distance limits and installation tolerances are maintained. Outlets that are beyond EIA/TIA distance shall be brought to the Owner/Engineer's attention as soon as possible. Owner/Engineer shall not be responsible for outlets beyond distance limits as a result of incorrectly routed pathways.

E. Coordinate with pathway installer to ensure that EIA/TIA distance limits and installation tolerances are maintained. Outlets that are beyond EIA/TIA distance shall be brought to the Owner/Engineer's attention as soon as possible. Owner/Engineer shall not be responsible for outlets beyond distance limits as a result of incorrectly routed pathways.

PART 2 PRODUCTS

2.1 MATERIALS

A. Unless otherwise specified, all materials and equipment shall be new, unused, and undamaged. Materials and equipment shall be the current and standard designs of manufacturers regularly engaged in their production.

B. Manufacturers: Subject to compliance with requirements.

C. Cable Management and Equipment Support:
1. Raceway and Boxes: Comply with Division 26 Section "Conduit" and "Boxes."
2. Backboards: 3/4-inch, A/C rated, interior-grade, fire-retardant-treated plywood.
3. Cabinets:
   a. Wall-mount Cabinets:
      1) Designed so access to all internal components can be from the front or rear of the cabinet body by way of a dual hinge design. Symmetrical in design to allow front and rear sections to open left or right.
      2) Design Basis: Chatsworth CUBE-IT
4. Vertical Cable Management:
   a. Include components that aid in routing, managing, and organizing cable to and from equipment, protect network equipment by controlling cable bend radius and providing cable strain relief, and a universal design mounted to EIA 19-inch racks.
5. Horizontal Cable Management:
   a. Include components that aid in routing, managing, and organizing cable to and from equipment, protect network equipment by controlling cable bend radius and providing cable strain relief, and a universal design mounted to EIA 19-inch racks.
   b. Install the horizontal cable management panel in between each patch panel.

6. Distribution Rings:
   a. Wall Mounted 6-Inch D-Rings:
      1) Plastic: Chatsworth No. 10812-001 or equivalent
      2) Metal: Senior Industries No. 4754 or equivalent
   b. Wall Mounted 4-Inch D-Rings:
      1) Plastic: Chatsworth No. 12127-001 or equivalent
      2) Metal: Senior Industries No. 4753 or equivalent
      3) Post Type: Chatsworth No. 15002-002 or equivalent
7. Cable Bundling Hardware:
   a. Reusable Velcro cable ties.

D. Twisted-Pair Cables, Connectors, and Terminal Equipment
1. Horizontal Cables: Listed as complying with Category 6 of TIA/EIA 568-B.
   a. Horizontal Cables: Listed as complying with Category 6 of TIA/EIA 568-B.
   b. Manufcature: CommScope
   c. Voice: White in color
   d. Data: Blue in color
2. UTP Cable Connecting Hardware:
   a. Patch Panel:
      1) Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
      2) Provide patch panels wired 568B in each communications closet to terminate data station cables. Mount in equipment racks. See detail drawings.
      3) Manufacture: Commscope
   b. Punch-Down Blocks:
      1) Type: 110
      2) Provide punch-down blocks for termination of voice cables. Mount blocks in 19" wall mount cabinet. Allow adequate space for installation of cross-connect wires. Provide jumper management to neatly arrange jumper cables.
      3) Provide 4-pair connecting blocks for termination of station cables. Provide 5-pair connecting blocks for termination of entrance cable.
      4) Manufacture: Commscope

E. Cable Bundling Products:
1. Reusable, adjustable, cable straps, capable of withstanding fastening to wall with screws or equipped with snap-and-button fasteners. Black in color. With or without cinch ring as applicable.

F. Jacks and Jack Assemblies for UTP Cable: Modular, color-coded, RJ-45 receptacle units with integral IDC-type terminals.
1. Voice Jack:
   a. Mounting: in modular faceplate
   b. TIA/EIA Category: 3
   c. Pins: 8
   d. Connection: USOC
   e. Color: White
2. Voice Jack (Wall Phone):
   a. Mounting: Wall plate with studs to support phone
   b. TIA/EIA Category 3
   c. Plate: Stainless steel
   d. Pins: 8
   e. Connection: USOC
3. Data Jack:
   a. Mounting: In modular faceplate
   b. TIA/EIA Category: 6
   c. Connection: T568B
   d. Color: Gray
4. Provide a filler for each unused faceplate opening.
5. Install jacks in outlet boxes indicated on drawings. Provide faceplates as required.

6. Manufacture: Commscope

G. UTP Patch Cords:
1. Four-pair cables terminated with RJ-45 plug at each end.
2. Category 6.
3. Color:
a. Blue for data.
4. The same manufacturer as the connectivity.
5. Lengths:
a. Workstation: 10 feet.
b. Closet: 10 feet.
6. Lengths listed above are for bidding purposes only. Coordinate specified length and color with Owner prior to purchasing cords.
7. Provide one workstation patch cord for each port at outlet assembly.
8. Provide one closet patch cord for each port at outlet assembly.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Horizontal Cable:
1. Provide horizontal cables from each outlet to the nearest communication closet as indicated on the drawings.
2. Route cables from outlets to communication closets so that the maximum cable length is 295 feet or 90M. Install cables parallel to the building structure.
3. Neatly arrange cables in cable trays and in telecommunications rooms.
4. For areas and locations that are close to EIA/TIA distance limits, run a length test on proposed routing to said area or location. Inform Owner and Engineer of any jacks beyond EIA/TIA distance limits. Owner and Engineer shall not be responsible for out-of-distance outlets that are not tested prior to installation.

B. Provide cutover connections necessary to transfer voice and data communication signals to the new cable system.

C. Protect the existing electronics, cables, and enclosures from possible damage as there are active circuits and equipment in the building.

D. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

E. Provide supports as required for vertical cable runs. Provide three supports per floor and a service loop or offset every three floors to allow for proper strain relief.

F. Terminate cables in accordance with EIA/TIA-568-B Commercial Building Telecommunications Wiring Standard, observing the industry standards for terminating the various types of color coded cables within a building.

G. Adequately support cables from building structure in such a manner that the cable will not be damaged by normal building use. Provide strain relief for the cables above suspended ceilings, and where any continuous cable support system is interrupted, using mechanical fasteners such as Category 5 rated J-hooks and other necessary devices to support cables from the structure or ceiling support. Do not use suspended ceiling support wires or ceiling grid to support telecommunications cabling.

H. Route cables in a direct path between the termination points. Neatly arrange cables in cable trays and in communication closets. Provide “D” rings spaced a maximum of 12 inches on center to support cables run on the face of any plywood wall.

3.3 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

3.4 SYSTEM REQUIREMENTS

A. Expansion Capability: Unless otherwise indicated, provide spare fiber optic strands and copper conductor pairs in cables to accommodate 20 percent future increase in active workstations.

