

PROJECT MANUAL

PGSD INTERCOM UPGRADES

PASCAGOULA-GAUTIER SCHOOL DISTRICT

Owner Address

1006 Communy Ave., Pascagoula, MS 39567

Project Address

Arlington Elementary School | 3511 Arlington St, Pascagoula, MS 39581
Cherokee Elementary School | 4102 Scovel Ave, Pascagoula, MS 39581
College Park Elementary School | 2617 Ladnier Rd, Gautier, MS 39553
Eastlawn Elementary School | 2611 Ingalls Ave, Pascagoula, MS 39567
Gautier Elementary School | 505 Magnolia Tree Dr, Gautier, MS 39553
Jackson County Exceptional School | 4311 Hospital Rd, Pascagoula, MS 39581
Jackson Elementary School | 3203 Lanier Ave, Pascagoula, MS 39581
Lake Elementary School | 4504 Willow St, Pascagoula, MS 39567



MP Design Group Project #: 0111.25.004

REV 0: ISSUED FOR Construction

January, 9, 2026



YOUR PROJECT • OUR PRIORITY • NO EXCUSES

**SECTION 000102
PROJECT INFORMATION****PART 1 GENERAL****1.01 PROJECT IDENTIFICATION**

- A. Project Name: PGSD Intercom Upgrades
- B. Engineer/Architect's Project Number: 0111.25.004
- C. Project Address:
 - 1. Arlington Elementary School - 3511 Arlington St, Pascagoula, MS 39581
 - 2. Cherokee Elementary School - 4102 Scovel Ave, Pascagoula, MS 39581
 - 3. College Park Elementary School - 2617 Ladnier Rd, Gautier, MS 39553
 - 4. Eastlawn Elementary School - 2611 Ingalls Ave, Pascagoula, MS 39567
 - 5. Gautier Elementary School - 505 Magnolia Tree Dr, Gautier, MS 39553
 - 6. Jackson County Exceptional School - 4311 Hospital Rd, Pascagoula, MS 39581
 - 7. Jackson Elementary School - 3203 Lanier Ave, Pascagoula, MS 39581
 - 8. Lake Elementary School - 4504 Willow St, Pascagoula, MS 39567
- D. The Owner, hereinafter referred to as Owner: Pascagoula-Gautier School District
- E. Owner's Address: 1006 Communny Avenue, Pascagoula, MS 39567

- F. Owner's Project Manager: Engineer/Architect.

1.02 NOTICE TO PROSPECTIVE BIDDERS

- A. These documents constitute an Invitation to Bid to General Contractors for the construction of the project described below.

1.03 PROJECT DESCRIPTION

- A. Summary Project Description: This project will consist of the following general scope of work. This description is provided for convenience purposes only and shall not be considered all inclusive. It is the general contractor's responsibility to become fully familiar with the existing conditions, review all of the construction document drawings, specifications, and any additional information documents in their entirety and bring forth any and all questions regarding scope confusion, misinterpretations, and/or possible errors and omissions to the Architect and/or Engineer prior to bid submission and/or start of construction.
 - 1. This project consists of new intercom system, security cameras, access controls and door hardware as described in the Construction Documents and Specifications.
- B. Contract Terms: Lump sum (fixed price, stipulated sum).
- C. All bid amounts must be based on the most stringent requirement called for in the complete construction document package. In addition, the most stringent requirement shown shall govern and take precedence in the event of any and all conflicts between different drawings (plans, elevations, details, sections, schedules, etc...), between different specification sections, within specification sections, and between the drawings and the specifications. It will be the General Contractor's responsibility to bring any and all discrepancies to the architect's attention for further clarity prior to submitting a formal bid.
- D. The currently occupied premises at the project site are open for examination by bidders only during the following hours:
 - 1. Monday through Friday: 8:00 AM to 5:00 PM.

1.04 PROJECT CONSULTANTS

- A. The Architect, hereinafter referred to as Engineer/Architect: MP Design Group.
 - 1. Address: 918 Howard Avenue, Suite F.
 - 2. City, State, Zip: Biloxi, MS 39530.
 - 3. Phone: 228-388-1950.
 - 4. Fax: 228-388-1971
 - 5. Website: www.mpdesigngroup.us

6. Plan Room: www.mpdesigngroupplans.us
7. Project E-mails: bpatano@mpdesigngroup.us, tabell@mpdesigngroup.us.

1.05 PROCUREMENT TIMETABLE

- A. A non-mandatory Pre-Bid Meeting and site walk: Tuesday, February 10, 2026 at 10 AM local time at the District Office at 1006 Communy Avenue, Pascagoula, MS 39567. Following the meeting, a site walkthrough will be conducted.
- B. Last Request for Substitution Due: 7 days prior to due date of bids.
- C. Last Request for Information Due: 7 days prior to due date of bids.
- D. Bid Due Date: As described in Document 001113 - Advertisement for Bids.
- E. Bid Opening: Same day, after the bids are due at the descretion of the Onwer and a time that is best determined by the Owner.
- F. Notice to Proceed: Will be issued after bid due date with anticipated starts dates as shown below..
- G. Bids May Not Be Withdrawn Until: 60 days after due date.
- H. Contract Time: As described in Document 004100 - Bid Form.
- I. Final Completion date is critical due to requirements of Owner's operations.
- J. The Owner reserves the right to change the schedule or terminate the entire procurement process at any time.

1.06 PROCUREMENT DOCUMENTS

- A. Availability of Documents: Complete sets of procurement documents may be obtained:
 1. Bid Documents for a Stipulated Sum contract may be obtained from the website of the Architect at www.mpengplans.us upon receipt of a nonrefundable deposit, by cash or check, in the amount indicated on the plan room site for one set delivered in PDF format.
 2. Bid Documents can be obtained from PlanHouse printing in Gulfport, MS. Contact PlanHouse Printing at (228) 248-0181 for more detailed information on pricing and available construction document delivery formats.
- B. Documents may be viewed at Office of the Architect.

1.07 BID SECURITY

- A. Bids shall be accompanied by a security deposit as follows:
 1. Bid Bond of a sum no less than 5 percent of the Bid Amount on AIA A310 Bid Bond Form.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION 000107
SEALS PAGE**

ARCHITECT OF RECORD

VANESSA J. HEMENWAY, AIA

MP Design Group, PLLC

918 Howard Avenue, Suite F, Biloxi, MS 39530

Phone: 228.388.1950 | Fax: 228-388-1971

Email: vanessa@mpdesigngroup.us

ELECTRICAL ENGINEER OF RECORD

BRADLEY P. PATANO, P.E.

MP Design Group, PLLC

918 Howard Avenue, Suite F, Biloxi, MS 39530

Phone: 228.388.1950 | Fax: 228-388-1971

Email: bpatano@mpdesigngroup.us

END OF SECTION

**SECTION 000110
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**SECTION 001113
ADVERTISEMENT FOR BIDS****FROM:****1.01 THE OWNER (HEREINAFTER REFERRED TO AS OWNER):**

- A. Pascagoula-Gautier School District
- B. Address:
 - 1. 1006 Communy Avenue , Pascagoula, MS 39567

1.02 & THE ENGINEER/ARCHITECT (HEREINAFTER REFERRED TO AS ENGINEER/ARCHITECT):

- A. MP Design Group
- B. Address and Contact Information:
 - 918 Howard Avenue, Suite F
 - Biloxi, MS 39530
 - Phone: 228-388-1950
 - Fax: 228-388-1971
 - Web Site: www.mpdesigngroup.us
 - Plan Room: www.mpdesigngroupplans.us

1.03 TO: POTENTIAL BIDDERS

- A. Your firm is invited to submit an offer under seal to the Owner located at the above address for renovations of multiple building located in Pascagoula-Gautier School District before 2:00 pm local standard time on the 26th day of February, 2026, for:
- B. Project Name: PGSD Intercom Upgrades
- C. Engineer/Architect's Project Number: Design Professional's Project Number.
- D. Project Address:
 - 1. Arlington Elementary School - 3511 Arlington St, Pascagoula, MS 39581
 - 2. Cherokee Elementary School - 4102 Scovel Ave, Pascagoula, MS 39581
 - 3. College Park Elementary School - 2617 Ladnier Rd, Gautier, MS 39553
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 - 6. Jackson County Exceptional School - 4311 Hospital Rd, Pascagoula, MS 39581
 - 7. Jackson Elementary School - 3203 Lanier Ave, Pascagoula, MS 39581
 - 8. Lake Elementary School - 4504 Willow St, Pascagoula, MS 39567
- E. Project Description: new intercom system, security cameras, access controls and door hardware _____.
- F. Bid Documents for a Stipulated Sum contract may be obtained from the plan room website of the Architect at www.mpdesigngroupplans.us upon receipt of a non-refundable deposit, by cash or check, in the amount indicated on the plan room site for one set delivered in electronic PDF format.
- G. Bidders will be required to provide Bid security in the form of a Bid Bond of a sum no less than 5 percent of the Bid Amount or a certified check for a sum no less than 5 percent of the Bid Amount.
- H. Refer to other bidding requirements described in Document 002113 - Instructions to Bidders and Document 003100 - Available Project Information.
- I. Submit your offer on the Bid Form provided. Bidders may supplement this form as appropriate.
- J. If Bids are mailed or hand delivered, then they must be contained in a sealed envelope marked on the outside with the project name. They must be on file as received or delivered by the time stated above to the address of the Owner stated above. Do not deliver Bids to the project address or the Architect's address. The Owner is NOT responsible for bids which are mailed to the wrong address or which arrive in the mail after the designated bid opening time.
- K. Electronic Bid Submission will be accepted on this project. Online bids can be placed on the website of the Architect at www.mpdesigngroupplans.us. If Bids are electronically submitted, then a title page

containing the same information as would occur on the front of a sealed envelope must be included and must be clearly indicated as such in the file name.

- L. Bids in excess of \$50,000.00 must be marked on the outside of the envelope with the contractor's Mississippi certificate of responsibility number as issued by the Mississippi Board of Contractors along with a copy of the General Contractor's proof of Mississippi license.
- M. Per the Mississippi Law, MS Code 31-3-21(3); any bid submitted by a non-resident contractor which does not include the non-resident contractor's current state law pertaining to such state's treatment of non-resident contractors, shall be rejected and not considered for award. If no such law exists in the non-resident contractor's state, then the non-resident contractor may provide statement to that effect.
- N. Your offer will be required to be submitted under a condition of irrevocability for a period of 60 days after submission.
- O. The Owner reserves the right to accept or reject any or all offers.

END OF SECTION

**SECTION 002113
INSTRUCTIONS TO BIDDERS****INVITATION****1.01 BID SUBMISSION**

- A. Bids signed and under seal, executed, and dated will be received at the office of the Owner as Described in Document 001113 - Advertisement for Bids.
- B. Electronic Bid Submission will be accepted on this project. Online bids can be placed on the website of the Architect at www.mpdesigngroupplans.us.
- C. Offers submitted after the above time will be returned to the bidder unopened.
- D. Offers will be opened publicly after the time for receipt of bids.

1.02 INTENT

- A. The intent of this Bid request is to obtain an offer to perform work to complete a new intercom system, security cameras, access controls and door hardware located at Pascagoula, Mississippi for a Stipulated Sum contract, in accordance with the Contract Documents.

1.03 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

- A. Work of this proposed Contract comprises remodeling, renovation, and demolition, including general construction and electrical Work.
- B. All bid amounts must be based on the most stringent requirement called for in the complete construction document package. In addition, the most stringent requirement shown shall govern and take precedence in the event of any and all conflicts between different drawings (plans, elevations, details, sections, schedules, etc...), between different specification sections, within specification sections, and between the drawings and the specifications. It will be the General Contractor's responsibility to bring any and all discrepancies to the architect's attention for further clarity prior to submitting a formal bid.

1.04 BUILDING PERMITS AND PLAN REVIEW

- A. Refer to 011000 Summary

1.05 CONTRACT TIME

- A. Perform the Work in time as described in Document 000102 - Project Information.
- B. Inclement Weather: The Contract Time for the project has incorporated all days for inclement weather. No additional request inclement weather days will be allowed during the project duration. The only inclement weather delays that will be considered to be above and beyond standard adverse conditions and will be considered appropriate for the Contractor's request for additional time will be Acts of God that have directly effected the project site as follows:
 - 1. Named Storms
 - 2. Earthquakes
 - 3. Tornadoes
 - 4. Floods
 - 5. Hail Storms

BID DOCUMENTS AND CONTRACT DOCUMENTS**2.01 DEFINITIONS**

- A. Bid Documents include the Advertisement for Bids, Instructions to Bidders, Bid Form, Information Available to Bidders, Supplements To Bid Forms and Appendices, other sample bidding and contract forms, and the proposed Contract Documents including any Addenda issued prior to receipt of bid. The Contract Documents proposed for the Work consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary, and other Conditions), the Drawings, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract.
- B. All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

- C. Addenda are written or graphic instructions issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.
- D. A Bid is a complete and properly signed proposal to do the Work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents.
- E. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which work may be added or from which work may be deleted for sums stated in Alternate Bids.
- F. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
- G. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials or services as described in the Bidding Documents or in the proposed Contract Document.
- H. A bidder is a person or entity who submits a Bid.
- I. A Sub-Bidder is a person or entity who submits a bid to a Bidder for materials or labor for a portion of the work.

2.02 CONTRACT DOCUMENTS IDENTIFICATION

- A. The Contract Documents are identified as PGSD Intercom Upgrades; Number 0111.25.004, as prepared by Engineer/Architect , and with contents as identified in the Project Manual.

2.03 AVAILABILITY

- A. Bid Documents can also be obtained from the Plan Room website of the Architect at www.mpdesigngroupplans.us upon receipt of a nonrefundable deposit, by cash or check, in the amount indicated on the plan room site for one set delivered in PDF format.
- B. Bid Documents can be obtained from PlanHouse printing in Gulfport, MS. Contact PlanHouse Printing at (228) 248-0181 for more detailed information on pricing and available construction document delivery formats.
- C. Bid Documents are made available only for the purpose of obtaining offers for this project. Their use does not grant a license for other purposes.

2.04 EXAMINATION

- A. Bid Documents may be viewed at the office of Engineer/Architect .
- B. Upon receipt of Bid Documents verify that documents are complete. Notify Engineer/Architect should the documents be incomplete.
- C. Immediately notify Engineer/Architect upon finding discrepancies or omissions in the Bid Documents.

2.05 INQUIRIES/ADDENDA AND INTERPRETATIONS

- A. Direct questions to Brad Patano or Tyler Abell, at email: bpatano@mpdesigngroup.us and tabell@mpdesigngroup.us respectively.
- B. Addenda may be issued during the bidding period. All Addenda become part of Contract Documents. Include resultant costs in the Bid Amount.
- C. Verbal answers are not binding on any party.
- D. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be forwarded to known recipients .
- E. Any interpretation, correction or change of the Bidding Documents will be made by Addendum issued during the bidding period. All Addenda become part of the Contract Documents. Interpretations, corrections or changes of the Bidding Documents made in any other manner will not be binding.
- F. Failure of any bidder to receive addendum issued, or to acknowledge receipt on the bid form, shall not relieve such bidder from any obligation under this bid as submitted.
- G. All bid amounts must be based on the most stringent requirement called for in the complete construction document package. In addition, the most stringent requirement shown shall govern and take precedence

in the event of any and all conflicts between different drawings (plans, elevations, details, sections, schedules, etc...), between different specification sections, within specification sections, and between the drawings and the specifications. It will be the General Contractor's responsibility to bring any and all discrepancies to the architect's attention for further clarity prior to submitting a formal bid. No other method of estimating shall be used in preparing the bid proposal, unless contrary instructions are issued in the form of an Addendum before bid proposal due date.

- H. Any claim by the Contractor or Subcontractors that they, in submitting their respective bid proposals, did not include all items as shown in the Contract Documents will be given no consideration for an adjustment of any kind. If any item is specified in a Section which would not normally furnish this item, it shall be the responsibility of the Contractor to provide the work in question, without any additional cost to the Owner.

2.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS

- A. General Requirements for Substitution Requests:
- B. Where the Bid Documents stipulate a particular product, substitutions will be considered up to 7 days before receipt of bids.
- C. Substitution Request Form:
1. Submit substitution requests by completing the form in Section 004325; see this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- D. Review and Acceptance of Request:
1. When a request to substitute a product is made, Engineer/Architect may approve the proposed substitution and will issue an Addendum to known bidders.
 2. The submission shall provide sufficient information to determine acceptability of such products.
 3. Provide complete information on required revisions to other work to accommodate each proposed substitution.
 4. Provide products as specified unless substitutions are submitted in this manner and accepted.
- E. Submit substitution requests by completing the form in Section 004325 - Substitution Request Form - During Procurement; see this section for additional information and instructions. Use only this form; other forms of submission are unacceptable. If this form is not completed in its entirety, then it will be rejected and will have to be resubmitted.
- F. See Section 012500 - Substitution Procedures for additional requirements.

SITE ASSESSMENT

3.01 SITE EXAMINATION

- A. Examine the project site before submitting a bid.
- B. A visit to the project site has been arranged for bidders as follows: Immediately following the Pre-Bid Conference
- C. The currently occupied premises at the project site are open for examination by bidders only during the following hours:
1. Monday through Friday: 8 AM to 5 PM.
 2. Contractor will be require to contact the Owner prior to arriving to schedule a time for examination.

3.02 PREBID CONFERENCE

- A. A bidders conference has been scheduled as described in Document 000102 - Project Information.
- B. All general contract bidders and suppliers are invited.
- C. Representatives of Engineer/Architect will be in attendance.
- D. Summarized minutes of this meeting may be circulated to all known bidders. These minutes will not form part of the Contract Documents.
- E. No verbal answers during this meeting are binding nor do they become a part of the Bid Documents. Information relevant to the Bid Documents will be recorded in an Addendum, issued to Bid Document recipients.

QUALIFICATIONS**4.01 SUBCONTRACTORS/SUPPLIERS/OTHERS**

- A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.
- B. Refer to General Conditions.

BID SUBMISSION**5.01 SUBMISSION PROCEDURE**

- A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.
- B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with bidder's name, project name and Owner's name on the outside. If Bids are electronically submitted, then a title page containing the same information as would occur on the front of a sealed envelope must be included and must be clearly indicated as such in the file name (i.e. "open first," or "Envelope Information," etc...), so that it will be the first item opened.
- C. Bids in excess of \$50,000.00 must be marked on the outside of the envelope with the contractor's Mississippi Certificate of Responsibility Number as issued by the Mississippi Board of Contractors along with a copy of the General Contractor's proof of Mississippi license.
- D. Electronic Bid Submission will be accepted on this project. Online bids can be placed on the website of the Architect at www.mpengplans.us.

5.02 BID INELIGIBILITY

- A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.
- B. Bid Forms, Appendices, and enclosures that are improperly prepared may, at the discretion of Owner, be declared unacceptable.
- C. Failure to provide security deposit, bonding or insurance requirements may, at the discretion of Owner, invalidate the bid.

BID ENCLOSURES/REQUIREMENTS**6.01 SECURITY DEPOSIT**

- A. Bids shall be accompanied by a security deposit as follows:
 - 1. Bid Bond of a sum no less than 5 percent of the Bid Amount on AIA A310 Bid Bond Form.
 - OR-
 - 2. Certified check in the amount of a sum no less than 5 percent of the Bid Amount.
- B. Endorse the certified check in the name of the Owner.
- C. The security deposit will be returned after delivery to the Owner of the required Performance and Payment Bond(s) by the accepted bidder.
- D. Include the cost of bid security in the Bid Amount.
- E. If no contract is awarded, all security deposits will be returned.

6.02 PERFORMANCE ASSURANCE

- A. Accepted Bidder:
 - 1. Provide a Performance Bond
 - 2. Provide a Payment Bond
 - 3. Provide a Schedule of Values (AIA G703) within 7 days of bid submission.
 - 4. Provide a Construction Schedule within 7 days of bid submission.
- B. Include the cost of Performance and Payment Bonds in the Bid Amount.

6.03 INSURANCE

- A. Provide an executed "Undertaking of Insurance" letter on official letterhead provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance

requirements of the Contract Documents. This is nothing more than a letter. There is no special form required. The intent is to assure the Owner that the Bidder is capable of obtaining insurance coverage requirements set forth herein for this specific project.