3.5 APPLICATION OF MEDIA

A. Backbone Cable for Data Service: Use fiber-optic cable for runs between equipment rooms and telecommunications rooms and for runs between telecommunications rooms.

B. Backbone Cable for Voice Service: Use UTP Category 3 cable for runs between equipment rooms and telecommunications rooms and for runs between telecommunications rooms.

C. Horizontal Cable for Data Service: Use UTP Category 5e cable for runs between telecommunications rooms and workstation outlets.

D. Horizontal Cable for Voice Service: Use UTP Category 3 cable for runs between telecommunications rooms and workstation outlets.

E. Campus Voice Backbone Cable: Use direct buried cable for runs between buildings.

F. Campus Data Backbone Cable: Use direct burial cable for runs between buildings.

3.6 TELECOMMUNICATIONS LABELING

A. Quality Assurance:
   1. Comply with ANSI/TIA/EIA-606 administration Standard for the Telecommunications Infrastructure at Commercial Buildings.

B. Identification Products:
   1. Cable Labels: Self-Adhesive vinyl or vinyl-cloth wraparound tape markers, machine printed with alphanumeric cable designations.
   2. Label Maker: Brady I.D. Pro or approved equivalent.

C. Identification and Labeling:
   1. General Label Requirements:
      a. Mechanically print and install all labels per drawing details.
      b. Format: Select font size to be readable and to fit all information required without overlap of text.
      c. Use all capital letters.
      d. Clean all surfaces prior to attachment of any label. Follow manufacturer's recommendations for cleaning and affixing labels.
   2. Telecommunications Outlets and Termination Hardware:
      a. Label each station outlet block, station outlet faceplate, and patch panel per drawing details.
   3. Inside Plant Cables:
      a. Label Location: Within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
      b. Label Information: Cable number. Follow Owner standards.
      c. Method: Brady cable labels appropriately sized or approved equal.

3.7 TELECOMMUNICATIONS TESTING AND DOCUMENTATION

A. General Testing Requirements:
   1. Install and terminate cables prior to testing.
   2. Reterminate and retest cables which fail.
   3. Replace cables which fail the second test.
   4. Utilize cable testing equipment capable of generating a report for each cable tested. Provide a hard copy report per TIA/EIA-568-B.
   5. Provide certification reports printed on 8-1/2 inch x 11 inch sheets. Provide one or more three-ring binders as required to contain reports. Provide a separate tab for each group of

cables served from a common communication room. Provide an additional tab for backbone cables. Present cable testing results in a matrix format.

6. Perform Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.
7. Inspect for physical damage and test each conductor signal path for continuity and shorts. Test for faulty connectors, splices, and terminations.
8. Each Voice and data cable link shall be tested and conform to the most current ANSI TIA-568 Commercial Building Telecommunications Cabling Standard. Testing shall be accomplished using level III or higher field testers.

B. Copper Horizontal Cable Testing:
1. Test horizontal cables from the punch-down blocks, patch panels, or other termination equipment, to the jacks unless otherwise noted.
2. Test horizontal cables from punch-down block to punch-down block.
3. Field Test Requirements for a Category 6 Balanced Twisted-Pair Cabling System:
a. General Requirements:
1) Test every cabling link in the installation in accordance with the Telecommunications Industry Association (TIA) Standard ANSI/TIA/EIA-568B, 100-Ohm Twisted-Pair Transmission Performance and Field Test Requirements.
2) The installed twisted-pair horizontal links shall be tested from the IDF in the telecommunications room to the telecommunications wall outlet in the work area against the “Permanent Link” performance limits specification as defined in ANSI/TIA/EIA-568-B.
3) Test 100 percent of the installed cabling links. All cable links must pass the requirements of the standards mentioned above and as further detailed below.
b. Performance Test Parameters:
1) Test all horizontal copper station cables according to the parameters set for in the TIA/EIA-568-B Standard. The test of each link must contain the following parameters as detailed below. In order to pass the Category 6 link test, all measurements at each frequency in the range from 1 MHz through 250 MHz must meet or exceed the limit value determined in the above-mentioned Category 6 standard.
2) Perform the following tests as defined in TIA/EIA-568-B: Wire map, length, insertion loss (attenuation), NEXT loss, pair-to-pair PSNEXT loss, ELFEXT loss, pair-to-pair PSELFEXT loss, return loss, ACR, PSACR, propagation delay and delay skew.
c. Test Result Documentation:
1) Record the test results information for each link in the memory of the field tester upon completion of the test.
2) Transfer the test results records saved by the tester into a Windows™-based database utility that allows for the maintenance, inspection and archiving of these test records. Guarantee that the measurement results are transferred to the PC unaltered, i.e., “as saved in the tester”, at the end of each test and that these results cannot be modified at a later time.
3) Provide a paper copy of the test results that lists all the links that have been tested with the following summary information:
(a) The identification of the link in accordance with the naming convention defined in the overall system documentation.
(b) The overall Pass/Fail evaluation of the link-under-test including the NEXT Headroom (overall worst case) number.
(c) The date and time the rest results were saved in the memory of the tester.

C. Category 3 Voice Cable Testing:
1. Test every cabling link in the installation in accordance with the TIA standard 568-B, 100-OHM twisted-pair transmission performance and field test requirements.

2. Test for continuity and wire map.

END OF SECTION

SECTION 280500
COMMON WORK RESULTS FOR ELECTRONIC SECURITY

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section includes basic design requirement specifications for electronic security systems (ESS). This section contains requirements that pertain to other Division 28 security specifications such as requirements for warranty, submittals, quality assurance, record drawings, installation, demonstrations and operator training. The term Security System Integrator (SSI) shall apply to the installation contractor for the division 28 security specification sections.

B. Acceptable Bidder (no others approved) per the State of Nebraska office of the CIO
   1. Johnson Controls. 14238 Hillsdale Circle, Omaha, NE 68137
   2. Mark A. Clarke, 402-891-5856

1.2 RELATED SECTIONS

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

B. When included as a part of this specification, the following contain related requirements:
   1. Section 27 1001 Structured Cabling (short spec)
   2. Section 28 1300 Electronic Access Control System
   3. Section 28 2300 Electronic Video Surveillance System

1.3 DEFINITIONS

A. Install: Supply labor to construct complete system, ready for intended use utilizing Owner-provided materials.

B. Furnish: Supply and deliver to the site, ready for use, items required to complete tasks or perform tests required to build a complete ready-to-use system.

C. Provide: Furnish, install, connect and test, supplying required labor to construct a complete system, ready for the intended use.

D. Contractors Field Test (CFT): Test performed by the contractor to verify device functionality in the field.

E. Performance Verification Test (PVT): Test performed by the contractor in the presence of the Owners Representative verifying a fully operational system.