6.04 NON COLLUSIVE AFFIDAVIT

- A. Bids shall be accompanied with 004105 Form of Non Collusive Affidavit.

6.05 NON-RESIDENT CONTRACTORS

- A. The following is excerpted from MS Code 31-3-21 Bidding process and requirements; report following award of contract, and is required for any non-resident contractor.
1. In the letting of public contracts preference shall be given to resident contractors, and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded Mississippi public contracts only on the same basis as the nonresident bidder's state awards contracts to Mississippi contractors bidding under similar circumstances; and resident contractors actually domiciled in Mississippi, be they corporate, individuals, or partnerships, are to be granted preference over nonresidents in awarding of contracts in the same manner and to the same extent as provided by the laws of the state of domicile of the nonresident. When a nonresident contractor submits a bid for a public project, he shall attach thereto a copy of his resident state's current preference law, if any, pertaining to such state's treatment of nonresident contractors. Any bid submitted by a nonresident contractor which does not include the nonresident contractor's current state law shall be rejected and not considered for award. As used in this section, the term "resident contractors" includes a nonresident person, firm or corporation that has been qualified to do business in this state and has maintained a permanent full-time office in the State of Mississippi for two (2) years prior to submission of the bid and the subsidiaries and affiliates of such a person, firm or corporation. Any public agency awarding a contract shall promptly report to the Department of Revenue the following information:
 - a. The amount of the contract.
 - b. The name and address of the contractor reviewing the contract.
 - c. The name and location of the project.

6.06 BID FORM REQUIREMENTS

- A. Complete all requested information in the Bid Form and Appendices.

6.07 BID FORM SIGNATURE

- A. The Bid Form shall be signed by the bidder, as follows:
1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature.
 2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature.
 3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of directors authorizing them to do so, must also be submitted with the Bid Form in the bid envelope.

6.08 ADDITIONAL BID INFORMATION

- A. Upon request by the Architect, the selected Bidder shall within seven days thereafter submit the following:
1. A schedule of values (AIA G703) for each major item of work included in the bid broken down at a minimum by specification section. This must be delivered to the Architect/Engineer within 7 days of bid submis.
 2. A list of the work to be performed by the Bidder with his own work forces.
 3. A list of Subcontractors or other persons or organizations proposed for use on this project. The Bidder will be required to establish to the Architect, Owner and the Owner's Representative the reliability and responsibility of the proposed Subcontractors to furnish and perform the work. Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner, Architect, and the Owner's Representative must be used on the work for which they were

proposed and accepted and shall not be changed except with the written approval of the Owner, Architect and Owner's Representative.

6.09 SELECTION AND AWARD OF ALTERNATES

- A. Bids will be evaluated on the total of the base bid price and any combination of the Alternates. After determination of the successful bidder, consideration will be given to which Alternates will be included in the Work.

6.10 QUALIFICATION OF BIDDERS

- A. If required, a Bidder shall submit to the Architect a properly executed Contractor's Qualification Statement AIA Document A305, within five (5) days from request.
- B. The successful low bidder(s) will have to meet the following criteria to the Owners' satisfaction, prior to award of bid. Failure to do so may result in the rejection of the defaulting Contractors' Bid.
 - 1. The Contracting Company's ability to perform the designated scope of work.
 - 2. Qualified personnel and adequate work force capable of completing the specified project Work.
 - 3. Satisfactory construction plan.
 - 4. Satisfactory safety plan and work history related to safety and reportable OSHA related incidences.
 - 5. Successful completion of a similar project and no documented letters of dissatisfaction from similar owners.
- C. Independent Contractor Status: It is understood and agreed that the contractor is an independent Contractor and not an employee of the Owner and that the Contractor shall be responsible for all necessary licenses, federal and state taxes, liability insurance, worker's compensation coverage and other obligations imposed upon him and his employees as an independent Contractor under applicable laws, rules and regulations.
- D. Indemnity to the Owner: It is understood and agreed that the Contractor shall hold the Owner harmless and indemnify the Owner against any losses, damages, or liabilities resulting from the performance of the aforesaid services by said Contractor. Contractor shall be responsible for all employee withholding, payroll and FICA taxes, and shall maintain any and all Worker's Compensation Insurance on its laborers as required by law and shall hold the Owner harmless from all claims, if any, concerning Contractor's employees or subcontractors.
- E. The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the Contract and to complete the scope of Work. Conditional bids will not be accepted. The Owner may consider either of the following reasons as being sufficient for the disqualification of a bidder and the rejection of the bidder's proposal:
 - 1. Submission of more than one proposal for the same work from an individual, partnership, firm or corporation under the same or different name(s),
 - 2. Evidence of collusion among bidders. Participants of such collusion may be disqualified for future Work of the Owner, and
 - 3. If the Bidder has been placed in default on another project with the Owner.

6.11 DURATION OF OFFER

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of sixty (60) days after the bid closing date.

6.12 ACCEPTANCE/ REJECTION OF OFFER

- A. Owner reserves the right to accept or reject any or all offers.
- B. The Bidder acknowledges the right right of the Owner to reject any or all bids and to waive any informality or irregularity in any bid received. In addition, the Bidder recognizes the right of the Owner to reject a bid if the Bidder failed to furnish required bid security or to submit the data required by the bidding documents, or if the bid is in any way incomplete or irregular. Each actual or prospective bidder agrees to waive any claim it has or may have against the Owner, or against the Architect, or against the Owner's Representative, and their respective employees and agents, arising out of or in connection with the bidding process specifically including the receipt, evaluation, recommendation, and administration of any bid.

- C. The Owner intends to award a Contract to the lowest and best Bidder within available funds, based on the sum of the base bid plus accepted alternates, if any. A bidder may be disqualified for any legally permissible reason. In making award, the Owner reserves the right to consider a bidder's experience, quality of previous work, availability of appropriate financial, material, facility, managerial or personal resources, warranties, life cycle cost and any other legal factors related to evaluating the bidder's capability to perform contract requirements in a timely and proper manner.
- D. The Owner reserves the right to cancel the award of a contract any time prior to the execution by all parties without liability against the Owner.
- E. Any protest from any bidder must be delivered to the Owner in writing within seventy-two (72) hours of bid opening.
- F. Any claim of error and request to be released from the bid by any bidder must be delivered to the Owner within twenty-four (24) hours of bid opening. Sufficient documentation and proof must accompany this written request clearly showing an error was made by the bidder.
- G. The Contract will provide for Liquidated Damages in the amounts indicated on the Bid Form. Amounts indicated are to be paid per day by the Contractor for this Project to the Owner for each calendar day after the date of substantial completion.
- H. After acceptance by Owner, Engineer/Architect on behalf of Owner, will issue to the successful bidder, a written Notice To Proceed.

6.13 LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

- A. The successful Bidder, upon his failure or refusal to execute and deliver the Contract and bonds required within seven (7) days after he has received notice of the acceptance of his bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the difference between his bid and the next acceptable bid, up to the maximum amount of the Bid Security.
- B. Refer to the Bid Form for the Amount and Time Frame for the Liquidated Damages.

6.14 TIME OF COMPLETION

- A. Bidder must agree to commence work on a date to be specified in a written "Notice to Proceed" and to substantially complete the Work within the number of calendar days indicated on the bid form.
- B. Bidders shall substantially complete all the work involved in its contract within the calendar days stated and shall be subject to damages for each calendar day of delay thereafter in accordance with the General Conditions of the Contract for Construction.

END OF SECTION

**SECTION 004000
PROCUREMENT FORMS AND SUPPLEMENTS**

PART 1 GENERAL

1.01 FORMS

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the procurement requirements.
- B. Bid Form: Section 004100 - Bid Form.
- C. Procurement Form Supplements:
 - 1. Certificate of Responsibility Number: Required on the Outside of the Envelope
 - 2. Bid Bond Form: AIA A310. Required to be submitted with the Bid.
 - 3. Proposed Schedule of Values Form: AIA G703. This does not have to be submitted with the bid, but must be provided to the Architect within seven (7) if so requested.
 - 4. Form of Non Collusive Affidavit: 004105 Form of Non Collusive Affidavit. Required to be submitted with the Bid.

1.02 REFERENCE STANDARDS

- A. AIA A310 - Bid Bond; 2010.
- B. AIA G703 - Continuation Sheet; 1992.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 004100
BID FORM**

THE PROJECT AND THE PARTIES

1.01 TO:

- A. Pascagoula-Gautier School District (Owner)
1006 Communy Avenue, Pascagoula, MS 39567

1.02 FOR:

- A. Project: PGSD Intercom Upgrades
Engineer/Architect Project Number: 0111.25.004
 1. Arlington Elementary School - 3511 Arlington St, Pascagoula, MS 39581
 2. Cherokee Elementary School - 4102 Scovel Ave, Pascagoula, MS 39581
 3. College Park Elementary School - 2617 Ladnier Rd, Gautier, MS 39553
 4. Eastlawn Elementary School - 2611 Ingalls Ave, Pascagoula, MS 39567
 5. Gautier Elementary School - 505 Magnolia Tree Dr, Gautier, MS 39553
 6. Jackson County Exceptional School - 4311 Hospital Rd, Pascagoula, MS 39581
 7. Jackson Elementary School - 3203 Lanier Ave, Pascagoula, MS 39581
 8. Lake Elementary School - 4504 Willow St, Pascagoula, MS 39567
 Project Location Address 1
Pascagoula, MississippiProject Location ZIP

1.03 DATE: _____ (BIDDER TO ENTER DATE)

1.04 SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

- A. Bidder's Full Name _____
 1. Address _____
 2. City _____ State _____, Zip _____

1.05 OFFER

- A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by MP Design Group for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work, within the time set forth herein for the Sum of:

B. BASE BID LUMP SUM PRICE:

_____ dollars
 (\$_____), in lawful money of the United States of America.

- C. We have included the required security deposit as required by the Instruction to Bidders.
- D. We have included the required Non Collusive Affidavit Form as required by the Instructions to Bidders.
- E. We have included the required performance assurance bonds in the Bid Amount as required by the Instructions to Bidders.
- F. We have included the cost of all local jurisdiction building permits required to complete the construction of this project in our Base Bid amount unless specifically called for otherwise in Section 012100 Allowances.
- G. All applicable federal taxes are included and state of Mississippi taxes are included in the Bid Sum.
- H. All Cash and Contingency Allowances described in Section 012100 - Allowances are included in the Bid Sum.

1.06 ACCEPTANCE

- A. This offer shall be open to acceptance and is irrevocable for sixty days from the bid closing date.
- B. If this bid is accepted by Owner within the time period stated above, we will:
 1. Furnish the required bonds within seven days of receipt of Notice of Award.
 2. Commence work within seven days after written Notice to Proceed of this bid.

- C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.
- D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

1.07 CONTRACT TIME

- A. If this Bid is accepted, we will:
 - 1. Complete the Work in 240 calendar days from Notice to Proceed.
- B. If the Substantial Completion date falls beyond the above date based on days, we will pay to the Owner the following amount as liquidated damages, not as a penalty, for each calendar day of delay for the Project until the actual date of Substantial Completion of the Project:

***** UP TO \$500.00 PER CALENDAR DAY *****

1.08 ADDENDA

- A. The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid Sum. Add additional lines if needed.
 - 1. Addendum # _____ Dated _____
 - 2. Addendum # _____ Dated _____
 - 3. Addendum # _____ Dated _____
 - 4. Addendum # _____ Dated _____
 - 5. Addendum # _____ Dated _____

1.09 BID FORM SUPPLEMENTS

- A. The following information is included with Bid submission:
 - 1. Non Collusive Affidavit
 - 2. Bid Bond: Form AIA Document A310
 - 3. Letter from Insurance Company
 - 4. Proof of Contractor's State License
 - 5. Non-Resident Contractors: Attach a copy of your state's current law (refer to Instructions to Bidders for additional information)
- B. We agree to submit the following Supplements to Bid Forms within 7 days after submission of this bid for additional bid information:
 - 1. Schedule of Values on form AIA G703 broken down at a minimum by specification section.
 - 2. Construction Schedule .

1.10 BID FORM SIGNATURE(S)

I certify that I am authorized to enter into a binding contract, if this Proposal is accepted.

Name of Business (Complete legal spelling as represented at the state Contractor's Board)

Signature of Signee

Printed Name of Authorized Signing Officer and Title

1.11 IF THE BID IS A JOINT VENTURE OR PARTNERSHIP, ADD ADDITIONAL FORMS OF EXECUTION FOR EACH MEMBER OF THE JOINT VENTURE IN THE APPROPRIATE FORM OR FORMS AS ABOVE.

END OF SECTION

**SECTION 004105
FORM OF NON COLLUSIVE AFFIDAVIT**

PART 1 GENERAL

1.01 FORM OF NON-COLLUSION AFFIDAVIT IS AS FOLLOWS:

- A. A copy of the Non-Collusion Affidavit is attached to the end of this Section. It will be the General Contractor's (Bidders) responsibility to complete this form in its entirety and submit it with and in his bid package.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

NON-COLLUSION AFFIDAVIT

The undersigned bidder or agent, being duly sworn on oath, says that he/she has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to include anyone to refrain from bidding, and that this bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He/She further says that no person or persons, firms, or corporation has, have or will receive directly or indirectly, any rebate, fee gift, commission or thing of value on account of such sale.

OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES FOR PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT.

Dated this ____ day of _____, _____

General Contractor (GC) Company Name

Printed Name and Title of GC's Representative

Signature of GC's Representative

NOTARY PUBLIC ACKNOWLEDGEMENT

STATE OF _____

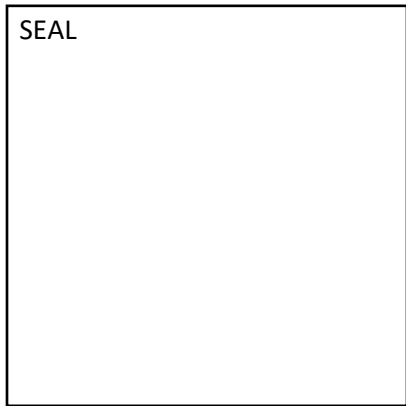
COUNTY OF _____

Before me, a Notary Public, personally appeared the above named and swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to me this _____ day of _____, _____.

Signature

My Commission Expires: _____



**SECTION 004325
SUBSTITUTION REQUEST FORM - DURING PROCUREMENT**

PART 1 GENERAL

1.01 SUBSTITUTION REQUEST FORM IS AS FOLLOWS:

- A. A copy of the Substitution Request Form that must be used is attached at the end of this section.
 - 1. No other forms will be allowed.
 - 2. Any additional information that can be provided to substantiate the substitution request will be gladly accepted.
 - 3. An incomplete Substitution Request Form will be immediately rejected.

1.02 RELATED REQUIREMENTS

- A. Section 002113 - Instructions to Bidders

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION



YOUR PROJECT · OUR PRIORITY · NO EXCUSES

Project: _____

Specification Section Number and Paragraph: _____

Contract Drawings Affected: _____

Proposed Manufacturer: _____

Proposed Product Substitution: _____

Proposed Product Description: _____

EFFECTS OF PROPOSED PRODUCT SUBSTITUTION

PROVIDE THE FOLLOWING: (If you answer yes to any of the following, then provide additional explanation)

1. Attach list of at least 3 projects where proposed substitution has been used within past 6 to 12 months include name, address, and telephone number of Owner and Architect.
2. Does substitution affect dimensions indicated on Drawings? (Y/N) _____
3. Does substitution affect Work of other Specification Sections? (Y/N) _____
4. Does substitution require any modifications to the design, changes to Drawings, or revisions to specifications? (Y/N) _____

CONTRACTOR'S / BIDDER'S RESPONSIBILITY

Undersigned accepts responsibility for coordination of proposed substitution and accepts all additional costs resulting from the incorporation of proposed substitution into the Project per Section 01600. The only response to this Request for Substitution will be by Addendum.

SUBMITTED BY

(Include name, address, telephone, and contract person of manufacturer/supplier of proposed substitution)

Contact Name: _____

Contact Address: _____

Contact Telephone: _____

Signature and date: _____

ARCHITECT / ENGINEER REVIEW

Reviewed by: _____ Date: _____

Comments:

**SECTION 005000
CONTRACTING FORMS AND SUPPLEMENTS**

PART 1 GENERAL**1.01 AGREEMENT AND CONDITIONS OF THE CONTRACT**

- A. See Section 005200 - Agreement Form for the Agreement form to be executed.
- B. See Section 007200 - General Conditions for the General Conditions.
- C. The Agreement is based on AIA A101.
- D. The General Conditions are based on AIA A201.

1.02 FORMS

- A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in Contract Documents.
- B. Bond Forms:
 - 1. Bid Bond Form: AIA A310.
 - a. Must be submitted with the Bid Form.
 - 2. Performance and Payment Bond Form: AIA A312.
 - a. A Performance Bond and a Payment (Labor and Material) Bond are required as a condition of this Contract.
 - b. Simultaneous with delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for the faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract in the amount of 100% of the contract sum for payment, executed on AIA Document A312.
 - c. The surety on such bond or bonds will be a duly authorized surety company who is licensed by the State of Mississippi's Commissioner of Insurance and who has a B++ or higher rating in accordance with the most recent edition of the A.M. Best Company, Inc., Key Rating Guide.
 - d. All bonds shall be countersigned by a Mississippi resident agent with the name and address typed or lettered legibly.
 - e. All bonds must be accompanied by an appropriate Power of Attorney.
- C. Post-Award Certificates and Other Forms:
 - 1. Architect's Submittal Transmittal Letter Form: Attached at the end of this section.
 - 2. Schedule of Values Form: AIA G703.
 - 3. Application for Payment Forms: AIA G702 with AIA G703 (for Contractors).
- D. Clarification and Modification Forms:
 - 1. Architect's Request for Interpretation Form: Attached to the end of this section.
 - 2. Architect's Substitution Request Form (During the Bidding/Negotiating Stage): Attached at the end of this section.
 - 3. Architect's Supplemental Instructions Form: AIA G710.
 - 4. Construction Change Directive Form: AIA G714.
 - 5. Change Order Form: AIA G701.
- E. Closeout Forms:
 - 1. Certificate of Substantial Completion Form: AIA G704.
 - 2. Affidavit of Release of Liens Form: AIA 706A.
 - 3. Attic Stock Transmittal Form: Attached at the end of this section.

1.03 REFERENCE STANDARDS

- A. AIA A101 - Standard Form of Agreement Between Owner and Contractor where the basis of Payment is a Stipulated Sum; 2017.
- B. AIA A201 - General Conditions of the Contract for Construction; 2017.
- C. AIA A310 - Bid Bond; 2010.
- D. AIA A312 - Performance Bond and Payment Bond; 2010.

- E. AIA G701 - Change Order; 2017.
- F. AIA G702 - Application and Certificate for Payment; 1992.
- G. AIA G703 - Continuation Sheet; 1992.
- H. AIA G704 - Certificate of Substantial Completion; 2017.
- I. AIA G710 - Architect's Supplemental Instructions; 2017.
- J. AIA G714 - Construction Change Directive; 2017.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION



YOUR PROJECT · OUR PRIORITY · NO EXCUSES

Project Name:

Project Number:

RFI Number	Submitted To	Submitted By	Copies To				
Date							
Subject		Discipline	Co-Author				
Specification Section		Drawing Reference					
Information Requested (suggest solution, if possible):			Date Requested:				
				Response			
						
						
						
						

By responding to the RFI, we do not agree to any additional costs and/or time. Any additional costs and/or time shall be submitted in accordance with the Contract Documents.

Date Answered:

Answered By:



YOUR PROJECT • OUR PRIORITY • NO EXCUSES

SUBMITTAL IDENTIFICATION

Submittal No. _____

Contractor to Complete

Project Name: _____

MP Project Number: _____

General Contractor: _____

Submittal Subcontractor: _____

Date Submitted to MP: _____

Specification Number: _____

Specification Description: _____

Architect/Engineer to Complete

Date Returned: _____

Method Returned: _____

Returned To: _____

**SECTION 005200
AGREEMENT FORM**

PART 1 GENERAL

1.01 FORM OF AGREEMENTS ARE AS FOLLOWS:

- A. Standard Form of Agreement Between Owner and Contractor, American Institute of Architects Document A101, 2017 Edition will be used for the Contract.
- B. Standard Form Insurance and Bonds, American Institute of Architects Document A101, 2017 Exhibit A will be used for the Contract.

1.02 RELATED REQUIREMENTS

- A. Section 007200 - General Conditions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION 006200
INSURANCE AND BONDS****PART 1 GENERAL****1.01 INSURANCE**

- A. The Contractor is responsible for maintaining the following insurance coverages described herein.
- B. **PROPERTY INSURANCE (BUILDER'S RISK)**
1. The Contractor shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a Builder's Risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.
- C. **COMMERCIAL GENERAL LIABILITY (CGL) INSURANCE**
1. Commercial General Liability Insurance for the Project shall be written on an occurrence form with policy limits of not less than Two Million Dollars (\$2,000,000) each occurrence, Four Million Dollars (\$4,000,000) general aggregate, and Two Million Dollars (\$2,000,000) aggregate for products-completed operations hazard, providing coverage for claims including:
 - a. damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;
 - b. personal injury and advertising injury;
 - c. damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
 - d. bodily injury or property damage arising out of completed operations; and
 - e. the Contractor's indemnity obligations under the General Conditions.
 - f. an excess umbrella policy will be acceptable to meet the requirements of 1.01 C.1.
 2. The Contractor's Commercial General Liability policy shall not contain an exclusion or restriction of coverage for the following:
 - a. Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
 - b. Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
 - c. Claims for bodily injury other than to employees of the insured.
 - d. Claims for indemnity of the General Conditions arising out of injury to employees of the insured.
 - e. Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
 - f. Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
 - g. Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
 - h. Claims related to roofing, if the Work involves roofing.
 - i. Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
 - j. Claims related to earth subsidence or movement, where the Work involves such hazards.
 - k. Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.
- D. **AUTOMOBILE LIABILITY INSURANCE**
1. Automobile Liability Insurance covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than One Million Dollars (\$1,000,000) per accident, for

bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

E. EMPLOYERS' LIABILITY INSURANCE (WORKER'S COMP)

1. Employers' Liability Insurance with policy limits not less than One Million Dollars (\$1,000,000) each accident, One Million Dollars (\$1,000,000) each employee, and One Million Dollar (\$1,000,000) policy limit by not less than per statute.
2. Employers' Liability Insurance with policy limits not less than Two Million Dollars (\$2,000,000) each accident, One Million Dollars (\$1,000,000) each employee, and Two Million Dollar (\$2,000,000) policy limit.

1.02 SECURITY BONDS FOR FAITHFUL PERFORMANCE

- A. A Performance Bond and a Payment (Labor and Material) Bond are required as a condition of this Contract.
- B. Simultaneous with delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for the faithful performance of this Contract and for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract in the amount of 100% of the contract sum for payment, executed on AIA Document A312.
- C. The surety on such bond or bonds will be a duly authorized surety company who is licensed by the State of Mississippi's Commissioner of Insurance and who has a B++ or higher rating in accordance with the most recent edition of the A.M. Best Company, Inc., Key Rating Guide.
- D. All bonds shall be countersigned by a Mississippi resident agent with the name and address typed or lettered legibly.
- E. All bonds must be accompanied by an appropriate Power of Attorney.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 007200
GENERAL CONDITIONS**

PART 1 GENERAL

1.01 GENERAL CONDITIONS ARE AS FOLLOWS:

- A. Standard Form of General Conditions of the Contract for Construction, American Institute of Architects Document A201, 2017 Edition will be used for the Contract.
- B. If a conflict exists between the General Conditions and the Specifications, the Specifications shall rule. Any party discovering a conflict between the Specifications and the General Conditions shall immediately notify the Architect in writing.
- C. Prospective bidders should read and understand the General Conditions before submitting bids or executing the Agreement.
- D. A copy of the Agreement is available at the Architect's office for the Contractor's examination on M-F from 8-5. The Agreement is incorporated by reference as though fully written herein.

END OF SECTION

**SECTION 009000
ADDENDA**

PART 1 GENERAL

1.01 SUMMARY

- A. Any addenda to the drawings or specifications issued before or during the time of bidding shall be included in the proposal and become a part of the Contract.
- B. Indicate receipt of addenda on the proposal form.

1.02 PART 2 PRODUCTS (NOT USED)

1.03 PART 3 EXECUTION (NOT USED)

END OF SECTION

**SECTION 011000
SUMMARY****PART 1 GENERAL****1.01 PROJECT**

- A. Project Name: PGSD Intercom Upgrades
- B. Owner's Name: Pascagoula-Gautier School District.

1.02 PROJECT DESCRIPTION

- A. Description: Refer to Section 000102 Project Information
- B. Alternates: refer to Division 1 Section "Alternates" for information.
- C. All accessories or incidental items not specifically shown and detailed in the specifications herein, which are necessary and/or required to complete the work within the intent of the specifications, shall be included by the Contractor without additional cost to the Owner.
- D. All bid amounts must be based on the most stringent requirement called for in the complete construction document package. In addition, the most stringent requirement shown shall govern and take precedence in the event of any and all conflicts between different drawings (plans, elevations, details, sections, schedules, etc...), between different specification sections, within specification sections, and between the drawings and the specifications. It will be the General Contractor's responsibility to bring any and all discrepancies to the architect's attention for further clarity prior to submitting a formal bid.

1.03 BUILDING PERMITS AND PLAN REVIEW

- A. Building Permits:
 - 1. All Building Permits including all special subcontractor permits will be required for this project.
 - 2. The General Contractor will be required to apply for and pull all permits in their name.
 - 3. The General Contractor will be required to pay for all permits. Refer to Allowances section for any specified amount that may be allocated for the paying of said permits. If there is no set allowance provided, then it will be the General Contractor's responsibility to coordinate with the AHJ and provide for the costs of all permits in his base bid amount.
- B. Plan Review:
 - 1. The project will be required to go through the plans review process with the Authority Having Jurisdiction (AHJ).
 - 2. The General Contractor will be required to pay for all plans review fees. Refer to Allowances section for any specified amount that may be allocated for the paying of said plan review. If there is no set allowance provided, then it will be the General Contractor's responsibility to coordinate with the AHJ and provide for the costs of the plan review in his base bid amount.
 - 3. The General Contractor will be responsible for providing and paying for all hard copy sets of plans and specifications required by the AHJ for their completion of the plan review process.

1.04 DESCRIPTION OF ALTERATIONS WORK

- A. Scope of demolition and removal work is indicated on drawings.
- B. Scope of alterations work is indicated on drawings.

1.05 GENERAL INFORMATION

- A. All work shall be performed in a professional manner and workmanlike manner.
- B. Submittals: Submittals shall be submitted in accordance with Division 1 Section "Submittals".
- C. Scheduling: The contractor shall prepare a construction schedule showing each construction activity, based on the project specification divisions, prior to starting work.
- D. The Contractor will be expected to cooperate with the Owner and his representative in pursuing work continuously and with the highest degree of efficiency possible.
- E. The Contractor will be required to finish the job and leave the site in a condition similar to starting project.
- F. Inclement Weather: The Contract Time for the project has incorporated all days for inclement weather. No additional request inclement weather days will be allowed during the project duration. The only

inclement weather delays that will be considered to be above and beyond standard adverse conditions and will be considered appropriate for the Contractor's request for additional time will be Acts of God that have directly effected the project site as follows:

1. Named Storms
 2. Earthquakes
 3. Tornadoes
 4. Floods
 5. Hail Storms
- G. Storm Damage: Should warnings of winds of gale force or stronger be issued, the Contractor shall take every practical precaution to minimize danger to persons and damage to property. These precautions shall be coordinated through the Owner's Representative and shall include closing all openings; removing all loose materials, tools, and equipment from exposed locations; as well as removing or securing scaffolding and other temporary work.
- H. Interruption of Utility Service: Interruptions to utility services shall be minimized. Necessary outages shall be coordinated with the Owner a minimum of 10 days in advance of the planned outage.

1.06 OWNER OCCUPANCY/WORKING CONDITIONS

- A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
- B. Workmen shall be limited to the use of only those areas necessary to perform the work.
- C. Owner intends to occupy the Project upon Substantial Completion.
- D. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- E. The Contractor shall take all necessary and prudent safety precautions to ensure the safety of the workforce and other exposed personnel.

1.07 CONTRACTOR USE OF SITE AND PREMISES

- A. Construction Operations: Limited to areas permitted by Law, Ordinances, Permits, and Contract Documents..
- B. Provide access to and from site as required by law and by Owner:
 1. Do not obstruct roadways, sidewalks, or other public ways without permit and/or permission by Owner.
 2. Deliveries and access/exit to project site is not available during the student drop off/unloading and student pick up/unloading times in the morning hours of 7:15 a.m. to 8:00 a.m. and during the afternoon hours of 3:15 to 4:00 p.m. General Contractor shall coordinate with Owner and not schedule or maneuver equipment during this time to obstruct traffic flow of buses and parents entering/exiting the school grounds during these time frames.
- C. Existing building spaces and portions of site occupied by Owner for daily use may not be used for storage.
- D. Contractor shall not unreasonably encumber site with materials or equipment.
- E. Contractor shall assume full responsibility for protection and safe-keeping of products sorted on premises.
 1. Move any stored materials/products which interfere with operations of other Contractors.
 2. Obtain and pay for, use of additional storage or work areas needed for operations.
 3. Refer to Division 1 Section "Temporary Facilities and Controls" for additional information.
- F. No Smoking (Tobacco) Policy:
 1. Smoking and other tobacco products including vaping are prohibited within and outside of all buildings. This applies to **ALL** buildings including the project site during all times of construction.
- G. No Weapons Policy:
 1. No deadly weapons of any kind are permitted on the property.
- H. No Alcohol Policy:
 1. No alcoholic beverages of any kind are permitted on the property.

I. Utility Outages and Shutdown:

1. Limit disruption of utility services to hours the existing surrounding building is unoccupied.
2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 012000
PRICE AND PAYMENT PROCEDURES**

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.
- D. Procedures for preparation and submittal of application for final payment.

1.02 RELATED REQUIREMENTS

- A. Section 005000 - Contracting Forms and Supplements: Forms to be used.
- B. Section 007200 - General Conditions.
- C. Section 012100 - Allowances.

1.03 SCHEDULE OF VALUES

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Engineer/Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date established in Notice to Proceed.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization, bonds and insurance, and allowances .
- F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Forms filled out by hand will not be accepted.
- C. For each item, provide a column for listing each of the following:
 - 1. Item Number.
 - 2. Description of work.
 - 3. Scheduled Values.
 - 4. Previous Applications.
 - 5. Work in Place and Stored Materials under this Application.
 - 6. Authorized Change Orders.
 - 7. Total Completed and Stored to Date of Application.
 - 8. Percentage of Completion.
 - 9. Balance to Finish.
 - 10. Retainage.
- D. Notarize certification by signature of authorized officer.
- E. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- F. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- G. Submit one electronic copy of each Application for Payment.
- H. Include the following with the application:
 - 1. Transmittal letter as specified for submittals in Section 013000.
 - 2. Construction progress schedule, revised and current as specified in Section 013000.
 - 3. Allowance Tracking Report/Spreadsheet
 - 4. Current construction photographs specified in Section 013000.

5. Partial release of liens from major subcontractors and vendors.
 6. Back up information and pictures will be required for stored materials.
 7. Monthly OAC Meeting agenda and Meeting minutes.
- I. When Engineer/Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.05 MODIFICATION PROCEDURES

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Engineer/Architect will issue instructions directly to Contractor.
- B. For other required changes, Engineer/Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Engineer/Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change . Contractor shall prepare and submit a fixed price quotation within 7 days.
- D. Contractor may propose a change by submitting a request for change to Engineer/Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 016000.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
 1. For change requested by Engineer/Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Engineer/Architect.
- F. Substantiation of Costs: Provide full information required for evaluation.
 1. On request, provide the following data:
 - a. Quantities of products, labor, and equipment.
 - b. Taxes, insurance, and bonds.
 - c. Overhead and profit.
 - d. Justification for any change in Contract Time.
 - e. Credit for deletions from Contract, similarly documented.
 2. Support each claim for additional costs with additional information:
 - a. Origin and date of claim.
 - b. Dates and times work was performed, and by whom.
 - c. Time records and wage rates paid.
 - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
- G. Execution of Change Orders: Engineer/Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.
- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- J. Promptly enter changes in Project Record Documents.

1.06 APPLICATION FOR FINAL PAYMENT

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

- B. Application for Final Payment will not be considered until the following have been accomplished:
1. All closeout procedures specified in Section 017000.

END OF SECTION

**SECTION 012100
ALLOWANCES****PART 1 GENERAL****1.01 SUMMARY**

- A. This Section sets forth the following allowances to be included in the Contract:
1. Contingency Allowance

1.02 ALLOWANCE CONDITIONS AND REQUIREMENTS

- A. The Contractor shall include in his Base Bid the cash and/or material allowances as described hereinafter for the purchase of materials as described or as to be determined herein.
- B. Purchase products under allowance as directed by Architect/Engineer or as specified herein.
- C. All specified allowances shall appear as a separate line item amount, matching the amount specified herein, on the contractor's AIA Document G703, Schedule of Values.
- D. Use of any allowance shall be specifically authorized in writing upon approval by authorized Owner Representative AND the Architect. A final accounting of all contingency funds used will be made by issuance of a change order at the end of the project.
- E. At close-out of Contract, funds remaining in Allowances will be credited to owner by Change Order. In addition to the balance of the allowance all applicable costs for overhead, profit, bond, insurance and taxes will be added to the allowance change order credit. Overhead amounts that can be clearly documented as being expended over the course of the project will be excluded from this added amount to the allowance credit. Refer to AIA A201 General Conditions for further information.
- F. Contractor shall solicit a minimum of three (3) quotes for material and labor to be performed under all allowances.
- G. General Contractor's overhead, profit, bond, insurance, and tax amounts or any other additional costs CANNOT be included in these proposals or the final proposal. The General Contractor's overhead, profit, bond, insurance, and tax amounts in relation to all allowances shall be included in the General Contractor's Base Bid amount. In addition, the GC's Base Bid included overhead amounts allocated to these allowances shall include all GC associated costs, whether direct or indirect, that may be tied to any and all additional work required. These items shall include but are not limited to the following:
1. Additional Man Hours (both standard and overtime)
 2. Drive Time
 - a. Vehicle maintenance or wear and tear
 - b. Fuel Costs
 - c. Research
 - d. Paperwork
 - e. Phone Calls
 - f. Equipment Rental
- H. Sub Contractor's costs Included in Cash Allowances: Cost of product to Contractor or subcontractor, less applicable trade discounts.
1. Net cost of product
 2. Delivery to site
 3. Installation
 4. Labor
 5. Insurance
 6. Payroll
 7. Taxes
 8. Bonding
 9. Sub Contractor's Overhead and Profit (O&P).
 10. Equipment Rental
- I. Engineer/Architect Responsibilities:
1. Consult with Contractor for consideration and selection of products, suppliers, and installers.

2. Select products in consultation with Owner and transmit decision to Contractor.
3. Prepare Change Order.

J. Contractor Responsibilities:

1. Assist Engineer/Architect in selection of products, suppliers, and installers.
2. Obtain proposals from suppliers and installers and offer recommendations.
3. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

K. Differences in costs will be adjusted by Change Order.

1.03 ALLOWANCE SCHEDULE:

A. **General Contingency Allowance:**

1. In addition to the work shown on the contract documents, the contractor shall include in the base bid contract amount the following lump sum cash allowance amount:
 - a. Three Hundred Thousand Dollars (\$350,000).

1.04 SELECTION/DELIVERY/INSTALLATION PROCESS

- A. Architect shall consult with Contractor in coordination of products and suppliers and shall make selection of products to be used.
- B. Contractor shall assist Architect in determining qualified suppliers, obtain proposals from suppliers for Architect's review, and enter into purchase agreement with designated supplier chosen.
- C. Contractor is responsible for arranging delivery, unloading and inspecting products for damage and defects.
- D. Contractor shall comply with requirements of referenced specification section for installation and/or install per Manufacturer's recommendations.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

**SECTION 012500
SUBSTITUTION PROCEDURES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 002113 - Instructions to Bidders: Restrictions on timing of substitution requests.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
 - a. Substitution requests offering advantages solely to the Contractor will not be considered.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 6. Agrees to reimburse Owner and Engineer/Architect for review or redesign services associated with re-approval by authorities.
- B. A Substitution Request for specified installer constitutes a representation that the submitter:
 - 1. Has acted in good faith to obtain services of specified installer, but was unable to come to commercial, or other terms.
- C. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
 - 1. Note explicitly any non-compliant characteristics.
- D. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
- E. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:
 - 1. Section 002113 - Instructions to Bidders specifies time restrictions and the documents required for submitting substitution requests during the bidding period.
- B. Submittal Form (before award of contract):

1. Submit substitution requests by completing the form included in this project manual. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submittal Form (after award of contract):
 1. Submit substitution requests by completing the form attached to this project manual. See this section for additional information and instructions. Use only this form; other forms of submission are unacceptable.
- B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Engineer/Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience within 14 days of discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Engineer/Architect, in order to stay on approved project schedule.
 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
 3. Bear the costs engendered by proposed substitution of:
 - a. Owner's compensation to the Engineer/Architect for any required redesign, time spent processing and evaluating the request.
 - b. Other construction by Owner.
 - c. Other unanticipated project considerations.
- D. Substitutions will not be considered under one or more of the following circumstances:
 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 2. Without a separate written request.
 3. When acceptance will require revisions to Contract Documents.

3.04 RESOLUTION

- A. Engineer/Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Engineer/Architect will notify Contractor in writing of decision to accept or reject request.
 1. Engineer/Architect's decision following review of proposed substitution will be noted on the submitted form.

3.05 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

END OF SECTION

SECTION 013000
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Contractor Driven Site Meetings or Site Inspections.
- E. Construction progress schedule.
- F. Progress photographs.
- G. Coordination drawings.
- H. Submittals for review, information, and project closeout.
- I. Number of copies of submittals.
- J. Requests for Interpretation (RFI) procedures.
- K. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 016000 - Product Requirements: General product requirements.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 017000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION****3.01 COLLABORATION SOFTWARE**

- A. Summary
 - 1. The Contractor will be required to utilize the Architect/Engineer's web based construction project management collaboration software to submit, track, distribute and collaborate on project documentation and action items.
 - 2. The intent of utilizing a web based construction management application is to reduce cost and schedule risk, improve quality and safety, and maintain a healthy team dynamic by improving information flow, reducing non-productive activities, reducing rework and decreasing turnaround times.
- B. Software
 - 1. General Contractor will be required to use Procore (www.procore.com)
 - 2. Access to said software be provided by the Architect/Engineer at no cost to the General Contractor.
 - 3. If unfamiliar, the Architect/Engineer's staff will assist the General Contractor in using the software or they will provide the resources necessary for the General Contractor to understand how to use the software.
- C. Architect/Engineer Responsibilities
 - 1. Upload signed/stamped drawings and any subsequent Architect/Engineer driven changes or revisions to the drawings.
 - 2. Upload signed/stamped specifications and any subsequent Architect/Engineer driven changes or revisions to the specifications.
 - 3. Add Design Team and Owner Contact Information
 - 4. Uploading all WCPR's as deemed necessary by the Architect/Engineer.
 - 5. Uploading all ASI's as deemed necessary by the Architect/Engineer.
 - 6. Uploading all contracts as deemed necessary by the Architect/Engineer.
 - 7. Creation of set distribution lists to the design team and Owner only.