1.4 WARRANTIES

A. The Contractor shall warrant all materials, workmanship, and equipment against defects for a period of one year after the date of substantial completion. Certain equipment shall be warranted beginning at the time of final acceptance or for longer periods of time as specified in those sections of the Project Manual. The Contractor shall repair or replace, at no additional cost to the Owner, any item which may become defective within the warranty period. Any manufacturers' warranties concerning any item installed will run to the benefit of the Owner. The Contractor agrees not to void or impair, or to allow Sub-Contractors to void or impair, any warranties regarding products or items installed as part of this project. The repair of faulty workmanship shall be considered to be included in the contract.

1.5 SYMBOLS

A. Items of equipment and materials are indicated on the drawings in accordance with the Security Symbols Legend on the drawings. Some of the symbols scheduled may not be required for the project. Because of the scale of the Drawings, symbols are shown on Drawings as close as possible to the mounting location. Verify exact locations with the Architect and Owner's Representative.

1.6 ABBREVIATIONS

A. CCTV: Closed Circuit Television
B. DAC: Digital Alarm Communicator
C. DPS: Door Position Switch
D. DVMS: Digital Video Management Server
E. DVR: Digital Video Recorder
F. EAC: Electronic Access Control
G. EMI: Electromagnetic interference
H. FACP: Fire alarm Control Panel
I. IDS: Intrusion Detection System
J. LAN: Local Area Network
K. LCD: Liquid Crystal Display
L. LBM: Latch Bolt Monitor
M. NEC: National Electrical Code, latest edition
N. NEMA: National Electrical Manufacturers Association
O. NFPA: National Fire Protection Association
P. NVE: Network Video Encoder
Q. NVR: Network Video Recorder
R. PSTN: Public Switched Telephone Network
S. PTZ: Pan-Tilt-Zoom
T. PVC: Polyvinyl chloride
U. RQE: Request to Exit.
V. SMS: Security Management System
W. SSI: Security System Integrator
X. STP: Shielded twisted pair
Y. TVSS: Transient Voltage Surge Suppression
Z. UL: Underwriters Laboratories, Inc
AA. UPS: Uninterruptible Power Supply
AB. UTP: Unshielded twisted pair
AC. WTH: Wire Transfer Hinge

1.7 CODES AND STANDARDS

A. The work shall be performed by competent craftsmen skilled in the trade involved and shall be done in a manner consistent with normal industry standards. All work shall conform to all applicable sections of currently adopted editions of the codes and standards listed below or the codes, standards, and specifications published by the organizations listed below:
1. Safety and Health Regulations for Construction.
2. Occupational Safety and Health Standards (OSHA), National Consensus Standards and Established Federal Standards.
3. National Electrical Code (NEC), latest edition.
4. American National Standards Institute (ANSI).
5. National Electrical Manufacturer's Association (NEMA).
6. Institute of Electrical and Electronics Engineers (IEEE).
7. National Fire Protection Association (NFPA).
8. American Society for Testing Materials (ASTM).
9. Life Safety Code (NFPA 101).
10. Underwriters' Laboratories, Inc., Standards (UL).
11. Independent Testing Laboratories (ITL).
12. International Organization for Standardization (ISO)

13. Electrical Testing Laboratories (ETL).
14. Microsoft® Open Database Connectivity (ODBC) interface
15. National Electrical Safety Code (NESC).
16. Factory Mutual Engineering Corporation or other recognized national laboratories.
17. Uniform Building Code (UBC).
18. International Building Code (IBC)
19. Building Officials and Code Administrators International, Inc. (BOCA).
20. Building Industry Consulting Service International (BICSI).
21. Electronics Industry Association (EIA).
22. Telecommunications Industry Association (TIA).
23. State and Local Codes.

B. Where there is a conflict between the code or referenced standards and the contract documents, the code or standard shall have precedence only when it is more stringent than the contract documents. Items that are allowed by the code but are less stringent than those specified shall not be substituted.

C. Follow Owner's installation standards unless otherwise shown on the drawings or stated herein. Where requirements of Installation Standards conflict with Performance Standards or manufacturer's recommendations, refer to Owner for a decision before proceeding. Owner's standards are listed below.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An Experienced installer who is an authorized representative of equipment manufacturer with industry accepted experience relative to size and nature of project.

B. The work specified in these specifications and construction documents shall be accomplished by an experienced Contractor in the design, fabrication, installation, checkout and warranty contract management of systems such as those being described in each Section.

C. Installer shall employ only a qualified PM-Project Manager and must meet the following requirements: Required participation in meetings and conferences. Be present at Project site for Substantial Completion Inspection, Final inspection, approves the operating and maintenance manuals and to provide any additional instructions as needed to designated members of the Owner's staff.

D. Be responsible for supervision of all technical work that is part of this Specification.

E. Supervise preparation of shop drawings and submittals and sign all submittals.

F. Supervise the shop fabrications and field installation work to assure strict conformance in accordance to the Contract Drawings, Specifications and the reviewed Shop Drawings to assure workmanship of the specified quality.

G. Oversee the testing of all assemblies and all sub-assemblies prior to their delivery at the Project Site.

H. Lead in the specified testing of completed installation to assure the Owner that all Contract Requirements were met. Working with and assisting the Owner in the final testing for approval and acceptance of the system by Owner.

I. Substitutions:

J. Substitutions when allowed must be submitted to and approved by the Engineer.

K. Comply with NFPA 70, National Electric Code

L. Comply with NFPA 101, Life Safety Code

M. Comply with American Disabilities Act (ADA)

N. Comply with International Building Code (IBC)

O. Comply with ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling

P. Comply with ANSI/TIA/EIA-607 Commercial Building Grounding and Bonding Require-ments for Telecommunications.

Q. Follow Owner's installation standards unless otherwise shown on the drawings or stated herein. Where requirements of Installation Standards conflict with Performance Standards or manufacturer's recommendations, refer to Owner for a decision before proceeding.

1.9 SUBMITTALS

A. When required by other sections of this Project Manual, the Contractor shall submit shop drawings, product data or samples to the Architect/Engineer for review. Unrequired submittals will not be reviewed. A completed copy of the transmittal form included with the Project Manual shall accompany each submittal. Submittals shall be numbered consecutively. Unless otherwise noted in the front-end specifications, submit information electronically in PDF format.

B. Product Data: Include technical data necessary to evaluate the material and equipment. Include a complete technical specification for the submitted equipment, noting differences and adherences to this section. Submit for approval prior to material order.

C. Shop Drawings: Provide complete shop drawings which include the following:
1. Indicate all system device locations on architectural floor plans. No other system(s) shall be included on these plans.
2. Include full schematic wiring information and load schedule for all devices.
3. Wiring information shall include cable type, conductor routings, quantities, and connection details at device
4. Include a complete one-line, block diagram.
5. Include a statement of the system sequence of operation.

D. Performance Verification Test Report (PVT): A proposed test plan shall be submitted to the Owner's Representative for approval prior to commencement of final test.

E. Construction record drawings:
1. Maintain current documents at the construction site. Submit with Operations and Maintenance Manuals.
2. Record drawings shall include all information required for shop drawings and in addition shall indicate the following:
a. Routing of cables from equipment cabinets to security devices.
b. Routing of cables between equipment cabinets.
c. Routing of cables between service entrance room and equipment cabinets.
d. Revisions to construction documents (addenda and field changes.)
e. Floor plans with all final device and equipment cabinet locations and labeling.