8. Creation of Defficiency Reports as deemed necessary by the Architect/Engineer.
 9. Site Visit Reports as deemed necessary by the Architect/Engineer.
- D. Contractor's Responsibilities:
1. Do not remove people from a set distribution list that preloads on RFIs and Submittals; only add to it.
 2. Make sure attachments actually attach in all RFIs, Submittals, and transmittals. Transmittals mostly because they have to select the 'ADD' button once the attachment is uploaded.
 3. Provide us with a Subcontractor list so that they are able to easily distribute information to their subs via Procore.
 4. Submittals must be created in the software:
 - a. Submittal titles must be by specification section. Grouping multiple specification sections into one submittal will result in immediate rejection.
 - b. The Contractor will be responsible for submitting all RFIs and Submittals through the software and assigning them to the appropriate parties.
 - c. Architects / Engineers / Consultants etc. are responsible for posting all responses to these items via the software, including all relevant attachments.
 - d. The Contractor will distribute responses to all affected subcontractors and confirm agreement with the response by closing the item.
 - e. GC is the only one to create submittals. They will create them on behalf of their subs when needed. The subs should never create the submittal themselves.
 - f. Once a submittal is labeled as 'Reject and Resubmit' the GC needs to close it out and create the revision as a completely new submittal. Never create the revision WITHIN the original submittal.
 - g. Distribute and CLOSE all submittals once you have received a sufficient review/response from the Architect/Engineer.
 - h. Be sure to select a spec section for submittals.
 5. Project Schedules must be uploaded to the software in one of the follwoing accepted formats:
 - a. Microsoft Project
 - b. Primavera P3
 - c. Primavera P6
 - d. Asta Powerpoint
 6. Emails must be generated in the software
 7. Daily Logs must be created in the software
 8. RFI's must be created in the software
 9. All project photos must be uploaded to the software

3.02 PRECONSTRUCTION MEETING

- A. General Requirements:
1. The Engineer/Architect will coordinate with the Owner and the General Contractor and will schedule a meeting within 7-14 days after contracts for construction have been excecuted..
 2. The meeting will occur before the Notice to Proceed is issued.
 3. The General Contractor will be responsible for coordinating and running this meeting.
 4. A draft of the agenda must be sent to the Architect/Engineer at least 72 hours prior to the meeting for review and approval.
 5. General Contractor will be required to record minutes and distribute digital copies within two days after meeting to the participants and any any additional individuals that may be affected by decisions made.
- B. Attendees Guide - The following can be adjusted accordingly based on the scale and scope of the project but must be agreed upon by the Architect/Engineer.
1. Project owners and/or representatives
 2. End User Representatives
 3. General contractor (GC) and project manager
 4. Architect and/or design team
 5. Civil, structural, MEP engineers

6. Major subcontractors (electrical, HVAC, plumbing, etc.)
 7. Local permitting authorities (as needed)
 8. Construction manager or owner's rep
- C. Documentation Guide - The following can be adjusted accordingly based on the scale and scope of the project but must be agreed upon by the Architect/Engineer.
1. Construction drawings and specifications
 2. Permit approvals and inspection requirements
 3. Construction schedule
 4. List of Subcontractors
 5. Schedule of Values
 6. Submittal logs
 7. Contact list with roles and responsibilities
 8. Safety plan and site logistics plan
 9. Quality control plan
 10. Environmental controls and stormwater pollution prevention (SWPPP), if applicable
 11. Insurance certificates and bond documents
- D. **Agenda Guide**
1. Project Overview
 - a. Review of scope, budget, and timeline
 - b. Critical milestones and phasing
 2. Roles & Communication
 - a. Points of contact for each stakeholder (Name, Company, Position, Email, Work and Cell Number)
 - b. Chain of communication
 - c. Use of Procore and access
 - d. Meeting schedule for OAC meetings
 3. Schedule & Logistics
 - a. Site access and working hours
 - b. Job trailer location
 - c. Staging and laydown areas
 - d. Deliveries and material storage
 - e. Crane or heavy equipment operations (if any)
 4. Safety
 - a. Site-specific safety requirements
 - b. PPE requirements
 - c. Emergency contacts and procedures
 - d. Incident reporting
 5. Quality Assurance
 - a. Required Mockups and their expectations
 - b. 3rd Party testing and inspection requirements
 - c. Submittals and approvals process
 - d. Coordination of trades
 - e. Process Substitutions
 - f. Applications for payment process, timeline, and deadlines for submission
 - g. Change order process
 - h. Contract closeout procedures
 - i. Owner requirements for any work or site access constraints
 6. Environmental / Compliance
 - a. Noise, dust, erosion control
 - b. Local ordinances (e.g., working hours, traffic control)
 - c. Waste management
 7. Risk and Contingency Planning
 - a. Weather delays

- b. Labor, lead time, or supply chain issues
- c. Site security

3.03 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 - 1. Contractor.
 - 2. Owner.
 - 3. Engineer/Architect.
 - 4. Contractor's superintendent.
 - 5. Major subcontractors.
- D. Agenda:
 - 1. Review minutes of previous meetings.
 - 2. Review of work progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems that impede, or will impede, planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Maintenance of quality and work standards.
 - 11. Effect of proposed changes on progress schedule and coordination.
 - 12. Other business relating to work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Engineer/Architect, Owner, participants, and those affected by decisions made.

3.04 CONTRACTOR DRIVEN SITE MEETINGS AND PROJECT INSPECTIONS

- A. All site inspections, site visits, site meetings, etc.... not previously scheduled, which are required for any reason, arranged, or scheduled by the general contractor, or any of the project's subcontractors, vendors, suppliers, etc.... that require the involvement of any employee of MP Design Group or any consultant of MP Design Group shall be arranged and finalized in writing at least forty-eight (48) hours in advance with MP Design Group.

3.05 CONSTRUCTION PROGRESS SCHEDULE

- A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- B. Within 7 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- C. Within 3 days after joint review, submit complete schedule.
- D. Submit updated schedule with each Application for Payment.

3.06 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 - 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 - 1. Prepare a separate RFI for each specific item.

2. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 016000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Engineer/Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 1. Maintain on the Electronic Document Submittal Service.
- G. Review Time: Engineer/Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.

4. Notify Engineer/Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.07 SUBMITTAL SCHEDULE

- A. Submit to Engineer/Architect for review a schedule for submittals in tabular format.
 1. Submit at the same time as the preliminary schedule specified in Section - 013216 - Construction Progress Schedule.

3.08 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. The contractor who prepared the submittals for review must represent that they are licensed and qualified to perform the work in the submittal, and said work is in full compliance with applicable codes.
- C. Stamping the Submittals: The General Contractor is not required to stamp the submittal prior to submission to the Architect/Engineer for their review. However; it is highly encouraged, and if there is no General Contractor review stamp on a submittal then by default the General Contractor has agreed with the following statement:
 1. Acceptance is for general compliance with the contract documents only. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques for construction; coordinating its work with that of all other trades; and performing its work in a safe and satisfactory manner.
- D. The contractor agrees that all submittals have been reviewed by the Architect and/or Engineer only for conformance with the design concept of the project and with the information delineated in the contract drawings and specifications. A returned review whether marked as "No Exceptions" or "Exceptions as Noted" does not waive any provisions of the contract documents. Contractor shall verify all details, dimensions and quantities, and coordinate with the work of other trades. Architect and/or Engineer's review of a submittal shall not relieve the contractor from responsibility for deviations, errors, or omissions in the shop drawings or submittals.
- E. Samples will be reviewed for aesthetic, color, or finish selection.
- F. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 017800 - Closeout Submittals.

3.09 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.

3.10 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 017800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.

5. Other types as indicated.

D. Submit for Owner's benefit during and after project completion.

3.11 SUBMITTAL PROCEDURES

A. General Requirements:

1. Use a separate submittal identification number and submittal transmittal cover page for each specification section. Do not combine multiple specification sections into one submittal; if done, it will be immediately rejected for resubmission without time extension.
2. Transmit using approved form.
 - a. Use Contractor's form, subject to prior approval by Engineer/Architect.
3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
6. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
7. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 10 working days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Engineer/Architect's consultants, Owner, or another affected party, allow an additional 7 working days.
8. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
9. When revised for resubmission, identify all changes made since previous submission.
10. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.

B. Product Data Procedures:

1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Do not submit (Material) Safety Data Sheets for materials or products.
4. Submit manufacturer's standard published data. **Where multiple choices occur on a submittal, it will be the Contractor's responsibility to clearly mark in contrasting color by means of underlining, highlighting, circling, ect... each copy to identify applicable products, models, options, and other data.** Unmarked copies will be immediately rejected and sent back to the General Contractor. Supplement manufacturers' standard data to provide information specific to this Project.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
4. Shop Drawing Submittals for all exterior Aluminum Storefront Systems and all exterior Hollow Metal Door and Frames: Job specific shop drawing details for all head, jamb and sill conditions shall be prepared for each exterior wall type indicating, but not limited to, wall construction, anchoring, flashing, etc. as required for a watertight installation. Canned details shall not be accepted. Non-job specific details submitted will result in the submittal being rejected.

5. Shop Drawing Submittals for Roof: Job specific shop drawing details for all roof conditions shall be prepared indicating, but not limited to, roof construction, fasteners, flashing, rake edge, drip edge, equipment curbs, etc. as required for a watertight installation. Canned details shall not be accepted. Non-job specific details submitted will result in the submittal being rejected.
 6. Shop Drawing Submittals for Exterior Insulation and Finish System (EIFS): Job specific shop drawing details for all EIFS conditions shall be prepared indicating, but not limited to, elevations indicating reveals with dimensions, inside corner, outside corner, termination at top of wall, termination at bottom of wall / grade, opening head, jamb and sill details, expansion joint, adhesive, flashing, etc. as required for a watertight installation. Canned details shall not be accepted. Non-job specific details submitted will result in the submittal being rejected.
 7. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances. **Canned or Typical drawings, unless they specifically apply to the project, will be immediately rejected.**
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
 3. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - a. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
 - b. **All submissions for the choosing of a products color must be physical samples indicating the products true and final color.** Digital and or printed samples will not be accepted.
- E. Transmit each submittal with a copy of approved submittal identification form.
- F. Contractor bears responsibility for all additional costs or work associated with work performed or materials installed prior to a returned approved submittal.

3.12 SUBMITTAL REVIEW

- A. Submittals for Review: Engineer/Architect will review each submittal, and provide no exceptions, or take other appropriate action.
- B. Submittals for Information: Engineer/Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Engineer/Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Engineer/Architect's actions on items submitted for review:
 1. No Exceptions
 - a. Purchase, Fabrication, delivery, and/or installation may take place.
 2. Exceptions as Noted
 - a. Contractor's option to resubmit. However; all mark ups must be incorporated in the construction whether acknowledged in a resubmittal or not.
 3. Revise and Resubmit
 - a. Must be resubmitted
 4. Incomplete Submittal
 - a. Must be resubmitted
 5. Submit Specified Item
 - a. Must be resubmitted
 6. Submittal Rejected
 - a. Must be resubmitted
- E. Engineer/Architect's and consultants' actions on items submitted for information:

END OF SECTION

**SECTION 014000
QUALITY REQUIREMENTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Contractor's construction-related professional design services.
- F. Contractor's design-related professional design services.
- G. Control of installation.
- H. Mock-ups.
- I. Tolerances.
- J. Manufacturers' field services.
- K. Defect Assessment.

1.02 CONTRACTOR'S CONSTRUCTION-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Provide such engineering design services as may be necessary to plan and safely conduct certain construction operations, pertaining to, but not limited to the following:
 - 1. Temporary sheeting, shoring, or supports.
 - 2. Temporary bracing.

1.03 CONTRACTOR'S DESIGN-RELATED PROFESSIONAL DESIGN SERVICES

- A. Coordination: Contractor's professional design services are subject to requirements of project's Conditions for Construction Contract.
- B. Base design on performance and/or design criteria indicated in individual specification sections.
- C. Scope of Contractor's Professional Design Services: Provide for the following items of work:
 - 1. Structural Design of Steel Trusses: As described in Section 054400 - Cold-Formed Steel Trusses.

1.04 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to Engineer/Architect and to Contractor.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Compliance with Contract Documents.
 - k. When requested by Engineer/Architect, provide interpretation of results.

- C. Certificates: When specified in individual specification sections or by code, submit certification by the manufacturer and Contractor or installation/application subcontractor to Engineer/Architect, in quantities specified for Product Data.
 - 1. Indicate material or product complies with or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Erection Drawings: Submit drawings for Engineer/Architect's benefit as contract administrator or for Owner.
 - 1. Submit for information for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents.

1.05 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.06 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Engineer/Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Engineer/Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.07 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Owner will employ and pay for services of an independent testing agency to perform specified testing and inspection.
 - 1. The General Contractor shall coordinate all testing and inspections with the independent testing agency.
 - 2. The General Contractor will be required to credit the Owner back all costs associated for any retesting of a failed test or any reinspections.
 - 3. No additional construction time will be granted due to a failed test and any rework that has to be done to acquire a passing test or inspection.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer/Architect before proceeding.

- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

3.02 MOCK-UPS

- A. Before installing portions of the Work where mock-ups are required, for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Engineer/Architect will use to judge the Work.
- C. Integrated Exterior Mock-ups: Construct integrated exterior mock-up as indicated on drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- D. Notify Engineer/Architect seven (7) working days in advance of dates and times when mock-ups will be constructed.
- E. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- F. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- G. Obtain Engineer/Architect's approval of mock-ups in writing before starting work, fabrication, or construction.
 - 1. Engineer/Architect will issue written comments within five (5) working days of initial review and each subsequent follow up review of each mock-up.
 - 2. Make corrections as necessary until Architect's approval is issued.
 - 3. Submit Mock-up formally as outlined in Section 014001 - Mock-up submittal process. Architect/Engineer will provide any comments, rejection of and/or approval of mock up in that submittal response.
- H. Engineer/Architect will use accepted mock-ups as a comparison standard for the remaining Work.
- I. Where mock-up has been accepted by Engineer/Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Engineer/Architect.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer/Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTION

- A. See individual specification sections for testing and inspection required.
- B. Testing Agency Duties:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Engineer/Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify Engineer/Architect and Contractor of observed irregularities or non-compliance of Work or products.

6. Perform additional tests and inspections required by Engineer/Architect.
 7. Submit reports of all tests/inspections specified.
- C. Limits on Testing/Inspection Agency Authority:
1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 2. Agency may not approve or accept any portion of the Work.
 3. Agency may not assume any duties of Contractor.
 4. Agency has no authority to stop the Work.
- D. Contractor Responsibilities:
1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
 3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Notify Engineer/Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- E. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Engineer/Architect.
- F. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

- A. Replace Work or portions of the Work not complying with specified requirements.
- B. If, in the opinion of Engineer/Architect, it is not practical to remove and replace the work, Engineer/Architect will direct an appropriate remedy or adjust payment.

END OF SECTION

**SECTION 014100
REGULATORY REQUIREMENTS**

PART 1 GENERAL

1.01 SUMMARY OF REFERENCE STANDARDS

- A. Regulatory requirements applicable to this project that all work shall comply with are as follows:
- B. 28 CFR 35 - Nondiscrimination on the Basis of Disability in State and Local Government Services; Final Rule; Department of Justice; current edition.
- C. 28 CFR 36 - Nondiscrimination by Public Accommodations and in Commercial Facilities; Final Rule; Department of Justice; current edition.
- D. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- E. 49 CFR 37 - Transportation Services for Individuals with Disabilities (ADA); current edition.
- F. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- G. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
- H. City of Biloxi Land Development Ordinance
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- J. Building Code: ICC (IBC) - International Building Code 2018.
- K. Plumbing Code: ICC International Plumbing Code 2018.
- L. Mechanical Code: ICC International Mechanical Code 2018.
- M. Fuel Gas Code: ICC Fuel Gas Code 2018.
- N. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- O. Elevator Code: ASME A17.1-2016 - Safety Code for Elevators and Escalators.
- P. Erosion and Sedimentation Control Regulations: All MS DEQ Guidelines.

1.02 RELATED REQUIREMENTS

- A. Section 014000 - Quality Requirements.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 015000
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Temporary utilities.
- B. Temporary sanitary facilities.
- C. Temporary Controls: Barriers, enclosures, and fencing.
- D. Vehicular access and parking.
- E. Waste removal facilities and services.
- F. Project identification sign.
- G. Field offices.

1.02 TEMPORARY UTILITIES

- A. Provide and pay for every utility required to complete construction including but not limited to all electrical power, lighting, water, heating, cooling, sanitary, waste, and ventilation. The General Contractor will be required to continue to pay all costs associated with these temporary utilities until a Certificate of Occupancy has been issued from the Authority Having Jurisdiction to the Owner.
- B. Existing facilities may not be used.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted.
- C. Maintain daily in clean and sanitary condition.
- D. At end of construction, return facilities to same or better condition as originally found.

1.04 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.06 EXTERIOR ENCLOSURES

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.07 INTERIOR ENCLOSURES

- A. Provide temporary partitions as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and reinforced polyethylene sheet materials with closed joints and sealed edges at intersections with existing surfaces:

1.08 SECURITY

- A. Coordinate with Owner's security program.

1.09 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Existing on-site roads may be used for construction traffic.
- F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.
- G. Do not interrupt, alter, or disrupt bus or parent standard drop off or pick up times, procedures, or operations. Coordinate with Owner.

1.10 WASTE REMOVAL

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.11 PROJECT IDENTIFICATION

- A. Provide project identification sign of design and construction to be provided by engineer after award of bid. Sign shall be 4'x8' wood sign mounted on 4"x4" timber posts. Sign shall be full color and shall be removed upon completion of the project. Include all associated costs in bid.
- B. Erect on site at location approved by owner.
- C. No other signs are allowed without Owner permission except those required by law.

1.12 FIELD OFFICES

- A. Office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture and drawing display table. Must be locked at the end of each work day.
- B. Locate offices a minimum distance of 30 feet (10 m) from existing structures.

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet (600 mm). Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

1.14 TEMPORARY STORAGE

- A. General Contractor will be required to provide lockable temporary storage as required or necessary to complete the job. Existing facilities will not be allowed to be used for storage of any kind.

PART 2 PRODUCTS - NOT USED**PART 3 EXECUTION - NOT USED****END OF SECTION**

**SECTION 016000
PRODUCT REQUIREMENTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.
- F. Non Asbestos containing materials certification.

1.02 SUBMITTALS

- A. Refer to Section 013000 Administrative Requirements for additional submittal requirements not indicated herein.
- B. Proposed Products List: Submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.
 - 1. Submit within 7 days after date of Agreement of Notice of intent to award, whichever is sooner..
 - 2. For products specified only by reference standards, list applicable reference standards.
- C. Product Data Submittals: Submit manufacturer's standard published data. **Where multiple choices occur on a submittal, it will be the Contractor's responsibility to clearly mark in contrasting color by means of underlining, highlighting, circling, ect... each copy to identify applicable products, models, options, and other data.** Unmarked copies will be rejected and sent back to the General Contractor. Supplement manufacturers' standard data to provide information specific to this Project.
- D. Shop Drawing Submittals: All shop drawings and details **MUST** be prepared specifically for this project; indicate all materials, all products, all connections, all dimensions, all utility and electrical characteristics, all utility connection requirements, and location of utility outlets for service for functional equipment and appliances. **Canned or Product/Company Typical drawings, unless they specifically apply to the project, will be rejected - No Exceptions.**
- E. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection of product finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
 - 2. All submissions for the choosing of a products color must be physical samples indicating the products true and final color. Digital, web site links, and or printed samples will not be accepted and will be rejected - no expetions.
 - 3. Contractor shall provide duplicate physical samples for projects located farther than 60 miles from MP Design Group's primary office located at 918 Howard Ave Ste. F, Biloxi MS 39530. Overnight or deliver one copy to MP Design Group's Construction Administration representative or designated on site meeting location; to be retained onsite, and overnight or deliver one copy to MP Design Group's primary office.

PART 2 PRODUCTS**2.01 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Made using or containing CFC's or HCFC's.
 - 2. Containing lead, cadmium, or asbestos.

2.02 PRODUCT OPTIONS / SUBSTITUTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

- B. Products Specified by Naming Three or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
 - 1. Where more than one manufacturer is specified for a single use, the Drawings have been prepared for the manufacturer/product listed first; and building adjustments may be necessary to accommodate the others. The Contractor will be responsible for any changes in the building construction required due to product selection and shall make any such changes to the satisfaction of the Architect.
- C. If products are specified by naming one or more manufacturers with a provision for substitutions by "or approved equal" or "equal as approved," then the Bidder **MUST** submit a request for substitution for any manufacturer not named **PRIOR TO BIDDING**. It must be approved by the Architect/Engineer through formal addendum in order for it to be accepted as a substitution.
- D. If products are specified by naming one or more manufacturers with a provision for substitutions by "or equal," then the General Contractor has the option to submit a request for substitution using the form included herein for any manufacturer or product not named in these specifications before the bid date. If the General Contractor does not submit a request for substitution before the bid date and he is awarded the contract then he **MUST** submit a request for substitution using the form included herein for any manufacturer or product not named in these specifications. If the submittal does not include this form then the Architect has the right to **REJECT THE SUBMITTAL** until said form is submitted. It is the sole responsibility of the General Contractor and/or his subcontractors to provide all information proving the substitution is equal to or above the requirements of the manufacturer and/or products specified herein. The Architect/Engineer **WILL NOT** research on his own accord to determine compliance and "or equal" status. If all necessary information is provided in a clear and concise manner then the Architect/Engineer will review the substitution request and substituted submittal. After review by the Architect/Engineer, if the substitution manufacturer or product is still found not to be "or equal" to those items specified, then the General Contractor will be required to provide those products specified or find another "or equal" product - **NO EXCEPTIONS**.