F. Operation and Maintenance Manuals:
1. The Contractor shall prepare three operating and maintenance manuals for the equipment furnished. Manuals shall be submitted to the Architect/Engineer for review and distribution to the Owner not less than 30 days prior to substantial completion of the project. Manuals not meeting the following requirements may be rejected by the Architect/Engineer.

G. Each manual shall be assembled in a three-ring binder with hard cover and plastic finish. Binders shall not exceed 3" thickness. Where more than one binder is required, the manuals shall be separated into a logical grouping, i.e., "Functional Design Manual", "Hardware Manual", "Software Manual", "Operators Manual", "Maintenance Manual". Each binder shall have the following information clearly printed on its front cover:
1. Project name and address.
2. Portion of the work covered by each volume (if more than one volume in the set). Where more than one volume is required, label each volume as "Volume ___ of ___".
3. Name, address and telephone number of Contractor and all Sub-Contractors including night or emergency number.

H. Manual shall include, but shall not be limited to, the following:
1. A Complete Index. Contractor may submit the index to the Architect/Engineer for review prior to submittal of complete manuals if desired.

I. Hardware Manual: The manual shall include:
1. Names, Addresses and Telephone Numbers. This list shall include the manufacturer and local representative who stocks or furnishes repair parts for all items of equipment and shall be typed on a single page in front of the binder.
2. One copy of all shop drawings and product data, clearly marked for each item furnished using the designation label specified or indicated on drawings.
3. Installation and check out procedures
4. Alignment and calibration procedures

J. Software Manual: The software manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation. The manual shall include:
   1. Definition of terms and functions
   2. System use and application software
   3. Initialization, start up, and shut down
   4. Reports generation
   5. Details on forms customization and field parameters

K. Operators Manual: The operators manual shall fully explain all procedures and instructions for the operation of the system including:
   1. Computers and peripherals
   2. System start up and shut down procedures
   3. Use of system, command, and applications software
   4. Recovery and restart procedures
   5. Graphic alarm presentation
   6. Use of report generator and generation of reports
   7. Data entry
   8. Operator commands
   9. Alarm messages and reprinting formats
   10. System permissions functions and requirements

L. Maintenance Manual: The maintenance manual shall include:
   1. Manufacturer's Operation and Maintenance Manuals and Parts Lists.
   2. Emergency Procedures. Provide a written description of emergency operating procedures or a list of service organizations (including addresses and telephone numbers) capable of rendering emergency services to the various parts of the system.
   3. All manufacturers' warranty information.
   4. Normal Maintenance Schedule. Include a listing of work to be performed at various time intervals; i.e., 30, 90, 180 days and yearly.

1.10 COORDINATION

A. Coordinate and schedule all construction work with the General Contractor, Owner, and occupants prior to beginning work. Do not interrupt building activities without strict coordination with the General Contractor, Owner, and occupants. Unscheduled appearance to work in the spaces without scheduling is not allowed.

B. Coordinate layout and installation of any required LAN cabling with Owner's ITstaff.

C. Meet jointly with IT equipment suppliers and Owner to exchange information and agree on details of equipment arrangements and installation interfaces.

D. Record agreements reached in meetings and distribute to other participants.

E. Adjust arrangements and locations of cross connect blocks and patch panels in equipment rooms and telecommunications rooms to accommodate and optimize arrangement and space requirements of IT equipment.

F. Coordinate security device rough-ins and door/door frame prep with general construction work and arrange in building structure during progress of construction to facilitate the security installations that follow.

G. Coordinate exact location(s) of ceiling mounted equipment/devices with architectural plans, reflected ceiling plans, structural plans and all affected trades prior to construction and installation.

H. Coordinate exact location(s) of all desk/counter top mounted security equipment with Millwork/Casework and furniture plans prior to installation.

I. Fully examine the drawings and specifications for other trades and coordinate the installation of security work with the work of the other trades. Consult and cooperate with the other trades for determining space requirements and for determining that adequate clearance is allowed with respect to his equipment, other equipment, and the building.

J. Coordinate installation and cabling with the raceway installer. Verify raceways are installed according to the plans and specifications before installing cable.

1.11 DELIVERY, STORAGE AND HANDLING

A. Security equipment shall neither be delivered nor installed until the building is totally enclosed, secured, weather tight and all dust or moisture generating construction work within the building is complete and cured. Care shall be taken to protect equipment from damage until the date of substantial completion of the project

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT MANUFACTURERS

A. The Contractor's options in selecting materials and equipment are limited by requirements of the contract documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects. Materials and equipment shall be provided in accordance with the following:

1. Primary Design Products: Primary design products are those products around which the project was designed in terms of capacity, performance, physical size and quality. Primary design products are indicated by use of a single manufacturer's name, model number or similar data on drawings or schedules or within the specifications. The Contractor shall provide primary design products unless substitutions are made in accordance with the following paragraphs.
2. Acceptable Equivalent Substitutions: Acceptable equivalent substitutions are products of manufacturers other than those listed for the primary design products. Equivalent acceptable substitutions shall meet each of the following requirements:
   a. The product shall be manufactured by one of the acceptable manufacturers listed in the Project Manual, drawings or addenda.
   b. The product shall meet or exceed the requirements of the contract documents in terms of quality, performance, suitability, appearance and physical characteristics.
   c. The Contractor providing the substitution shall bear the total cost of all changes due to substitutions. These costs may include additional compensation to the Architect/Engineer for redesign and evaluation services, increased cost of work by the Owner or other Contractors, and similar considerations.
   d. Performance Requirements. Where the contract documents list performance requirements or describe a product or assembly generically, provide products that comply with the specific requirements indicated and that are recommended by the manufacturer for the respective application.
3. Compliance with Standards, Code and Regulations: Where the specifications require only compliance with an imposed standard, code or regulation, the Contractor has the option of selecting a product that complies with specification requirements, including the standards, codes and regulations.
4. Proposed substitutions will be judged on the basis of quality, performance, appearance and on the governing space limitations. The reputation of the manufacturer, delivery time requirements, and the availability of repair or replacement parts may also be considered. All proposed substitution must be submitted to the Architect/Engineer for prior approval at least 10 days prior to the final Addendum.
5. The Architect/Engineer shall be the sole and final judge as to the suitability of substitution items.

2.2 MANUFACTURERS

A. Subject to compliance with requirements listed in the system specific Division 281328 (13)13 (28) specifications, provide products by one of the following:

B. CCTV Cameras:
   1. Samsung
   2. Vivotek

C. CCTV Digital Video Management:
   1. Milestone

D. Electronic Access Control (EAC) Software and Field Hardware:
   1. Cardkey and P2000

E. Electronic Access Control Authentication Hardware:
   1. HID Multiclass

F. Server and PC Hardware:
   1. Hewlett Packard

G. Secure and Access Devices:
   1. George Risk Industries (GRI), Inc
   2. Bosch

H. Power/Transient Voltage Surge Suppression (TVSS):
   1. Altronix
   2. Phoenix Contacts
   3. Ditek
   4. Transtector

I. Copper Cable:
   1. Security low-voltage cable (Anixter)
   2. Category 6 provided by division 27 contractor

J. Security Equipment Cabinets:
   1. Johnson Controls

2.3 MATERIALS AND EQUIPMENT FURNISHED BY OTHERS

A. Where materials and equipment are indicated as furnished by others and installed or connected under this contract, it shall be the Contractor's responsibility to verify installation details.

B. General: Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.

2.4 QUANTITY OF SPECIFIED ITEMS REQUIRED

A. Wherever in these specifications an article, device, or piece of equipment is referred to in the singular number, such reference shall apply to as many such articles as are shown on the drawings or required to complete the installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation. Proceed with installation only after unsatisfactory conditions have been corrected.

B. For Ethernet devices that are close to EIA/TIA distance limits, run a length test on pro-posed routing to said device. Inform Owner and Engineer of any devices beyond EIA/TIA distance limits. Owner and Engineer shall not be responsible for cables that exceed EIA/TIA distance limits.

C. For digital serial communication devices that are close to distance limits of the serial protocol being used (RS-232, RS-422, RS-485, Weigand), run a length test on proposed routing to said device. Inform Owner and Engineer of any devices beyond Recommended Standard (RS) distance limits. Owner and Engineer shall not be responsible for cables that exceed Recommended Standard distance limits.

3.2 INSTALLATION

A. Wiring Method: Use UL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal all raceway and cables except in unfinished spaces.

B. Arrange for moving of furniture to access devices in the work area as needed.

C. Install cables without damaging conductors, shield, or jacket.

D. Provide TVSS devices in the security cabinets for any security device located in outdoor locations.

E. Install copper ground bus bars with adequate number of compression lug terminations for all shielded cable drain wires, TVSS device ground wires, and power supply ground wires located

within the security cabinet. Bond security cabinets with minimum #6 AWG ground wire to nearest Telecommunications Ground Bar (TGB) when cabinets are located within the telecom room. Bond ground bus bar to approved ground rod installed by the electrical contractor when security cabinets are located in outdoor locations.

F. All shielded cables entering security cabinets must have the jackets stripped back near the point of entry, the foil shield removed and all drain wires terminated to the cabinet ground bar. Use heat shrink to prevent shorts between drain wires and electronic equipment within the cabinet.

G. Install security cables continuous from the device location to the security cabinet serving that area, or between security cabinets. Do not splice security cables, but if a splice is required, provide tamperresistant "torx with peg" security fasteners for junction boxes containing security cable splices.

H. All security devices located outdoors shall be rated as weather proof.

I. Furnish tools and test equipment. Provide all specified materials, installation hardware, and labor required to complete work shown on drawings and specified in this Section. This shall include work and miscellaneous items not specified but necessary to build a complete SMS installation including test equipment accessories and appurtenances required for testing the system. All systems shall be complete and ready for operation.

J. Use cable bundling hardware rated for the environment and application in which used. Applications include, but are not limited to, general purpose, outdoor, chemical resistant, flame retardant, high temperature, and vibration. Provide reusable cable management straps for bundling and securing cables. Do not use nylon cable ties.

K. Do not bend cables, in handling or in installing, to smaller radii than minimums recommended by manufacturer. Do not exceed cable manufacturer's recommended pulling tensions.

L. Install exposed cables parallel and perpendicular to surfaces or exposed structural members and follow surface contours where possible.

M. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

N. Wiring Within Wiring Closets and Enclosures: Provide conductors of adequate length. Train conductors to terminal points with no excess.

O. Bring to the attention of the Owner and Engineer conflicts between manufacturer's instructions and Contract Documents.

P. Separation of Wires: Comply with TIA/EIA-569-A rules for separating unshielded copper voice and data communication cabling from potential EMI sources, including electrical power lines and equipment.

3.3 FIELD QUALITY CONTROL

A. Performance Verification Tests:
   1. Notify Architect and Owner's representative in writing, in advance of testing to prevent delays in construction schedules.
   2. Test all systems and place in proper and specified working order prior to demonstration of the systems.
   3. Test system grounds to demonstrate that the ground resistance does not exceed the requirements of UL 1449 transient voltage surge suppression (TVSS) and the National Electric Code (NEC).
   4. Perform tests, as required, by authorities having jurisdiction over the site.
   5. Testing shall be in the presence of the Owner's designated representatives, Contractor, Architect and representatives of the authorities having jurisdiction.

B. Where systems have been expanded and/or upgraded, the SSI shall provide the personnel and labor to completely test and demonstrate all new, existing, and upgraded software and hardware.

C. Demonstrate each system and subsystem. The demonstration is to consist of no less than the following:
   1. Designate actual location of each component of a system or sub-system and demonstrate its function and its relationship to other components within the system.
   2. Verify final field of view for all fixed cameras

3. Demonstrate the systems and subsystems operations by actual "START/STOP-ON/OFF-OPEN/CLOSE" cycling showing how to work controls, how to reset devices, how to replace fuses and emergency operating/operations procedures.
4. Trip all alarm and intrusion detection devices and verify response of alarm and trouble signals.
5. Check Installation, supervision, and operation of all intelligent, addressable initiating and control devices by physically testing each device in accordance with the manufactures requirements.
6. Each of the alarm conditions that the system is required to detect shall be introduced on the system. Verify the proper receipt and the proper processing of the signal at the Front-end processing unit and the correct activation of all control points and the sequence of operations.

D. Activate each installed access control/security device through the Front-end processing unit and verify proper system operation.

E. Tag all equipment, stations, and other components for which tests have been satisfactorily completed.

F. Systems to be demonstrated are to include, but not be limited to the following:
1. Electronic Access Control System.
2. CCTV system.
3. Intercom System.

G. SSI shall furnish the necessary trained personnel to perform the demonstration and instructions and arrange to have the manufacturer's representatives present to assist with the demonstrations. Training time shall include, as a minimum, the total time determined by the sum of the times specified in each section, for performing the prescribed demonstrations/training.

H. SSI shall arrange with the Owner's designated representative the date and times for perform the demonstrations. The Owner will select date and time for demonstration.

3.4 INSPECTIONS

A. At the completion of the project and prior to final acceptance of the work, provide evidence of final inspections and approvals to the Owner, as required by the authorities having jurisdiction to requirements of Division 01.

3.5 TRAINING

A. The Contractor shall provide the Owner's Representative with training for operating the system as required by this specification. The Contractor shall provide actual field demonstrations of the operation of all system components and the entire system installed in the building.

B. The Contractor shall provide the Owner's Representative with training for operating the system as required. An additional 8 hours of technical training shall be given to the Security and Engineering staff. The technical training shall consist of two 4-hour training sessions.