2.03 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 012500 - Substitution Procedures.
- B. Substitution Submittal Procedure:
 - 1. Submit substitution request at least 10 days prior to bid.
 - 2. The Architect/Engineer will notify all bidders via addendum of decision to accept a request.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 017419.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

3.04 PRODUCT CERTIFICATION

- A. Submit letter on company letterhead and signed by company executive stating and certifying that "This project (insert project name, description, and location) has been completed and that no asbestos containing materials were found at the project site that were not properly remedied and that no new materials were used or installed that contain asbestos." Final pay application will not be processed until certification is received.

END OF SECTION

**SECTION 017000
EXECUTION AND CLOSEOUT REQUIREMENTS**

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances , _____.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Cleaning and protection.
- F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- G. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 015000 - Temporary Facilities and Controls: Temporary exterior enclosures.
- B. Section 015000 - Temporary Facilities and Controls: Temporary interior partitions.
- C. Section 078400 - Firestopping.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 - 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
 - 2. Identify demolition firm and submit qualifications.
 - 3. Include a summary of safety procedures.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 - 1. Structural integrity of any element of Project.
 - 2. Integrity of weather exposed or moisture resistant element.
 - 3. Efficiency, maintenance, or safety of any operational element.
 - 4. Visual qualities of sight exposed elements.
 - 5. Work of Owner or separate Contractor.

1.04 QUALIFICATIONS

- A. For asbestos demolition work, employ a firm specializing in the type of work required.
 - 1. Minimum of 5 years of documented experience.
- B. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.05 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- D. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. Outdoors: Limit conduct of especially noisy exterior work to the hours of 8 am to 5 pm.
 - 2. Indoors: Limit conduct of especially noisy interior work to the hours of 6 pm to 7 am.

1.06 COORDINATION

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS**2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 016000 - Product Requirements.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.
- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 PREINSTALLATION MEETINGS

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section. A preinstall meeting with the contractor, roofing vendor, and Architect/Engineer will be required.

- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Engineer/Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of examination, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Engineer/Architect, Owner, participants, and those affected by decisions made.

3.04 GENERAL INSTALLATION REQUIREMENTS

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Engineer/Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
 - 1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 015000 in locations indicated on drawings.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
 - 3. Relocate items indicated on drawings.
 - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.

- a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. Provide temporary connections as required to maintain existing systems in service.
- 4. Verify that abandoned services serve only abandoned facilities.
- 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Engineer/Architect.
 - 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 - 3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Engineer/Architect review and request instructions.
- H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- I. Refinish existing surfaces as indicated:
 - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
 - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
- J. Clean existing systems and equipment.
- K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- L. Do not begin new construction in alterations areas before demolition is complete.
- M. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
 - 1. Complete the work.
 - 2. Fit products together to integrate with other work.
 - 3. Provide openings for penetration of mechanical, electrical, and other services.
 - 4. Match work that has been cut to adjacent work.
 - 5. Repair areas adjacent to cuts to required condition.
 - 6. Repair new work damaged by subsequent work.
 - 7. Remove samples of installed work for testing when requested.
 - 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

- G. Restore work with new products in accordance with requirements of Contract Documents.
- H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 078400, to full thickness of the penetrated element.
- J. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.09 FINAL CLEANING

- A. Execute final cleaning after Substantial Completion but before making final application for payment.
 - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.
- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces,
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, and overflow drains.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.10 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
 - 1. Provide copies to Engineer/Architect and Owner.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

- C. Notify Engineer/Architect when work is considered ready for Engineer/Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Engineer/Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Engineer/Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Engineer/Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Engineer/Architect when work is considered finally complete and ready for Engineer/Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Engineer/Architect listed in executed Certificate of Substantial Completion.

3.11 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than 2 years from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION

**SECTION 017800
CLOSEOUT SUBMITTALS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Project record documents.
- B. Operation and maintenance data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Section 007200 - General Conditions and 007300 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 013000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 017000 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Engineer/Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed electronic documents within ten days after acceptance.
 - 2. Submit one electronic copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer/Architect comments. Revise content of all document sets as required prior to final submission.
 - 3. Submit one electronic set of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit electronic documents within 10 days after acceptance.
 - 2. Make other electronic submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART 3 EXECUTION**2.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Addenda.
 - 3. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Record Drawings: Legibly mark each item to record actual construction including:
 - 1. Field changes of dimension and detail.
 - 2. Details not on original Contract drawings.

2.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

2.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

2.04 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

**SECTION 081416
FLUSH WOOD DOORS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Pre-finished solid core wood doors; flush configuration with veneer faces; non-rated.

1.02 REFERENCE STANDARDS

- A. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2021, with Errata (2022).

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, extent of blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Samples: Submit two samples of door veneer, 12 by 12 inch (____ by ____ mm) in size illustrating wood grain, stain color, and sheen.
- E. Duplicate samples may be required. See section 016000 Product Requirements.
- F. Manufacturer's Installation Instructions: Indicate special installation instructions.
- G. Warranty, executed in Owner's name.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging [<>]. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer.

1.06 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for 2 years.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, and defective materials.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Wood Veneer Faced Doors:
 - 1. Eggers Industries: www.eggersindustries.com.
 - 2. Forte Openings: <https://www.forteopenings.com/>
 - 3. VT Industries, Inc: www.vtindustries.com/#sle.
 - 4. Substitutions: See Section 016000 - Product Requirements.

2.02 DOORS

- A. Doors: See drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Standard Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at all locations.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated. ANSI A208.1, Grade LD-2, made with binder containing no urea-formaldehyde resin.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White birch, HPVA Grade AA, rotary cut, with book match between leaves of veneer, center balance match of spliced veneer leaves assembled on door or panel face.
 - 1. "Pair Match" each pair of doors; "Set Match" pairs of doors within 10 feet (3 m) of each other when doors are closed.

2.05 ACCESSORIES

- A. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for countersink style screws for non rated doors. Aluminum channel shaped for rated doors.

2.06 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. For fire rated doors comply with requirements of NFPA 80.
- C. Factory cut and trim openings. Trim openings for non fire rated doors with manufacturer's stock solid wood moldings to match door finish.
- D. Factory cut openings for grilles as scheduled or indicated in Mechanical Drawings and Division 23.
- E. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
 - 2. Provide solid blocking for other throughbolted hardware.
- F. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- G. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- H. Provide edge clearances in accordance with the quality standard specified.

2.07 FINISHES - WOOD VENEER DOORS

- A. Finish work in accordance with WDMA I.S. 1A for Grade specified and as follows:
 - 1. Transparent:
 - a. System - TR-6, Catalyzed Polyurethane.
 - b. Stain: match existing
 - c. Sheen: match existing.
- B. Factory finish doors in accordance with approved sample.
 - 1. If on site sanding or removal of seal of top and bottom edge occurs, re-seal top and bottom edges with sealer to match door facing
- C. Seal door top edge and bottom edge with color sealer to match door facing. Finish all faces of door.
- D. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Installer must examine door frames and verify that frames are correct type and have been installed as required for proper hanging of corresponding doors.
- D. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Condition doors to average prevailing humidity in installation area prior to hanging doors. Building shall be fully enclosed and have permanent climate control system operating.
- B. Install doors in accordance with manufacturer's instructions and specified quality standard.
- C. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- D. Use machine tools to cut or drill for hardware.
- E. Coordinate installation of doors with installation of frames and hardware.
- F. Coordinate installation of glazing.
- G. Install door louvers plumb and level.
 - 1. Coordinate location of louvers with other scheduled door hardware including but not limited to mop plates, kickplates and operating hardware.

3.03 TOLERANCES

- A. Comply with specified quality standard for fit and clearance tolerances.
- B. Comply with specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.
- C. Rehang and replace doors which do not swing or operate freely and properly.

3.05 PROTECTION

- A. Protect installed wood doors from damage or deterioration until acceptance of work at Substantial Completion.

END OF SECTION

**SECTION 087100
DOOR HARDWARE****PART 1 GENERAL****1.01 SUMMARY:**

- A. Section Includes: Finish Hardware for door openings, except as otherwise specified herein.
 - 1. Door hardware for steel (hollow metal) doors.
 - 2. Door hardware for aluminum doors.
 - 3. Door hardware for wood doors.
 - 4. Door hardware for other doors indicated.
 - 5. Keyed cylinders as indicated.
- B. References: Comply with applicable requirements of the following standards. Where these standards conflict with other specific requirements, the most restrictive shall govern.
 - 1. Builders Hardware Manufacturing Association (BHMA)
 - 2. NFPA 101 Life Safety Code
 - 3. NFPA 80 -Fire Doors and Windows
 - 4. ANSI-A156.xx- Various Performance Standards for Finish Hardware
 - 5. UL10C – Positive Pressure Fire Test of Door Assemblies
 - 6. ANSI-A117.1 – Accessible and Usable Buildings and Facilities
 - 7. DHI /ANSI A115.IG – Installation Guide for Doors and Hardware
 - 8. ICC – International Building Code
- C. Intent of Hardware Groups
 - 1. Should items of hardware not definitely specified be required for completion of the Work, furnish such items of type and quality comparable to adjacent hardware and appropriate for service required.
 - 2. Where items of hardware aren't definitely or correctly specified, are required for completion of the Work, a written statement of such omission, error, or other discrepancy to be submitted to Architect, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.
- D. Allowances
 - 1. Refer to Division 1 for allowance amount and procedures.
- E. Alternates
 - 1. Refer to Division 1 for Alternates and procedures.

1.02 SUBSTITUTIONS:

- A. Comply with Division 1.

1.03 SUBMITTALS:

- A. Comply with Division 1.
- B. Special Submittal Requirements: Combine submittals of this Section with Sections listed below to ensure the "design intent" of the system/assembly is understood and can be reviewed together.
- C. Product Data: Manufacturer's specifications and technical data including the following:
 - 1. Detailed specification of construction and fabrication.
 - 2. Manufacturer's installation instructions.
 - 3. Wiring diagrams for each electric product specified. Coordinate voltage with electrical before submitting.
 - 4. Submit 6 copies of catalog cuts with hardware schedule.
 - 5. Provide 9001-Quality Management and 14001-Environmental Management for products listed in Materials Section 2.2
- D. Shop Drawings - Hardware Schedule: Submit 6 complete reproducible copy of detailed hardware schedule in a vertical format.
 - 1. List groups and suffixes in proper sequence.
 - 2. Completely describe door and list architectural door number.

3. Manufacturer, product name, and catalog number.
 4. Function, type, and style.
 5. Size and finish of each item.
 6. Mounting heights.
 7. Explanation of abbreviations and symbols used within schedule.
 8. Detailed wiring diagrams, specially developed for each opening, indicating all electric hardware, security equipment and access control equipment, and door and frame rough-ins required for specific opening.
- E. Templates: Submit templates and "reviewed Hardware Schedule" to door and frame supplier and others as applicable to enable proper and accurate sizing and locations of cutouts and reinforcing.
1. Templates, wiring diagrams and "reviewed Hardware Schedule" of electrical terms to electrical for coordination and verification of voltages and locations.
- F. Samples: (If requested by the Architect)
1. 1 sample of Lever and Rose/Escutcheon design, (pair).
 2. 3 samples of metal finishes
- G. Contract Closeout Submittals: Comply with Division 1 including specific requirements indicated.
1. Operating and maintenance manuals: Submit 3 sets containing the following.
 - a. Complete information in care, maintenance, and adjustment, and data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Name, address, and phone number of local representative for each manufacturer.
 - d. Parts list for each product.
 2. Copy of final hardware schedule, edited to reflect, "As installed".
 3. Copy of final keying schedule
 4. As installed "Wiring Diagrams" for each piece of hardware connected to power, both low voltage and 110 volts.
 5. One set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

1.04 QUALITY ASSURANCE

- A. Comply with Division 1.
1. Statement of qualification for distributor and installers.
 2. Statement of compliance with regulatory requirements and single source responsibility.
 3. Distributor's Qualifications: Firm with 3 years experience in the distribution of commercial hardware.
 - a. Distributor to employ full time Architectural Hardware Consultants (AHC) for the purpose of scheduling and coordinating hardware and establishing keying schedule.
 - b. Hardware Schedule shall be prepared and signed by an AHC.
 4. Installer's Qualifications: Firm with 3 years experienced in installation of similar hardware to that required for this Project, including specific requirements indicated.
 5. Regulatory Label Requirements: Provide testing agency label or stamp on hardware for labeled openings.
 - a. Provide UL listed hardware for labeled and 20 minute openings in conformance with requirements for class of opening scheduled.
 - b. Underwriters Laboratories requirements have precedence over this specification where conflict exists.
 6. Single Source Responsibility: Except where specified in hardware schedule, furnish products of only one manufacturer for each type of hardware.
- B. Review Project for extent of finish hardware required to complete the Work. Where there is a conflict between these Specifications and the existing hardware, notify the Architect in writing and furnish hardware in compliance with the Specification unless otherwise directed in writing by the Architect.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Comply with Division 1.
1. Deliver products in original unopened packaging with legible manufacturer's identification.

2. Package hardware to prevent damage during transit and storage.
3. Mark hardware to correspond with "reviewed hardware schedule".
4. Deliver hardware to door and frame manufacturer upon request.

B. Storage and Protection: Comply with manufacturer's recommendations.

1.06 PROJECT CONDITIONS:

- A. Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for the proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents.
- B. Review Shop Drawings for doors and entrances to confirm that adequate provisions will be made for the proper installation of hardware.

1.07 WARRANTY:

- A. Refer to Conditions of the Contract
- B. Manufacturer's Warranty:
 1. Closers: Ten years
 2. Exit Devices: Five Years
 3. Locksets & Cylinders: Three years
 4. All other Hardware: Two years.

1.08 OWNER'S INSTRUCTION:

- A. Instruct Owner's personnel in operation and maintenance of hardware units.

1.09 MAINTENANCE:

- A. Extra Service Materials: Deliver to Owner extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.
 1. Special Tools: Provide special wrenches and tools applicable to each different or special hardware component.
 2. Maintenance Tools: Provide maintenance tools and accessories supplied by hardware component manufacturer.
 3. Delivery, Storage and Protection: Comply with Owner's requirements for delivery, storage and protection of extra service materials.
- B. Maintenance Service: Submit for Owner's consideration maintenance service agreement for electronic products installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS:

- A. The following manufacturers are approved subject to compliance with requirements of the Contract Documents. Approval of manufacturers other than those listed shall be in accordance with Division 1.

<u>Item:</u>	<u>Manufacturer:</u>	<u>Approved Equal:</u>
Hinges	Stanley	Bommer, McKinney
Continuous Hinges	Stanley	Select, ABH
Mortise Locksets	Best	As Approved
Cylinders	Best	As Approved
Exit Devices	Sargent	Von Duprin 98/99
Closers	Stanley D-4550	LCN 4040XP, Sargent 351
Protection Plates	Trimco	Burns, Rockwood
Door Stops (Wall/Floor)	Trimco	Burns, Rockwood
Flush Bolts	Trimco	ABH, Burns
Coordinator & Brackets	Trimco	ABH, Burns
Threshold & Gasketing	National Guard	Reese, K.N. Crowder

Fire Rated Door Hardware ASSA ABLOY As Approved

2.02 MATERIALS:

- A. Hinges: Shall be Five Knuckle Ball bearing hinges
 - 1. Template screw hole locations
 - 2. Bearings are to be fully hardened.
 - 3. Bearing shell is to be consistent shape with barrel.
 - 4. Minimum of 2 permanently lubricated non-detachable bearings on standard weight hinge and 4 permanently lubricated bearing on heavy weight hinges.
 - 5. Equip with easily seated, non-rising pins.
 - 6. Non Removable Pin screws shall be slotted stainless steel screws.
 - 7. Hinges shall be full polished, front, back and barrel.
 - 8. Hinge pin is to be fully plated.
 - 9. Bearing assembly is to be installed after plating.
 - 10. Sufficient size to allow 180-degree swing of door
 - 11. Furnish five knuckles with flush ball bearings
 - 12. Provide hinge type as listed in schedule.
 - 13. Furnish 3 hinges per leaf to 7 foot 6 inch height. Add one for each additional 30 inches in height or fraction thereof.
 - 14. Tested and approved by BHMA for all applicable ANSI Standards for type, size, function and finish
 - 15. UL10C listed for Fire rated doors.
- B. Geared Continuous Hinges:
 - 1. Tested and approved by BHMA for ANSI A156.26-1996 Grade 1
 - 2. Anti-spinning through fastener
 - 3. UL10C listed for 3 hour Fire rating
 - 4. Non-handed
 - 5. Lifetime warranty
 - 6. Provide Fire Pins for 3-hour fire ratings
 - 7. Sufficient size to permit door to swing 180 degrees
- C. Mortise Type Locks and Latches:
 - 1. Tested and approved by BHMA for ANSI A156.13, Series 1000, Operational Grade 1, Extra-Heavy Duty, Security Grade 2 and be UL10C.
 - 2. Furnish UL or recognized independent laboratory certified mechanical operational testing to 4 million cycles minimum.
 - 3. Provide 9001-Quality Management and 14001-Environmental Management.
 - 4. Fit ANSI A115.1 door preparation
 - 5. Functions and design as indicated in the hardware groups
 - 6. Solid, one-piece, 3/4-inch (19mm) throw, anti-friction latchbolt made of self-lubricating stainless steel
 - 7. Deadbolt functions shall have 1 inch (25mm) throw bolt made of hardened stainless steel
 - 8. Latchbolt and Deadbolt are to extend into the case a minimum of 3/8 inch (9.5mm) when fully extended
 - 9. Auxiliary deadlatch to be made of one piece stainless steel, permanently lubricated
 - 10. Provide sufficient curved strike lip to protect door trim
 - 11. Lever handles must be of forged or cast brass, bronze or stainless steel construction and conform to ANSI A117.1. Levers that contain a hollow cavity are not acceptable
 - 12. Lock shall have self-aligning, thru-bolted trim
 - 13. Levers to operate a roller bearing spindle hub mechanism
 - 14. Mortise cylinders of lock shall have a concealed internal setscrew for securing the cylinder to the lockset. The internal setscrew will be accessible only by removing the core, with the control key, from the cylinder body.
 - 15. Spindle to be designed to prevent forced entry from attacking of lever
 - 16. Provide locksets with 7-pin removable and interchangeable core cylinders
 - 17. Each lever to have independent spring mechanism controlling it

18. Core face must be the same finish as the lockset.
- D. Cylindrical Type Locks and Latchsets:
1. Tested and approved by BHMA for ANSI A156.2, Series 4000, Operational Grade 1, Extra-Heavy Duty, and be UL10C listed.
 2. Provide 9001-Quality Management and 14001-Environmental Management.
 3. Fit modified ANSI A115.2 door preparation.
 4. Locksets and cores to be of the same manufacturer to maintain complete lockset warranty
 5. Locksets to have anti-rotational studs that are thru-bolted
 6. Keyed lever shall not have exposed "keeper" hole
 7. Each lever to have independent spring mechanism controlling it
 8. 2-3/4 inch (70 mm) backset
 9. 9/16 inch (14 mm) throw latchbolt
 10. Provide sufficient curved strike lip to protect door trim
 11. Outside lever sleeve to be seamless, of one-piece construction made of a hardened steel alloy
 12. Keyed lever to be removable only after core is removed, by authorized control key
 13. Provide locksets with 7-pin removable and interchangeable core cylinders
 14. Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
 15. Locksets outside locked lever must withstand minimum 1400 inch pounds of torque. In excess of that, a replaceable part will shear. Key from outside and inside lever will still operate lockset.
 16. Core face must be the same finish as the lockset.
 17. Functions and design as indicated in the hardware groups.
- E. Cylinders:
1. Provide the necessary cylinder housings, collars, rings & springs as recommended by the manufacturer for proper installation.
 2. Provide the proper cylinder cams or tail piece as required to operate all locksets and other keyed hardware items listed in the hardware sets.
 3. Coordinate and provide as required for related sections.
- F. Door Closers:
1. Fire Rated Door:
 - a. Manufacturer: ASSA ABLOY
 - b. Series: D-DC-351P9-689 Regular Duty Parallel Arm
 2. All Other Doors:
 - a. Tested and approved by BHMA for ANSI 156.4, Grade 1
 - b. UL10C certified
 - c. Provide 9001-Quality Management and 14001-Environmental Management.
 - d. Closer shall have extra-duty arms and knuckles
 - e. Conform to ANSI 117.1
 - f. Maximum 2 7/16 inch case projection with non-ferrous cover
 - g. Separate adjusting valves for closing and latching speed, and backcheck
 - h. Provide adapter plates, shim spacers and blade stop spacers as required by frame and door conditions
 - i. Full rack and pinion type closer with 1½" minimum bore
 - j. Mount closers on non-public side of door, unless otherwise noted in specification
 - k. Closers shall be non-handed, non-sized and multi-sized.
- G. Door Stops: Provide a dome floor or wall stop for every opening as listed in the hardware sets.
1. Wall stop and floor stop shall be wrought bronze, brass or stainless steel.
 2. Provide fastener suitable for wall construction.
 3. Coordinate reinforcement of walls where wall stop is specified.
 4. Provide dome stops where wall stops are not practical. Provide spacers or carpet riser for floor conditions encountered
- H. Over Head Stops: Provide a Surface mounted or concealed overhead when a floor or wall stop cannot be used or when listed in the hardware set.