3.6 ADJUSTMENTS

A. Within one year of date of Substantial Completion, provide up to three Projectsite visits, when requested by Owner, to adjust and calibrate components and to assist Owner's personnel in making program changes and in adjusting equipment and controls to suit actual conditions. Visits for this purpose shall be in addition to any required by warranty.

3.7 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION

SECTION 281300

ELECTRONIC ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This Section includes all necessary components to provide a complete and fully functional electronic access control system. The Security Management System (SMS) server is existing and will serve as the key component for managing electronic access control for the components outlined in these specifications and construction drawings.

1.2 RELATED SECTIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
   1. When included as a part of this specification, the following contain related requirements:
      a. Division 8 Section “Door Hardware”
      b. Division 8 Section “Common Work Results for Electronic Security”.
      c. Division 8 Section “Electronic Video Surveillance”.

1.3 SYSTEM DESCRIPTION

A. The system shall provide for a variety of integral functions including:
   1. Controlled access for authorized personnel within pre-determined areas based on time and/or clearance level.
   2. Monitor, track and interface the following alarms at a minimum:
      a. Door forced open
      b. Door held open
      c. Access Granted
      d. Access Denied
   3. Capable of providing at a minimum, a hardwired signal to the surveillance system to begin viewing, recording and storing upon the activation of a selected alarm point where and event has been detected
   4. The maximum permissible signal time elapse is two seconds between actuation of any alarm and its indication at the SMS server
   5. The system shall be programmable to automatically change status of various combinations of protected zones between secure and access conditions at scheduled times
   6. Status changes may be preset for repetitive, daily, and weekly; specially scheduled operations may be preset up to a year in advance
   7. Manual secure-access control stations shall override programmed settings
   8. Egress locks which are part of this work and are in the path of legal exiting shall be connected to the fire alarm system in accordance with local codes such that they automatically unlock in the event of actuation of the fire alarm system.
   9. All fire rated doors shall remain positively latched when electrically unlocked.

1.4 SUBMITTALS

A. Product Data: As specified in section 80500

B. Shop Drawings: As specified in section 80500

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Refer to Division 8 Section “Common Work Results for Electronic Safety and Security” for alternate manufacturers where allowed.

2.2 MATERIALS

A. GENERAL
1. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance.
2. Refer to the "Security Drawings" for additional information including locations and quantities.

2.3 SECURITY MANAGEMENT SYSTEM (SMS) SOFTWARE

A. Design Basis: P2000 (no approved equal)

B. Provide all additional client, server, and reader licenses/dongles required for the system as specified herein. Provide all 3rd party software licenses as required for the proper operation of the system.

C. Client:
1. Provide 1 client license(s) and dongles as required.

D. Readers:
1. Licensing as required per the drawings.

E. SMS SERVER AND PC HARDWARE
1. SMS Client Workstation:
a. See 282300

F. SMS FIELD CONTROLLER HARDWARE
1. General: All decisions regarding access, alarms, and automatic timed functions shall be made at the controller level, independent of the host server.
2. Card Key CK721

G. AUTHENTICATION HARDWARE
1. Proximity Reader
a. Design Basis: HID Multi-Class RP-40

H. SECURE AND ACCESS DEVICES
1. Door Position Switch (DPS)
a. Security Contractor shall provide cabling and connection to access control panel. Coordinate connection point with door hardware supplier.
b. Design Basis: George Risk Industries
2. Request-to-Exit (RQE) Motion Sensor
a. Design Basis: Bosch DS160
3. Electric Strike
a. Electric strike shall be provided on doors as indicated on drawings. Security Contractor shall make all connections to devices for a complete and functional system. Security Contractor shall coordinate cabling connections to access control panel.
b. Design Basis: Securitron
4. Sounder
a. Design Basis: System Sensor MHW
b. Field Selectable 12/24VDC Piezo sounder
c. Sounder shall be connected to access control panel such that an unapproved opening of the door shall activate the sounder until the alarm condition is reset.
d. Sounder shall provide at least 80 dBA output.

I. COPPER CABLE
1. Anixter custom Access Control Hybrid Cable

J. SECURITY EQUIPMENT RACKS AND CABINETS:
1. Wall Mount Cabinet
a. Enclosures for access control components shall protect against dust, falling dirt, and non-corrosive liquids.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The Security Contractor shall maintain the integrity of the existing system through renovation. The Contractor shall coordinate any outages or down-time with the Owner prior to starting any work.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with re-quirements for installation tolerances and other conditions affecting performance of intru-sion detection and access control.

C. Examine roughing-in for embedded and built-in anchors to verify actual locations of intrusion detection connections before intrusion detection installation.

D. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of intrusion detection or access control.

E. Inspect built-in and cast-in anchor installations, before installing intrusion detection, to verify that anchor installations comply with requirements

F. Remove and replace anchors where inspections indicate that they do not comply with requirements. Reinspect after repairs or replacements are made.

G. Perform additional inspections to determine compliance of replaced or additional anchor installations.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SYSTEM INSTALLATION

A. Systems shall be complete and operational in all respects.

B. Contractor shall program and provision the system per the drawings and specifications and owner requirements.

C. Contractor shall coordinate with the Div. 26 contractor regarding the installation of all conduit, raceways, and power.

D. All wiring shall be “Plenum” rated and in concealed spaces .

3.3 WIRING INSTALLATION

A. Wiring Method: Conceal raceways and wiring except in unfinished spaces and as indicated.

B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Use lac-ing bars and distribution spools. Separate power-limited and non-power-limited conductors as recommended in writing by manufacturer. Install conductors parallel with or at right angles to sides and back of enclosure. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with intrusion system to terminal blocks. Mark each terminal according to system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

C. Conductors: Size as recommended in writing by system manufacturer, unless otherwise indicated.

D. Connections: Comply with torque-tightening values specified in UL 486A.

E. Install power supplies and other auxiliary components for detection devices at control units, unless otherwise indicated or required by manufacturer. Do not install such items near devices they serve.

3.4 GROUNDING

A. Comply with Division 26 Section "Grounding and Bonding."

END OF SECTION

SECTION 282300
ELECTRONIC VIDEO SURVEILLANCE SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. When included as a part of this specification, the following contain related requirements:
   1. Division 28 Section "Common Work Results for Electronic Safety and Security".
   2. Division 28 Section "Electronic Access Control".

1.2 SECTION INCLUDES

A. All necessary components required providing a complete and fully functional electronic video surveillance (EVS) system. The EVS main database server is existing and will serve as the key component for managing video. The system shall provide full video control, monitoring, and recording as outlined in these specifications and construction drawings.

1.3 SYSTEM DESCRIPTION

A. The basis of the design is to provide to the owner a distributed digital video surveillance system supplied by the Contractor. The system shall be complete and operational per the owner performance requirements and as designed by Johnson Controls.