1. Concealed overhead stops shall be heavy duty bronze or stainless steel.
 2. Surface overhead stops shall be heavy duty bronze or stainless steel.
- I. Push Plates: Provide with four beveled edges ANSI J301, .050 thickness, size as indicated in hardware set. Furnish oval-head countersunk screws to match finish.
 - J. Pulls with plates: Provide with four beveled edges ANSI J301, .050 thickness Plates with ANSI J401 Pull as listed in hardware set. Provide proper fasteners for door construction.
 - K. Kickplates: Provide with four beveled edges ANSI J102, 10 inches high by width less 2 inches on single doors and 1 inch on pairs of doors. Furnish oval-head countersunk screws to match finish.
 - L. Power Supply: UL Listed, Field Selectable 12VDC or 24VDC output. The power supply will specifically designed to support electric locks and access controls. The power supply uses 115 VAC at 800mA input. The power shall be able to be expanded to four station controls. The filtered and regulated output power is field selectable for 12 or 24 VDC.
 1. Fire Alarm/Life Safety emergency release included in power supply.
 2. Available options for multiple door options four or more control stations, Adjustable Time delay relay, Battery charging, Battery Back up.
 - M. Electric Door Strike: Certified by ANSI/BHMA 156.31, Grade 1. and listed for Burglary Protection ANSI/UL1034 Grade 1.
 1. For General use provide fail-secure electric strike and with fire-rated device.
 2. Listed UL10C for Fire Door assemblies
 3. Latchbolt monitor switch option when specified in hardware sets.
 4. Provide the electric strike in the appropriate model that will accept a 5/8" or 3/4" latchbolt.
 - N. Door Position Switch: Provide door position switch for door status monitoring as indicated in hardware sets.
 1. At all fire rated doors the door and frames, position switch preparation will be provided by the door and frame manufacturer or by an authorized label service agent.
 - O. Silencers: Furnish silencers on all interior frames, 3 for single doors, 2 for pairs. Omit where any type of seals occur.

2.03 FINISH:

- A. Designations used in Schedule of Finish Hardware - 3.05, and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 including coordination with traditional U.S. finishes shown by certain manufacturers for their products
- B. Powder coat door closers to match other hardware, unless otherwise noted.
- C. Aluminum items shall be finished to match predominant adjacent material. Seals to coordinate with frame color.

2.04 KEYS AND KEYING:

- A. Key Supplier has to be within a 50 mile radius of the job site.
- B. Provide keyed brass construction cores and keys during the construction period. Construction control and operating keys and core shall not be part of the Owner's permanent keying system or furnished in the same keyway (or key section) as the Owner's permanent keying system.
- C. Cylinders, removable and interchangeable core system: Sargent SFIC XC 7-pin restricted key system (no substitution) in place. This is the school Districts standard.
- D. Permanent keys and cores: Stamped with the applicable key mark for identification. These visual key control marks or codes will not include the actual key cuts. Permanent keys will also be stamped "Do Not Duplicate."
- E. Transmit Grand Masterkeys, Masterkeys and other Security keys to Owner by Registered Mail, return receipt requested.
- F. Furnish keys in the following quantities:
 1. 1 each Grand Masterkeys
 2. 4 each Masterkeys

3. 2 each Change keys each keyed core
 4. 4 each Construction masterkeys
 5. 1 each Control keys
- G. The General Contractor will install permanent cores and return the construction cores to the Hardware Supplier. Construction cores and keys remain the property of the Hardware Supplier.
- H. Keying Schedule: Arrange for a keying meeting, and programming meeting with Architect Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying and programming complies with project requirements. Furnish 3 typed copies of keying and programming schedule to Architect.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verification of conditions: Examine doors, frames, related items and conditions under which Work is to be performed and identify conditions detrimental to proper and or timely completion.
1. Do not proceed until unsatisfactory conditions have been corrected.

3.02 HARDWARE LOCATIONS:

- A. Mount hardware units at heights indicated in the following publications except as specifically indicated or required to comply with the governing regulations.
1. Recommended Locations for Builder's Hardware for Standard Steel Doors and Frames, by the Door and Hardware Institute (DHI).
 2. Recommended locations for Architectural Hardware for flush wood doors (DHI).
 3. WDMA Industry Standard I.S.-1A-04, Industry Standard for Architectural wood flush doors.

3.03 INSTALLATION:

- A. Install each hardware item per manufacturer's instructions and recommendations. Do not install surface mounted items until finishes have been completed on the substrate. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- B. Conform to local governing agency security ordinance.
- C. Install Conforming to ICC/ANSI A117.1 Accessible and Usable Building and Facilities.
1. Adjust door closer sweep periods so that from the open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door.
- D. Installed hardware using the manufacturers fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use "Riv-Nuts" or similar products.

3.04 FIELD QUALITY CONTROL AND FINAL ADJUSTMENT

- A. Contractor/Installers, Field Services: After installation is complete, contractor shall inspect the completed door openings on site to verify installation of hardware is complete and properly adjusted, in accordance with both the Contract Documents and final shop drawings.
1. Check and adjust closers to ensure proper operation.
 2. Check latchset, lockset, and exit devices are properly installed and adjusted to ensure proper operation.
 - a. Verify levers are free from binding.
 - b. Ensure latchbolts and dead bolts are engaged into strike and hardware is functioning.
 3. Report findings, in writing, to architect indicating that all hardware is installed and functioning properly. Include recommendations outlining corrective actions for improperly functioning hardware if required.

3.05 HARDWARE SCHEDULE

- A. General: See Architectural and Electrical drawings for additional information.
1. Doors requiring mag locks, door contacts, and new electrified panic egress hardware not listed in the below hardware sets. See drawings for additional scope.

- B. **TYPE 1:** Interior Single Door - Door(s) A101, A102, A103, A104, A105
- 3 ea - hinges
 - 1 ea - leverset, storeroom function
 - 1 ea - closer
 - 1 ea - wall stop (provide a floor stop at millwork locations)
 - 1 ea - kick plate
 - 1 ea - silencer set
 - 1 ea - power supply
 - 1 ea - position switch
 - 1 ea - card reader

Notes: Door is normally closed and secure. Access by valid credential or key override. Free egress at all times. Door contacts monitor the position of the doors and report this status to the security system.

- C. **TYPE 2:** Interior Single Door - Door(s) A106
- 3 ea - hinges
 - 1 ea - leverset, storeroom function
 - 1 ea - wall stop
 - 1 ea - kick plate
 - 1 ea - silencer set

- D. **TYPE 3:** Interior Single Door - Door(s) A110
- 3 ea - hinges
 - 1 ea - leverset, privacy
 - 1 ea - closer
 - 1 ea - wall stop
 - 1 ea - kick plate
 - 1 ea - silencer set

- E. **TYPE 4:** Interior Single Door - Door(s) A107, A108, B108,
- 3 ea - hinges
 - 1 ea - leverset, office/entrance function
 - 1 ea - wall stop
 - 1 ea - kick plate
 - 1 ea - silencer set

END OF SECTION

**SECTION 088000
GLAZING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Glazing units.
- B. Glazing compounds.

1.02 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2019).
- D. ASTM C1036 - Standard Specification for Flat Glass; 2025.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2025.

1.03 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittal procedures.
- B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Samples: Submit 1 sample 12 by 12 inch (___ by ___ mm) in size of glass units.
- E. Duplicate samples may be required. See section 016000 Product Requirements.
- F. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
- C. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- D. Source Limitations for Glass: Obtain tinted float glass laminated glass insulating glass from single source from single manufacturer for each glass type.
- E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

1.06 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F (4 degrees C).
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.
- C. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a ten (10) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Float Glass Manufacturers:
 - 1. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.
 - 2. Substitutions: See Section 016000 - Product Requirements.

2.02 GLASS MATERIALS

- A. Float Glass: Provide float glass based glazing unless otherwise indicated.
 - 1. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
 - 2. Impact Resistant Safety Glass: Complies with ANSI Z97.1 - Class A, or 16 CFR 1201 - Category II criteria.
 - 3. Tinted Type: ASTM C1036, Class 2 - Tinted, Quality - Q3, with color and performance characteristics as indicated.
 - 4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.03 GLAZING UNITS

- A. Type G-2 - Monolithic Interior Vision Glazing:
 - 1. Applications: Interior glazing unless otherwise indicated.
 - 2. Glass Type: Fully tempered float glass.
 - 3. Tint: Clear.
 - 4. Thickness: 1/4 inch (6.4 mm), nominal.

2.04 ACCESSORIES

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) by width of glazing rabbet space minus 1/16 inch (1.5 mm) by height to suit glazing method and pane weight and area.
- B. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

PART 3 EXECUTION**3.01 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Verify that sealing between joints of glass framing members has been completed effectively.
- D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

3.04 INSTALLATION - DRY GLAZING METHOD (TAPE AND GASKET SPLINE GLAZING)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
- C. Place setting blocks at 1/4 points with edge block no more than 6 inch (152 mm) from corners.
- D. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- E. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
- F. Carefully trim protruding tape with knife.

3.05 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION

**SECTION 260010
BASIC ELECTRICAL REQUIREMENTS**

PART 1 GENERAL**1.01 DESCRIPTION**

- A. This section is an extension of the General Requirements and certain items of a common or administrative nature that pertain to all electrical work.
- B. The work of this section consists of furnishing materials, equipment, constant competent supervision, special tools, test equipment, technicians, and labor necessary for installation of a complete working electrical system as indicated herein and on the Drawings.
- C. The work shall include but not necessarily be limited to the following:
 - 1. Temporary electrical service for construction.
 - 2. All Electrical Construction.
- D. Lighting System.
- E. Power System.
- F. Fire Alarm/Voice Evac. System/Mass Notification System
- G. Telecommunication System.
- H. Intercom System
- I. Security Cameras
- J. Access Control System
- K. Grounding system.

1.02 QUALITY ASSURANCE

- A. The electrical installation shall conform to the requirements of the latest edition of the National Electrical Code (NEC). Notify Architect/Engineer of conflicts before performance.
- B. Electrical material shall be built and tested in accordance with the applicable standards of the (NEMA), (ANSI), (ASTM), and (IEEE).
- C. Electrical materials shall be new and unused and shall be listed and labeled for the service intended by Underwriters' Laboratories, Inc., where such labeling service is available.

1.03 REGULATORY REQUIREMENTS

- A. Permits: Obtain and pay for all necessary permits, inspections, connection charges, fees, insurance, bond, licenses, and comply with all governing laws, ordinances, rules and regulations.

1.04 COORDINATION

- A. Contractor shall be responsible for coordination of all work with other disciplines.
- B. Arrange work in a neat, well organized manner with exposed conduit and similar services running parallel with primary lines of the building construction, high as possible with a minimum of 8'-0" overhead clearance or as directed by the Engineer.
- C. Where the method of installation is not certain, ask for details. Lack of details, not requested, will not be an excuse for improper installation, and any such work must be corrected at contractor's cost.
- D. Coordination Drawings: For locations where several elements of electrical or combined mechanical and electrical work must be sequenced and positioned with precision in order to fit into the available space, prepare coordination drawings showing the actual physical dimensions (at accurate scale, minimum 1/4") required for the installation. Prepare and submit coordination drawings prior to purchase-fabrication-installation of any of the elements involved in the coordination.
- E. All Bidders shall be responsible to insure that equipment selected, switchboards, panel boards, etc., fit in spaces selected, along with NEC compliance. If standard equipment does not fit, Contractor shall be required to utilize custom equipment as required.

1.05 DRAWINGS AND SPECIFICATIONS

- A. Contract Documents (Drawings and Specifications) are intended to convey the scope of work and indicate general arrangements of equipment, fixtures and piping, and approximate sizes and locations of equipment and outlets. Follow these documents in laying out the work, check all Drawings to become familiar with all conditions affecting the work, and verify spaces in which the work will be installed.
- B. The contractor shall fully coordinate installation of electrical system with other disciplines. The Drawings show approximate locations only of selected feeders, branch circuits, outlets, etc., except where specific routing or dimensions are indicated. The Engineer reserves the right to make reasonable changes in locations indicated before roughing-in without additional cost to the Owner.
 - 1. Contractor shall investigate the structural and finish conditions affecting Division 26 work and shall arrange such work accordingly, furnishing fittings, bends, junction boxes, pull boxes, access panels, and accessories required to meet such conditions.
 - 2. These Specifications, together with the accompanying Drawings, contemplate apparatus fully erected, and in satisfactory operating condition with the Contractor furnishing and installing everything that may be necessary to complete the job.
 - 3. Contractor shall install circuits, breakers, equipment, etc. as indicated and label the above as noted. Contractor shall not deviate from equipment/circuit identification unless approved by Owner/Engineer.

1.06 SUBMITTALS

- A. Shop Drawings:
 - 1. Listed below are shop drawings required for transmittal. Refer to Phasing Plan for scheduling of submittal. No time delays will be allowed for failure to be so informed.
 - a. Lighting Fixtures (Interior and Exterior under the same submittal)
 - b. Lighting Controls (Submit under the Lighting Submittal)
 - c. Raceways
 - d. Connectors
 - e. Safety Switches
 - f. Fuses
 - g. Circuit Breakers
 - h. Wiring Devices
 - i. Motor Controls
 - j. Panel boards
 - k. Conductors
 - l. Fire Alarm/Voice Evac. System Components
 - m. Telecommunicaton System Components
 - n. Intercom System Components
 - o. Security Camera System Components
 - p. Access Control System Components
 - q. Relays and Contactors
 - 2. Transformers
 - 3. Grounding products
 - 4. Further descriptions or information required with shop drawings shall be included with the description of materials specified herein as follows:
 - a. Grounding Products: Include a complete grounding system diagram with materials and ground conductor sizes.
 - b. Miscellaneous Electrical Controls and Control Wiring: Include control wiring diagrams for all miscellaneous electrical controls.
 - c. Housekeeping Pads: Include location and dimensions of housekeeping pads, including blockouts and anchor bolts.
 - 5. Firestops: Include all firestop materials for the project, indicating intended use and UL fire rating where applicable.

- a. Provide "SpecSeal" products or approved equal. Provide SSB series firestop pillows (or equal) around the cable tray where cable trays make penetration in the walls, etc. Provide "LC150" series sealant (or equal) to seal the penetrations made by conduits.
6. Contractor prepared, new, detailed, dimensioned shop Drawings (PDF) for the installation of the work in the electrical equipment rooms areas shall be prepared and submitted for review. In preparing shop Drawings, establish lines and levels for the work specified and check the drawings to avoid interference with structural features and the work of other trades. Immediately call out the attention of the Engineering in writing any interferences for clarification.
7. Corrections or comments made on shop Drawings during the review do not relieve the Contractor from compliance with requirements of the contract documents. Review of shop Drawings shall not permit any deviation from Drawings and Specifications. Shop Drawings must be accompanied by signed statement from contractor, stating that he has reviewed the submittal and checked it for compliance. Contractor shall make note on the submittals if they deviate from the contract documents.
8. Contractor shall provide products as specified if submittals for review of materials are not received within thirty (30) days after award of the Contract.

1.07 PROJECT/SITE CONDITIONS

- A. Visit the site before bidding to become familiar with conditions under which the work will be performed.
- B. No additional compensation will be allowed for failure to be so informed.

1.08 CUTTING AND PATCHING

- A. Do all cutting, patching, fitting, and all other work that may be required to make the several parts come together and fit.
- B. Provide, everything required for the work or to conceal any of the work, in any part of the structure.
- C. Fireproofing:
 1. Plastic sleeves/pipe shall not be used within the building when penetrating a fire-resistant-rated wall, ceiling, partition, or floor.

1.09 RECORD DRAWINGS

- A. Upon completion of the project, provide a complete set of detailed electronic as-built drawings in AutoCAD 2018 format with all information required. Contractor shall also produce (2) sets of as-built drawings with modifications to construction documents in red ink. Contractor shall maintain a current set of as-built drawings on site at all times. As-built drawings shall include, but not be limited to detailed dimensions of all conduits, ductbank, etc. install in slab or below grade.
- B. Equipment Manuals:
 1. Before the date of substantial completion, Contractor shall furnish to the Engineer three (3) bound sets of descriptive, dimensional and parts data on all major items of electrical equipment and material including those items listed above under "Shop Drawings:".

1.10 WARRANTY/GUARANTEE

- A. Except where longer periods of warranty are specified, guarantee all labor and materials for a period of twelve (12) months from the date of substantial completion of the particular phase of the work. Repair all defective materials and work; replace with new materials and/or equipment, any material and/or equipment failing to give satisfactory service. If equipment carries a longer manufacturer warranty, then contractor shall cover equipment for the full duration of the manufacturer warranty.
- B. During the period of guarantee, promptly correct any defects in equipment, materials or workmanship without cost to the Owner.
- C. Guarantee includes equipment capacity and performance ratings specified without excessive noise levels. Any deficiencies in equipment specified shall be promptly corrected.
- D. Contractor's warranty shall include an inspection of the system one (1) week before the end of the one (1) year warranty period. Replace or repair any items found to be defective at this time.

1.11 TESTS AND BALANCING

- A. At such times as the Engineer directs, conduct operating tests to demonstrate that the electrical systems are installed and will operate properly and in accordance with the requirements of this Specification. Tests shall be performed in the presence of the Engineer's representative. Furnish instruments and personnel required for such tests.
- B. Any work and materials tested and found varying from the requirements of the Drawings and Specifications shall be replaced without additional cost to the Owner.
- C. This section does not relieve the Contractor from testing equipment installed under this Division but not listed in this section. Contractor is required to test all equipment, feeders, etc., installed under this Division. Reference specific spec sections for full testing requirements.

1.12 INTEGRATED SYSTEM TESTING

- A. Provide a coordinated functional test of Access Control (Section 281000), Video Surveillance (Section 282300), Intercommunication and Paging System (Section 275123) and Division 26 raceway/power.
- B. Demonstrate cross-system event handling:
 - 1. Fire Alarm Activation - all access-controlled egress doors unlock; intercom priority announcements override paging; related cameras bookmark event.
 - 2. Access Control System lockdown command - classroom/perimeter locks secure; mass notification alert issued; CCTV cameras auto-popup/bookmark where supported and licensed.
 - 3. Intercom call at door - associated camera pops up; Access Control logs entry created; audio verified.
- C. Owner and Engineer shall witness integrated tests.