1.4 SUBMITTALS

A. Product Data: As specified in Section 80500.

B. Shop Drawings: As specified in Section 80500.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Refer to Division 28 Section - Common Work Results for Electronic Safety and Security for alternate manufacturers where allowed.

2.2 MATERIALS

A. General:
   1. Coordinate the features of materials and equipment so they form an integrated system. Match components and interconnections for optimum future performance
   2. Refer to the "Security Drawings" for additional information including locations and quantities.

2.3 CAMERAS AND ILLUMINATORS

A. Exterior Fixed Dome Camera:
   1. Design Basis: Samsung 1.3MP network camera
   2. The camera system shall be outdoor applications. It shall have a versatile design allowing for multiple mounting options.
   3. Power: POE
   4. Mount: Refer to drawings

B. Interior Fixed Dome Camera:
   1. Design Basis: Samsung 1.3MP network camera
   2. The camera system shall be for indoor operation.
   3. Power: POE
   4. Mount: Refer to drawings

C. Interior 360 and 180 fisheye camera
1. Design Basis: Vivotek Supreme

2.4 SOFTWARE

A. Design Basis: Milestone

B. Provide all additional client, server, and camera licenses/dongles required for the system as specified herein. Provide all 3rd party software licenses as required for the proper operation of the system.

C. Must be compatible with the IP cameras or encoders:

D. Recording Server:
1. Provide recording/archiver software to support recording and management of cameras at each house

E. The SMS software developer shall be a Microsoft Gold Certified Partner.

2.5 HARDWARE

A. NVR Recording Server:
1. Design Basis: Hewlett Packard series
2. The Server shall meet the minimum requirements currently published by the software manufacture at the time of purchase

B. Flat Panel Monitor (Desktop):
1. Design Basis: Hewlett Packard.
2. 17 LCD flat panel display.

2.6 POWER/TVSS/SIGNALING

2.7 LAN EQUIPMENT

A. POE Ethernet Switch:
1. Provided by Owner.

2.8 COPPER CABLE

A. Category 6 Cable:
1. Provided by division 27 contractor

2.9 COPPER TERMINATION EQUIPMENT

A. Provided by division 27 contractor

2.10 SECURITY EQUIPMENT RACKS AND CABINETS

A. Wall Mount Cabinet provided by division 27 contractor

PART 3 - EXECUTION

3.1 EXAMINATION

A. The Security Contractor shall maintain the integrity of the existing system through renovation. The Contractor shall coordinate any outages or down-time with the Owner prior to starting any work.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the EVS system.

C. Examine roughing-in for embedded and built-in anchors to verify actual locations of EVS connections before installation.

D. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of intrusion detection or access control.

E. Inspect built-in and cast-in anchor installations, before installing EVS, to verify that anchor installations comply with requirements.

F. Remove and replace anchors where inspections indicate that they do not comply with requirements. Reinspect after repairs or replacements are made.

G. Perform additional inspections to determine compliance of replaced or additional anchor installations.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SYSTEM INSTALLATION

A. Systems shall be complete and operational in all respects.

B. Contractor shall program and provision the system per the drawings and specifications and owner requirements.

C. Contractor shall coordinate with the Division 26 contractor regarding the installation of all conduit, raceways, cable trays, power, etc. for all building EVS Systems.