PART 2 PRODUCTS**2.01 GENERAL**

- A. Refer to DIVISION 1 sections for general requirements on products, materials and equipment. Refer to other DIVISION 26 sections for additional requirements.
- B. Provide products which are compatible with other products of the electrical work, and with other work requiring interface with the electrical work, including electrical connections and control devices. Determine in advance of purchase that equipment and materials proposed for installation will fit into the confines indicated, leaving adequate clearance as required by applicable codes, and for adjustment, repair, or replacement.

2.02 MANUFACTURERS' NAMEPLATES

- A. Each major component of the equipment shall have the manufacturer's name, address, model number, and rating on a plate securely affixed in a conspicuous place.

PART 3 EXECUTION**3.01 GENERAL**

- A. Visit the building site before bidding to determine existing conditions and assume all responsibility and bear all expenses in allowing for these conditions in the bid.
- B. Obtain all necessary permits, pay all legal fees and charges.
- C. No work shall be concealed until approved by the engineer and all regulations are adhered to. Provide certificate of completion.
- D. Cooperate with other trades in installing work in order that there will be no conflict of space required by conduit, piping, ducts, outlets, etc.
- E. Verify dimensions with certified shop Drawings of the materials actually approved and purchased.

3.02 TEMPORARY WIRING, LIGHTING AND POWER AT THE SITE

- A. Furnish and install provisions for temporary electrical service and construction light and power during the construction period.
- B. Furnish, install, and maintain all temporary service equipment as required until permanent service is installed, switch-over temporary systems to the permanent service when latter is ready for same.

- C. Furnish, install, maintain, and switch on and off on all regular work days a complete temporary light system, for the building while under construction.
- D. Provide any and/or all relocations of temporary electric facilities as necessary to avoid the permanent installations of all trades.
- E. Coordinate with the Utility Company for a separate construction meter. Contractor shall pay all associated costs.
- F. Contractor shall pay the monthly utility bill for the full duration of construction.

3.03 WIRING FOR EQUIPMENT BY OTHERS

- A. Electrical service for all equipment furnished under this Specification and/or indicated on the Drawings shall be roughed-in and connected under this Section.
- B. Electrical work for equipment specified in Division 25 - Mechanical shall be as specified.
- C. Raceways, outlets, backboards, cabinets, grounding connections, handholes, underground distribution system, and other roughing-in indicated shall be provided as work of this division for intercom system, telecommunication system, fire alarm system and HVAC Control 120V power (Contractor to provide cable as well).

3.04 WORKMANSHIP

- A. Install all materials and electrical components of the work in accordance with instructions of manufacturer following the best modern construction practices and conforming with the Contract Documents.
Workmanship shall be first class, in both function and appearance, whether finally concealed or exposed and shall be performed by experienced workmen skilled in the type of work. As practicable, the lines of all components of the system shall be perpendicular or parallel. In general, workmanship shall conform to guidelines set forth in N.E.C.A. manuals.

3.05 MOUNTING HEIGHTS

- A. Upon approval of the Engineer mounting heights may be adjusted.

END OF SECTION

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Single conductor building wire.
- B. Service entrance cable.
- C. Metal-clad cable.
- D. Wiring connectors.
- E. Electrical tape.
- F. Heat shrink tubing.
- G. Oxide inhibiting compound.
- H. Wire pulling lubricant.
- I. Cable ties.
- J. Firestop sleeves.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 262100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conductors.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2024).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2024.
- F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- H. NECA 120 - Standard for Installing Armored Cable (AC) and Type Metal-Clad (MC) Cable; 2018.
- I. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
- J. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- M. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- N. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- O. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

- P. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- Q. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- R. UL 854 - Service-Entrance Cables; Current Edition, Including All Revisions.
- S. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 - 3. Notify Engineer/Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Engineer/Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Metal-clad cable is permitted only as follows:

1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - 1) Maximum Length: 6 feet (1.8 m).

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Provide new conductors and cables manufactured not more than one year prior to installation.
- D. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- E. Comply with NEMA WC 70.
- F. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- G. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- H. Conductors for Grounding and Bonding: Also comply with Section 260526.
- I. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
- J. Conductor Material:
 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 3. Tinned Copper Conductors: Comply with ASTM B33.
- K. Minimum Conductor Size:
 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 150 feet (46 m): 10 AWG, for voltage drop.
- L. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- M. Conductor Color Coding:
 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.
 - d. Travelers for 3-Way and 4-Way Switching: Pink.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Manufacturers:
 - 1. Copper Building Wire:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. General Cable Technologies Corporation; _____: www.generalcable.com/#sle.
 - d. Southwire Company: www.southwire.com/#sle.
 - e. Or Approve Equal.
- B. Description: Single conductor insulated wire.
- C. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Stranded.
 - b. Size 8 AWG and Larger: Stranded.
 - 2. Control Circuits: Stranded.
- D. Insulation Voltage Rating: 600 V.
- E. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
 - a. Size 4 AWG and Larger: Type XHHW-2.
 - b. Installed Underground: Type XHHW-2.
 - c. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.

2.04 SERVICE ENTRANCE CABLE

- A. Manufacturers:
 - 1. Copper Service Entrance Cable:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. Southwire Company: www.southwire.com/#sle.
- B. Service Entrance Cable for Underground Use: NFPA 70, Type USE single-conductor cable listed and labeled as complying with UL 854, Type USE-2 and with UL 44 Type RHH/RHW-2.
- C. Conductor Stranding: Stranded.
- D. Insulation Voltage Rating: 600 V.

2.05 METAL-CLAD CABLE

- A. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- B. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Stranded.
 - 2. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- E. Grounding: Full-size integral equipment grounding conductor.
- F. Armor: Steel, interlocked tape.

2.06 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 260526.
- C. Wiring Connectors for Splices and Taps:

1. Copper Conductors Size 8 AWG and Smaller: Use mechanical connectors or Barrel Crimp Sleeves.
 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or Barrel Crimp Sleeves.
- D. Wiring Connectors for Terminations:
1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
 5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
- E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- F. Do not use push-in wire connectors as a substitute for Barrel Crimp connectors. Wire nuts are not allowed.
- G. Mechanical connectors: Provide bolted type or set-screw type.
1. Manufacturers:
 - a. Burndy LLC; _____: www.burndy.com/#sle.
 - b. IlSCO: www.ilSCO.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Or Approved Equal.
- H. Compression Connectors: Provide circumferential type or hex type crimp configuration.
1. Manufacturers:
 - a. Burndy LLC; _____: www.burndy.com/#sle.
 - b. IlSCO: www.ilSCO.com/#sle.
 - c. Thomas & Betts Corporation: www.tnb.com/#sle.
 - d. Or Approved Equal.

2.07 ACCESSORIES

- A. Electrical Tape:
1. Manufacturers:
 - a. 3M: www.3m.com/#sle.
 - b. Plymouth Rubber Europa: www.plymouthrubber.com/#sle.
 2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.
 5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil (3.2 mm); suitable for continuous temperature environment up to 176 degrees F (80 degrees C).
 6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil (0.18 mm); suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil (2.3 mm).

- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
- E. Cable Ties: Material and tensile strength rating suitable for application.
- F. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for cables and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- G. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70 and these specifications.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.
 - 4. Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location indicated.
 - 5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
 - 6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
 - 7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
 - b. Increase size of conductors as required to account for ampacity derating.
 - c. Size raceways, boxes, etc. to accommodate conductors.
 - 8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Conductor ampacities shall be determined in accordance with the NEC, including adjustments and corrections for conditions of use (ambient temperature, conductor bundling, etc.). Continuous loads shall not exceed 80% of the overcurrent protective device rating, unless otherwise permitted by the NEC.
- D. The system shall be grounded and conductors color-coded in accordance with these specifications and the NEC.
- E. Do not use mechanical means to pull wire No. 8 AWG. or smaller.
- F. Type AC or MC cable is not allowed except as allowed in this spec.
- G. Perform work in accordance with NECA 1 (general workmanship).

- H. Install metal-clad cable (Type MC) in accordance with NECA 120.
- I. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.
 - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- J. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- K. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
 - 1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
 - 2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- L. Terminate cables using suitable fittings.
 - 1. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- M. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- N. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet (1.5 m) of slack.
- O. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- P. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- Q. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitably remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- R. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
 - 1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
 - 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

3. Wet Locations: Use heat shrink tubing.
- S. Insulate ends of spare conductors using vinyl insulating electrical tape.
- T. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible. Provide at all terminations, junction boxes, and accessible points.
- U. Identify conductors and cables in accordance with Section 260553.
- V. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- W. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Prior to energization, test cable and wire for continuity of circuitry and for short circuits.
- C. Inspect and test in accordance with NETA ATS, except Section 4.
- D. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required. Only insulation resistance testing is expected.
 1. Disconnect surge protective devices (SPDs) prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPDs connected.
- E. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground rod electrodes.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
 - 1. Includes oxide inhibiting compound.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. IEEE 81 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System; 2025.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2022.
- D. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify exact locations of underground metal water service pipe entrances to building.
 - 2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
 - 3. Notify Engineer/Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.
- B. Shop Drawings:
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Field quality control test reports.
- E. Project Record Documents: Record actual locations of grounding electrode system components and connections.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

1.08 DESCRIPTION OF WORK

- A. The work of this section consist of providing labor, materials, tools, appliances and miscellaneous Accessories associated with grounding of the electrical system as required by and as indicated herein and/or on the drawings.
- B. Main electrical service equipment, raceways, motors, panelboards and other electrical equipment shall be effectively and permanently grounded to the grounding electrode system. This electrode shall be the nearest available effectively grounded structural metal member of the structure or the nearest available effectively grounded metal water pipe and also a driven rod. Grounding connections and conductor sizes shall be in accordance with the requirements of the National Electrical Code, Article 250, local ordinances, and as described herein.
- C. A separate grounding conductor, sized in accordance with NEC Table 250-122 shall be provided in the conduit with the circuit conductors for all feeder and branch circuits. The grounding conductor may be bare or insulated copper; however, if this conductor is insulated, the insulating covering shall be green in color. Where bare copper grounding conductors are used, mark the conductor ends with green tape. Conduit runs shall be increased in size where necessary to accommodate the grounding conductor in addition to circuit conductors. The electrical continuity of all conduit runs shall be verified and corrected where necessary.
- D. Isolated Ground Connectors shall be insulated. Additional grounding conductors and conduit shall be provided as specified herein or shown on the drawings. All conduit for grounding system conductors, not run in conduit with circuit conductors, shall be rigid steel conduit.
- E. All electrical equipment enclosures and conductor enclosures shall be grounded. This includes but is not limited to metal raceways, outlet boxes, cabinets, switch boxes, work stations, motor frames, transformer cases and metallic enclosure for all electrical equipment.
- F. Under no circumstances shall neutral conductors again be grounded after they have been grounded once at the transformer secondary except at a separately derived system.
- G. Panelboards shall be equipped with a neutral bar which is insulated from the enclosure, and a grounding bar which is bonded to the enclosure. The grounding bar shall provide for terminating the green equipment grounding conductors in the panelboard or motor control center cabinets. Neutral busses shall be isolated from ground except at the main bonding jumper.
- H. Types of grounding in this section includes the following:
 - 1. Underground metal water piping.
 - 2. Grounding electrodes
 - 3. Service Equipment
 - 4. Enclosures
 - 5. Systems
 - 6. Equipment
- I. Requirements of this section apply to electrical grounding work specified elsewhere in these specifications.
- J. Provide bonding jumper across water meter. The bonding jumper shall be the same size as the grounding electrode conductor and long enough to allow the meter to be removed without disconnecting the bonding jumper.

PART 2 PRODUCTS**2.01 GROUNDING AND BONDING REQUIREMENTS**

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding System Resistance:
 - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Engineer/Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
 - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
- E. Grounding Electrode System:
 - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 - 2. Metal Underground Water Pipe(s):
 - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet (3.0 m) at an accessible location not more than 5 feet (1.5 m) from the point of entrance to the building.
 - b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
 - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
 - 3. Metal In-Ground Support Structure:
 - a. Provide connection to metal in-ground support structure that is in direct contact with earth in accordance with NFPA 70.
 - 4. Concrete-Encased Electrode:
 - a. Provide connection to concrete-encased electrode consisting of not less than 20 feet (6.0 m) of either steel reinforcing bars or bare copper conductor not smaller than 4 AWG embedded within concrete foundation or footing that is in direct contact with earth in accordance with NFPA 70.
 - 5. Ground Rod Electrode(s):
 - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
 - b. Space electrodes not less than 10 feet (3.0 m) from each other and any other ground electrode.
 - c. Where location is not indicated, locate electrode(s) at least 5 feet (1.5 m) outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
 - 6. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
 - 7. Ground Bar: Provide ground bar, separate from service equipment enclosure, for common connection point of grounding electrode system bonding jumpers as permitted in NFPA 70. Connect grounding electrode conductor provided for service-supplied system grounding to this ground bar.
 - a. Ground Bar Size: as shown on drawings unless otherwise indicated or required.
 - b. Ground Bar Mounting Height: 18 inches (450 mm) above finished floor unless otherwise indicated.
- F. Separately Derived System Grounding:
 - 1. Separately derived systems include, but are not limited to:

- a. Transformers (except autotransformers such as buck-boost transformers).
 2. Provide grounding electrode conductor to connect derived system grounded conductor to nearest effectively grounded metal building frame. Unless otherwise indicated, make connection at neutral (grounded) bus in source enclosure.
 3. Provide bonding jumper to connect derived system grounded conductor to nearest metal building frame and nearest metal water piping in the area served by the derived system, where not already used as a grounding electrode for the derived system. Make connection at same location as grounding electrode conductor connection.
 4. Where common grounding electrode conductor ground riser is used for tap connections to multiple separately derived systems, provide bonding jumper to connect the metal building frame and metal water piping in the area served by the derived system to the common grounding electrode conductor.
 5. Provide system bonding jumper to connect system grounded conductor to equipment ground bus. Make connection at same location as grounding electrode conductor connection. Do not make any other connections between neutral (grounded) conductors and ground on load side of separately derived system disconnect.
 6. Where the source and first disconnecting means are in separate enclosures, provide supply-side bonding jumper between source and first disconnecting means.
- G. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
 7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
 - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
 - b. Metal gas piping.
 8. Provide bonding for interior metal air ducts.
 9. Provide bonding for metal building frame.
 10. Provide bonding for metal siding not effectively bonded through attachment to metal building frame.
- H. Telecommunications Systems Grounding and Bonding:
1. Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with NFPA 70.
 2. Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
 - a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
 - b. Raceway Size: 3/4 inch (21 mm) trade size unless otherwise indicated or required.
 - c. Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.
 - d. Ground Bar Mounting Height: 18 inches (450 mm) above finished floor unless otherwise indicated.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:

1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
 1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
- C. Connectors for Grounding and Bonding:
 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors or exothermic welded connections for accessible connections.
- D. Ground Bars:
 1. Description: Copper rectangular ground bars with mounting brackets and insulators.
 2. Size: As indicated.
 3. Holes for Connections: As indicated or as required for connections to be made.
- E. Ground Rod Electrodes:
 1. Comply with NEMA GR 1.
 2. Material: Copper-bonded (copper-clad) steel.
 3. Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.
 4. Where rod lengths of greater than 10 feet (3.0 m) are indicated or otherwise required, sectionalized ground rods may be used.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Weld grounding conductors to underground grounding electrodes/grounding ring. The building equipment grounding system shall consist of the ground wire and electrically continuous metallic conduit system. Every item of equipment served by the electrical system shall be bonded to the building equipment ground. Metallic piping and duct systems which are electrically isolated shall be bonded to the equipment grounding system with a flexible bonding jumper.
- D. The neutral shall be grounded to the grounding electrode system at the service entrance only, and shall be kept isolated from the building grounding system throughout the building. The neutral of separately derived systems shall be grounded at one point as specified herein below.
- E. Continuity of the building equipment grounding system shall be maintained throughout the project. Grounding jumpers shall be installed across conduit expansion fittings, all liquid-tight flexible metal and flexible metal conduit, light fixture pigtails in excess of 6' and all other non-electrically continuous raceway fittings.
- F. All main grounding conductors shall be stranded copper conductors, sized as shown and/or required, and run in a suitable raceway. All main grounding conductors shall be continuous without joints or splices over their entire length.
- G. Ground telecommunication service equipment as required by local utility.
- H. Flexible conduit longer than 6' shall not be considered a ground path.
- I. Ground all grounding-type receptacles with a separate ground wire.

- J. Grounding of all motors or equipment connected to terminal box with flexible conduit shall be made with a separate grounding conductor between motor frame or equipment cabinet and rigid conduit system. Grounding conductor shall be sized in accordance with table 250-122 of the NEC.
- K. All grounding conductors shall be amply protected from mechanical injury and shall be supported in an approved manner. Where conductors are located in concrete, they shall be installed in conduit. Where ground conductors enter or emerge from slabs bearing directly on fill or soil, the voids between the conductor and the surrounding conduit shall be filled with compound to provide an effective water seal.
- L. Grounding conductors shall be not smaller than #12 AWG. Conductors shall be high conductivity copper, and sizes larger than #12 shall be stranded.
- M. Insulated bushings shall be installed on all raceways at transformers, switchboards, motor control centers, dry-type transformers, as well as switches used as service equipment.
- N. Install braided type bonding jumpers with clamps on water meter piping to electrically bypass the water meter.
- O. Install clamp-on connectors only on thoroughly cleaned metal contact surfaces, to ensure electrical conductivity and circuit integrity.
- P. Ground each steel structural column to the grounding electrode system. "Cadweld" grounding conductor to steel column.
- Q. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70.
 - 1. Outdoor Installations: Unless otherwise indicated, install with top of rod 12 inches below finished grade.
 - 2. Indoor Installations: Unless otherwise indicated, install with 4 inches (100 mm) of top of rod exposed.
- R. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 - 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- S. Identify grounding and bonding system components in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13.
- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements. Measured ground resistances shall be 5 ohms or less.
- F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION

**SECTION 260529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 260533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 260533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- C. Section 265100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
- D. Section 265600 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2023.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
 - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
 - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 5. Notify Engineer/Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.
- B. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
- C. Evaluation Reports: For products specified as requiring evaluation and recognition by ICC Evaluation Service, LLC (ICC-ES), provide current ICC-ES evaluation reports upon request.
- D. Installer's Qualification Statement: Include evidence of compliance with specified requirements.