D. All wiring shall be "Plenum" rated and in concealed spaces .

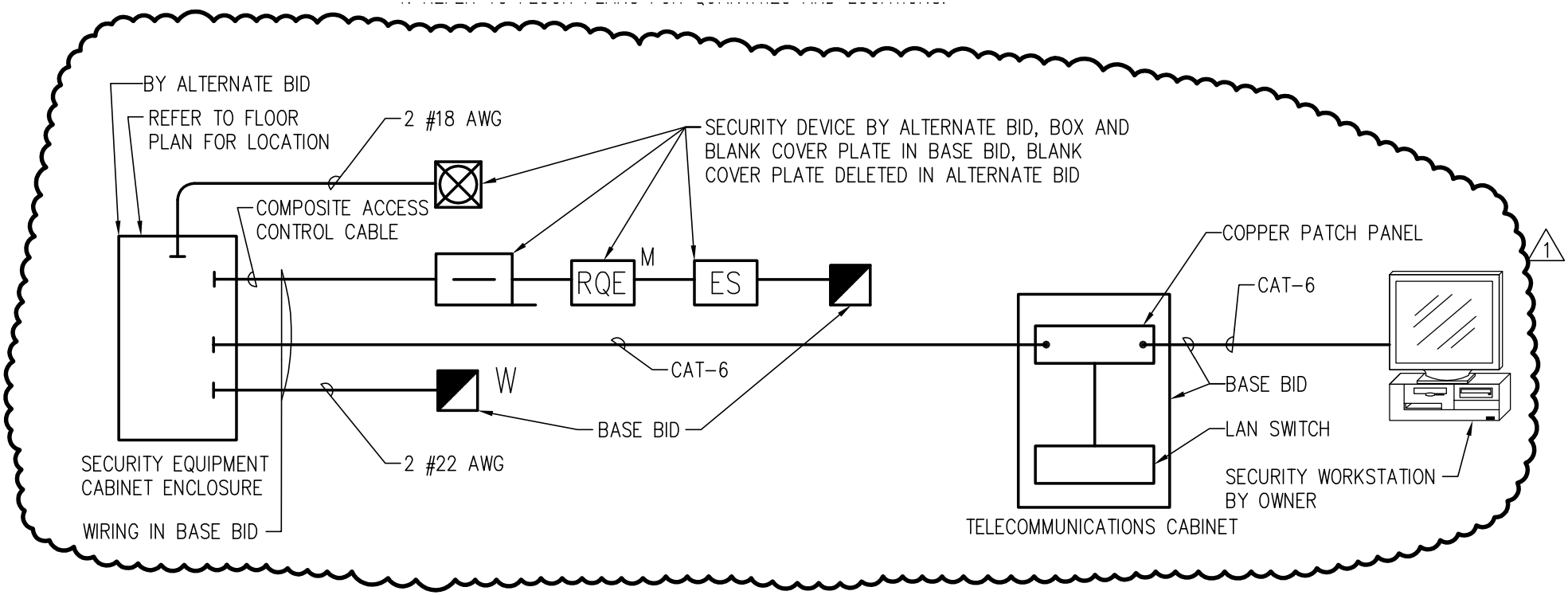
3.3 WIRING INSTALLATION

A. Refer to division 27

3.4 GROUNDING

A. Comply with Division 6 Section "Grounding and Bonding."

END OF SECTION



EAC SCHEMATIC

5
E401

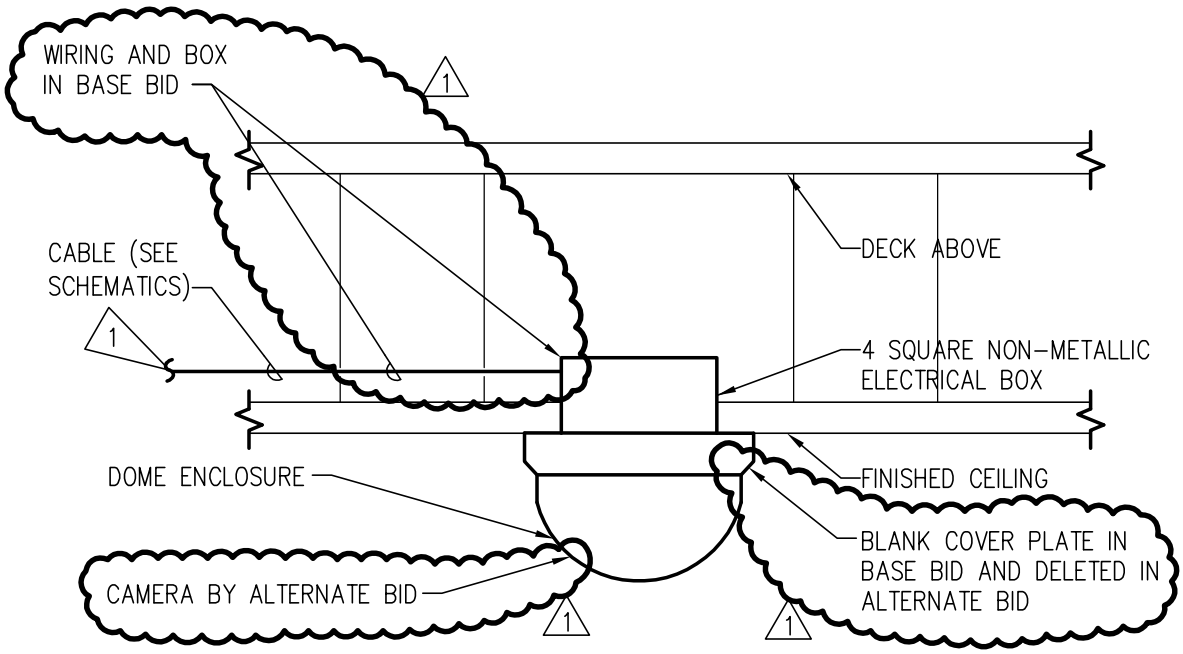
NO SCALE

1. REFER TO FLOOR PLANS FOR QUANTITIES AND LOCATIONS.

Alvine Engineering

NEW RESIDENTIAL HOUSING
STATE OF NEBRASKA – BRIDGES PROGRAM

PROJECT NO.	DATE	DRAWING REFERENCED: E401	SKETCH
20112416	3/23/12	ADDENDUM NO.: 1	ES-1

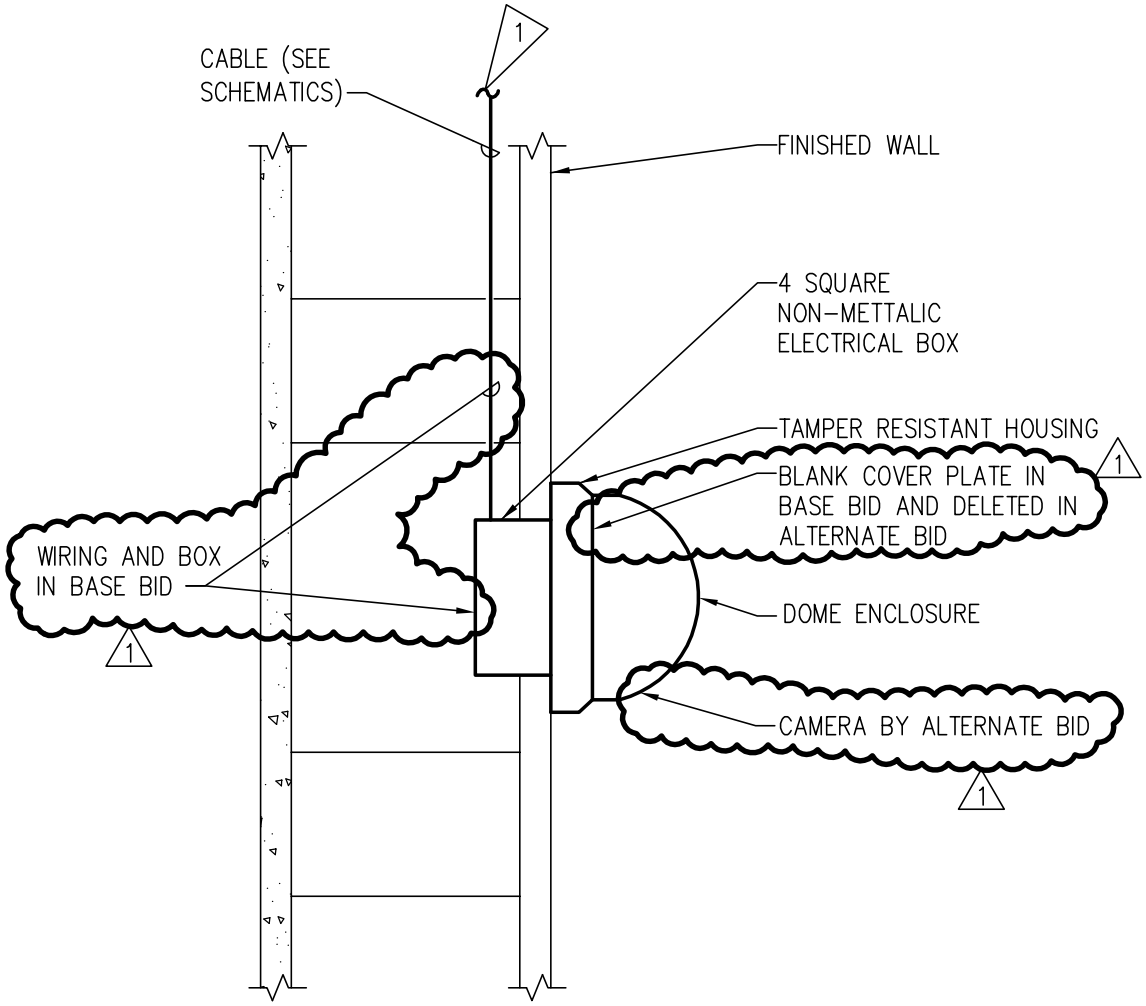


HARD CEILING MOUNT DOME

3
E402

SCALE: NO SCALE

Alvine Engineering	NEW RESIDENTIAL HOUSING STATE OF NEBRAKSA – BRIDGES PROGRAM			
	PROJECT NO. 20112416	DATE 3/23/12	DRAWING REFERENCED: E402 ADDENDUM NO.: 1	SKETCH ES-2



WALL MOUNT DOME

4
E402

SCALE: NO SCALE

Alvine Engineering	NEW RESIDENTIAL HOUSING STATE OF NEBRAKSA – BRIDGES PROGRAM			
	PROJECT NO. 20112416	DATE 3/23/12	DRAWING REFERENCED: E402 ADDENDUM NO.: 1	SKETCH ES-3