- E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.
- C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- D. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.
- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 MANUFACTURED SUPPORTING DEVICES

- A. General: Provide supporting devices complying with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation and as herein specified. Where more than one type of device meets indicated requirements, selection is Installer's option.
- B. Support: Provide supporting devices of types, sizes and materials as required and having the following construction features:
 1. Clevis Hangers: For supporting 2" rigid metal conduit, galvanized steel with 1/2" diameter hole for round galvanized or stainless steel rod, approximately 54 pounds per 100 units.
 2. Riser Clamps: For supporting 5" rigid metal conduit, galvanized steel with 2 bolts and nuts and 4" ears, approximately 510 pounds per 100 units.
 3. Reducing Couplings: Steel rod reducing coupling, 1/2" x 5/8" galvanized or stainless steel approximately 16 pounds per 100.
 4. C-Clamps: Malleable iron, 1/2" rod size, approximately 70 pounds per 100 units.
 5. I-Beam Clamps: Steel, 1-1/4" x 3/16" stock, 3/8" cross bolt, flange width 2", approximately 52 pounds per 100 units.
 6. One-Hole Conduit Straps: For supporting 3/4" rigid metal conduit, galvanized steel, approximately 7 pounds per 100 units. Include with backing plates.
 7. Two-Hole Conduit Straps: For supporting 3/4" rigid metal conduit, galvanized steel, 3/4" strap width, and 2-1/8" between center of screw holes.
 8. Round Steel Rod: Hot dipped galvanized or Stainless Steel, 1/2" diameter, approximately 67 pounds per 100 feet.
 9. Hexagon Nuts: For 1/2" rod size, galvanized steel, approximately 4 pounds per 100 units.
 10. Offset Conduit Clamps: For supporting 2" rigid metal conduit, steel approximately 200 pounds per 100 units.
- C. Anchors: Provide anchors of types, sizes and materials as required and having the following construction features:
 1. Lead Expansion Anchors: 1/2", approximately 38 pounds over 100 units.
 2. Toggle Bolts: Springhead, 3/16" x 4", approximately 5 pounds per 100 units.
 3. Available Manufacturers: Subject to compliance with requirements, manufacturers offering anchors which may be incorporated into the work include, but are not limited to the following:
 - a. Hilti
 - b. Powers/Dewalt
 - c. ITW/Red Head
 - d. Simpson Strong-Tie
- D. U-Channel Strut System:

1. Provide U-Channel strut system for supporting electrical equipment, 16-gage hot dip galvanized steel or stainless steel, of types and sizes required: construct with 9/16" diameter holes, 8" on center on top surface, and with the following fittings which mate and match with U-channel:
 - a. Fixture Hangers
 - b. Channel Hangers
 - c. End caps
 - d. Beam clamps
 - e. Wiring stud
 - f. Thinwall conduit clamps
 - g. Rigid conduit clamps
 - h. Conduit hangers
 - i. U-bolts
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering channel system which may be incorporated in the work include, but are not limited to, the following:
 - a. Eaton B-Line
 - b. Unistrut
 - c. Cooper Caddy
 - d. Superstrut
- E. General Requirements:
1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 4. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
 5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Indoor Dry Locations: Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Exterior or Damp and Wet Locations: Stainless Steel Type 304 or 316 or Epoxy-coated carbon steel.
 - c. Exterior or Damp and Wet Locations: Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
 - d. Do not used plain uncoated carbon steel in any location.
 - e. Provide anchors of the same material as adjacent supports.
- F. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

2.02 FABRICATED SUPPORTING DEVICES

- A. Pipe Sleeves: Provide pipe sleeves of one of the following:
1. Sheet-Metal: Fabricate from galvanized sheet metal round tube closed with snaplock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gages: 3" and smaller, 20 gage;; 4" or 6", 16 gage; over 6", 14 gage.
 2. Steel-Pipe: Fabricate from Schedule 40 galvanized steel pipe; remove burrs.
 3. Iron-Pipe: Fabricate from cast-iron or ductile-iron pipe; remove burrs.
 4. Plastic-Pipe: Fabricate from Schedule 80 PVC plastic pipe; remove burrs.
- B. Sleeve Seals: Provide Lead and Oakum sleeve seals, caulked between sleeve and pipe for sleeves located in foundation walls below grade or in exterior walls.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Engineer/Architect, do not provide support from suspended ceiling support system or ceiling grid.
- F. Unless specifically indicated or approved by Engineer/Architect, do not provide support from roof deck.
- G. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- H. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- I. Secure fasteners according to manufacturer's recommended torque settings.
- J. Remove temporary supports.
- K. Tighten sleeve seal nuts until sealing grommets have expanded to form a watertight seal.
- L. Coordinate all conduit penetrations into the building from the exterior with Division 1.

3.03 FIELD QUALITY CONTROL

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

**SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Galvanized steel rigid metal conduit (RMC).
- B. PVC-coated galvanized steel rigid metal conduit (RMC).
- C. Flexible metal conduit (FMC).
- D. Liquidtight flexible metal conduit (LFMC).
- E. Electrical metallic tubing (EMT).
- F. Rigid nonmetallic conduit
- G. Underground PVC Conduit (PVC)
- H. Conduit fittings.
- I. Accessories.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes additional requirements for fittings for grounding and bonding.
- C. Section 260529 - Hangers and Supports for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 262100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2025.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- E. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2025.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- G. NEMA RN 1 - Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Metal Conduit and Intermediate Metal Conduit; 2018.
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
- I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- L. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- M. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
- N. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- O. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- P. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
 - 4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
 - 5. Notify Engineer/Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
- C. Shop Drawings:
 - 1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.
 - 2. Include proposed locations of roof penetrations and proposed methods for sealing.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS**2.01 CONDUIT APPLICATIONS**

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Install fire alarm and MNS circuits per survivability levels in Section 283100.
- D. Underground:
 - 1. Exterior, Direct-Buried: Use Rigid PVC Conduit
 - 2. Where rigid pvc conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
 - 3. Where rigid polyvinyl (PVC) conduit is provided, use galvanized steel rigid metal conduit elbows for bends.
 - 4. Where steel conduit is installed in direct contact with earth, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.
- E. Concealed Within Masonry Walls: Use electrical metallic tubing (EMT).
- F. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

- G. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).
- H. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.
- I. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit.
- J. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
- K. Exposed, Exterior: Use galvanized steel rigid metal conduit.
- L. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
 - 1. Maximum Length: 6 feet (1.8 m).
- M. Connections to Vibrating Equipment:
 - 1. Dry Locations: Use flexible metal conduit.
 - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
 - 3. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.
 - 4. Vibrating equipment includes, but is not limited to:
 - a. Transformers.
 - b. Motors.

2.02 CONDUIT REQUIREMENTS

- A. Electrical Service Conduits: Also comply with Section 262100.
- B. Fittings for Grounding and Bonding: Also comply with Section 260526.
- C. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Minimum Conduit Size, Unless Otherwise Indicated:
 - 1. Branch Circuits: 3/4 inch (21 mm) trade size.
 - 2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
 - 3. Underground, Exterior: 1 inch (27 mm) trade size.
- F. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Manufacturers:
 - 1. Allied Tube & Conduit
 - 2. Republic Conduit
 - 3. Wheatland Tube, a Division of Zekelman Industries
 - 4. Or Approved Equal.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings Inc
 - b. O-Z/Gedney, a brand of Emerson Electric Co
 - c. Thomas & Betts Corporation
 - d. Or Approved Equal.
 - 2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
 - 4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.
- B. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil (1.02 mm).

- C. PVC-Coated Fittings:
 - 1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
 - 2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
 - 4. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil (1.02 mm).
- D. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil (0.38 mm).

2.05 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.07 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:
 - 1. Allied Tube & Conduit
 - 2. Republic Conduit
 - 3. Wheatland Tube, a Division of Zekelman Industries
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 - 1. Manufacturers:
 - a. Bridgeport Fittings Inc
 - b. O-Z/Gedney, a brand of Emerson Electric Co
 - c. Thomas & Betts Corporation
 - d. Or Approved Equal.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 3. Material: Use steel or malleable iron.
 - 4. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Manufacturers:
 - 1. Cantex Inc
 - 2. Carlon, a brand of Thomas & Betts Corporation
 - 3. JM Eagle
- B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- C. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.09 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil (0.51 mm).
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- D. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force (890 N).
- E. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- F. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.
- G. Sealing Systems for Roof Penetrations: Premanufactured components and accessories as required to preserve integrity of roofing system and maintain roof warranty; suitable for conduits and roofing system to be installed; designed to accommodate existing penetrations where applicable.
- H. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.
- I. Firestop Sleeves: Listed; provide as required to preserve fire resistance rating of building elements.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.
- E. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- F. Methods of Installation:
 - 1. Cut conduits straight, properly ream, and cut threads for heavy wall conduit deep and clean.
 - 2. Field-bend conduit with benders designed for purpose so as not to distort nor vary internal diameter.
 - 3. Minimum Interior conduit size shall be 3/4", Exterior shall be 1"
 - 4. Conduit Fill:
 - a. 53% of cross-sectional area for a single conductor
 - b. 31% for two conductors
 - c. 40% for three or more conductors
 - d. In no case shall conductors be installed in conduit in a manner that violates NEC derating or heat dissipation requirements.
 - e. Where voltage drop requires upsizing of conductors, conduit shall be sized accordingly to maintain compliance with the above fill requirements.
 - 5. Conduits when entering watertight enclosures shall be secured with a myers hub.
 - 6. Fasten conduit terminations in sheet metal enclosures by 2 locknuts, and terminate with bushing. Install locknuts inside and outside enclosure.
 - 7. Install conduits as not to damage or run through structural members.
 - 8. Test every conduit run installed with ball mandrel. Clear and restore/repair and conduit which rejects ball mandrel.

9. Provide permanent plastic tags at each end of embedded conduit run stating what the conduit is serving and where it is served from including the location.
 10. Label all junction boxes (larger than 6" x 6"); pull boxes, wireways with engraved plastic nameplates.
 11. Run all underground conduit under the slab in the dirt and hung from the slab except for miscellaneous 3/4" conduits which may be run in the slab (with approval from Structural Engineer) if the below stated conditions are met. The depth shall vary as required to avoid underground plumbing. Run in slab when turning up. Hang conduit to slab with stainless steel rods looped around conduit with stainless steel washer to keep loop closed on one end; the other end is to have a 90 degree bend set into slab or looped around reinforcing rods. Use 1/4" diameter rod for conduit up to 2", 3/8" diameter for conduit 2 1/2" or greater in diameter. Space supports no greater than 4' apart, or as required by the National Electrical Code and local codes.
 12. Install underground conduits minimum of 24" below finished grade. Use 36" radius long fittings only.
 13. Exposed Conduits:
 - a. Install exposed conduits and extensions from concealed conduit systems neatly, parallel with, or at right angles to walls of the building.
- G. Conduit Routing:
1. Unless dimensioned, conduit routing indicated is diagrammatic.
 2. When conduit destination is indicated without specific routing, determine exact routing required.
 3. Conceal all conduits unless specifically indicated to be exposed.
 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.
 - b. Mechanical equipment rooms.
 - c. Within joists in areas with no ceiling.
 5. Arrange conduit to maintain adequate headroom, clearances, and access.
 6. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
 7. Arrange conduit to provide no more than 150 feet (46 m) between pull points.
 8. Route conduits above water and drain piping where possible.
 9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 10. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
 11. Maintain minimum clearance of 12 inches (300 mm) between conduits and hot surfaces. This includes, but is not limited to:
 - a. Heaters.
 - b. Hot water piping.
 - c. Flues.
 12. Group parallel conduits in the same area together on a common rack.
- H. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
- I. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.

5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
 7. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 8. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- J. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
 8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- L. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
1. Where conduits pass from outdoors into conditioned interior spaces.
 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
 3. Where conduits penetrate coolers or freezers.
- M. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.
- N. Provide grounding and bonding in accordance with Section 260526.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Where coating of PVC-coated galvanized steel rigid metal conduit (RMC) contains cuts or abrasions, repair in accordance with manufacturer's instructions.
- D. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).
- C. Boxes and enclosures for integrated power, data, and audio/video.
- D. Floor boxes.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 083100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- C. Section 260526 - Grounding and Bonding for Electrical Systems.
- D. Section 260529 - Hangers and Supports for Electrical Systems.
- E. Section 260533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- G. Section 262726 - Wiring Devices:
 - 1. Wall plates.
 - 2. Floor box service fittings.
 - 3. Additional requirements for locating boxes for wiring devices.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013 (Reaffirmed 2020).
- E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013 (Reaffirmed 2020).
- F. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- K. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- M. UL 1203 - Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations; Current Edition, Including All Revisions.

1.04 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 minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
 - 4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
 - 5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
 - 6. Coordinate the work with other trades to preserve insulation integrity.
 - 7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
 - 8. Notify Engineer/Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 016000 - Product Requirements, for additional provisions.
 - 2. Keys for Lockable Enclosures: Two of each different key.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 3. Use suitable concrete type boxes where flush-mounted in concrete.
 4. Use suitable masonry type boxes where flush-mounted in masonry walls.
 5. Use raised covers suitable for the type of wall construction and device configuration where required.
 6. Use shallow boxes where required by the type of wall construction.
 7. Do not use "through-wall" boxes designed for access from both sides of wall.
 8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 10. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
 11. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 12. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 13. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
 14. Wall Plates: Comply with Section 262726.
 15. Manufacturers:
 - a. Eaton Crouse-Hinds
 - b. Hubbell Incorporated; Bell Products:
 - c. Hubbell Incorporated; RACO Products:
 - d. Arlington Industries
 - e. Allied Moulded Products
 - f. Orbit Industries
 - g. Legrand (Pass & Seymour / Wiremold)
 - h. Appleton (Emerson)
 - i. Or Approved Equal.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 12 painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 4. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
 - a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
 - b. Back Panels: Painted steel, removable.
 - c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.
 5. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
 6. Manufacturers:
 - a. Eaton B-Line
 - b. nVent Hoffman
 - c. Hubbell Wiegmann
 - d. Rittal

- D. Boxes and Enclosures for Integrated Power, Data, and Audio/Video: Size and configuration as indicated or as required with partitions to separate services; field-connected gangable boxes may be used.
- E. Floor Boxes:
 - 1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 262726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
 - 2. Use sheet-steel or cast iron floor boxes within slab above grade.
 - 3. Metallic Floor Boxes: Fully adjustable (with integral means for leveling adjustment prior to and after concrete pour).
 - 4. Manufacturer: Same as manufacturer of floor box service fittings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide separate boxes for emergency power and normal power systems.
- E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- F. Flush-mount boxes in finished areas unless specifically indicated to be surface-mounted.
- G. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- H. Round boxes are not acceptable where conduit must enter box through side of box.
- I. Provide knockout closures to cap unused knockout holes where blanks have been removed.
- J. Box Locations:
 - 1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
 - 2. Unless dimensioned, box locations indicated are approximate.
 - 3. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
 - 4. Locate boxes so that wall plates do not span different building finishes.
 - 5. Locate boxes so that wall plates do not cross masonry joints.
 - 6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
 - 7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.
 - 8. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
 - b. Do not install flush-mounted boxes with area larger than 16 square inches (0.0103 sq m) or such that the total aggregate area of openings exceeds 100 square inches (0.0645 sq m) for any 100 square feet (9.29 sq m) of wall area.

9. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
- K. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
 4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
- L. Install boxes plumb and level.
- M. Flush-Mounted Boxes:
 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.
- N. Install boxes as required to preserve insulation integrity.
- O. Metallic Floor Boxes: Install box level at the proper elevation to be flush with finished floor.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- Q. Close unused box openings.
- R. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- S. Provide grounding and bonding in accordance with Section 260526.
- T. Identify boxes in accordance with Section 260553.

3.03 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL**1.01 SECTION INCLUDES**

- A. Electrical identification requirements.
- B. Exposed conduit color banding
- C. Cable/Conductor Identification
- D. Operation Instructions and Warnings
- E. Danger Signs
- F. Equipment/System Identification Signs
- G. Identification nameplates and labels.
- H. Wire and cable markers.
- I. Voltage markers.
- J. Underground warning tape.
- K. Floor marking tape.
- L. Warning signs and labels.

1.02 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2023.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.
- E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
 - 2. Do not install identification products until final surface finishes and painting are complete.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- B. Shop Drawings: Provide schedule of items to be identified indicating proposed designations, materials, legends, and formats.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70 and NFPA 70E

1.06 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS**2.01 ELECTRICAL IDENTIFICATION MATERIALS**

- A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.
- B. Color-Coded Conduit Markers: Provide manufacturer's standard pre-printed, flexible or semi-rigid, permanent, plastic-sheet conduit markers. Except as otherwise indicated, provide lettering which indicates voltage of conductor(s) in conduit. Unless otherwise indicated or required by governing regulations, provide orange markers with black letters.
- C. Arc Flash Hazard Warning Labels: Contractor shall provide and install all arc flash hazard warning labels as required by NFPA 70E. Contractor shall provide all fault current studies necessary to provide appropriate labels on all equipment. Coordinate with Section 26 - Electrical Load Study
- D. Cable/Conductor Identification Bands: Provide manufacturer's standard vinyl-cloth, self-adhesive cable/conductor wire markers or wrap-around type, numbered to show circuit identification.
- E. Self-adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings, of sizes suitable for application areas and adequate for visibility. Unless otherwise indicated or required by governing regulations, provide orange signs with black lettering.
- F. Danger Signs: Provide Manufacturer's standard "Danger" signs of baked enamel finish on 20-gage steel, of standard red, black, and white graphics for adequate vision (as examples: "High Voltage", "Keep Away", "Buried Cable", "Do Not Touch Switch").
- G. Engraved Plastic-Laminate Signs: Provide engraved stock melamine plastic-laminate, complying with FS L-P-387 in sizes and thicknesses indicated.
 - 1. Thickness: 1/16", for units up to 20 sq. in. or 8" length, 1/8" for larger units.
 - 2. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate substrate.
- H. Manufacturers: Subject to compliance with requirements.

2.02 LETTERING AND GRAPHICS

- A. Coordinate names, abbreviations, and other designations used in electrical identification work with corresponding designations shown or specified for schedule. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical system and equipment.
- B. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces.
 - b. Transformers:
 - 1) Identify kVA rating.
 - 2) Identify voltage and phase for primary and secondary.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify load(s) served. Include location when not within sight of equipment.
 - c. Enclosed Contactors:

- 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify coil voltage.
 - 4) Identify load(s) and associated circuits controlled. Include location.
2. Service Equipment:
 - a. Use identification nameplate to identify each service disconnecting means.
 3. Use voltage marker to identify highest voltage present for each piece of electrical equipment.
 4. Use identification nameplate to identify equipment utilizing series ratings, where permitted, in accordance with NFPA 70.
 5. Use identification label to identify overcurrent protective devices for branch circuits serving fire alarm circuits. Identify with text "FIRE ALARM CIRCUIT".
 6. Use field-painted floor markings, floor marking tape, or warning labels to identify required equipment working clearances.
 - a. Field-Painted Floor Markings: Alternating black and white stripes, 3 inches (76 mm) wide, painted in accordance with Section 099123 and 099113.
 7. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70 including but not limited to the following.
 - a. Service equipment.
 - b. Elevator control panels.
 8. Arc Flash Hazard Warning Labels: Comply with Section 260573.
 9. Use warning signs to identify electrical hazards for entrances to all rooms and other guarded locations that contain exposed live parts operating at 600 V nominal or less with the word message "DANGER; Electrical hazard; Authorized personnel only" or approved equivalent.
- C. Identification for Raceways:
1. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
 2. Use underground warning tape to identify underground raceways.
- D. Identification for Devices:
1. Use engraved wallplate to identify serving branch circuit for all receptacles.
 - a. For receptacles in public areas or in areas as directed by Architect, provide identification on inside surface of wallplate.

2.03 VOLTAGE MARKERS

- A. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- B. Minimum Size:
 1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
- C. Legend:
 1. Markers for Voltage Identification: Highest voltage present.
- D. Color: Black text on orange background unless otherwise indicated.

2.04 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- B. Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil (0.1 mm).
- C. Legend: Type of service, continuously repeated over full length of tape.
- D. Color:
 1. Tape for Buried Power Lines: Black text on red background.
 2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

2.05 FLOOR MARKING TAPE

- A. Floor Marking Tape for Equipment Working Clearance Identification: Self-adhesive vinyl or polyester tape with overlamine, 3 inches (76 mm) wide, with alternating black and white stripes. Locations and Boundaries shall comply with NFPA 70E approach boundaries; do not cover egress paths.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. General Installation Requirements:
 - 1. Coordination: Where identification to be applied to surfaces which require finish, install identification after completion of painting.
 - 2. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.
- C. Conduit Identification:
 - 1. General: Apply color-coded identification on electrical conduit in a manner similar to piping identification. Except as otherwise indicated, use orange with black text.
- D. Cable/Conductor Identification:
 - 1. Apply cable/conductor identification on each box/enclosure/cabinet where wires are present, match identification with marking system used in panelboards, shop drawings, contract documents, and similar previously established identification for project electrical work.
 - 2. All conductors shall be clearly and permanently identified, and color coded per NEC.
 - 3. All control circuit and instrument circuit terminations shall be identified. For conductors #6 and smaller, conductor color-coding shall be color insulation. For conductor color coding of conductors larger than #6, use self-adhesive wrap around tape markers. Use markers for all panelboards, boxes, outlets, switches, circuit breakers and control centers.
 - 4. Operational Instructions and Warnings: Wherever reasonably required to ensure safe and efficient operation and maintenance of electrical and other related systems, and equipment, including prevention of misuse of electrical facilities by unauthorized personnel, install self-adhesive plastic signs or similar equivalent identification, instructions or warnings on switches, outlets and other control devices and covers of electrical enclosures.
- E. Equipment/System Identification:
 - 1. Install engraved plastic-laminate sign on each major unit of electrical equipment in the building unless unit is specified with its own self-explanatory identification.
 - 2. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for the following categories of electrical work:
 - a. Panelboards, electrical cabinets and enclosures
 - b. Access panel/doors to electrical facilities
 - c. Major electrical substation and switchboard
 - d. Disconnect/safety switches
 - e. Telecommunications switching equipment
 - f. Fire Alarm Master Station

4.01 FIELD QUALITY CONTROL

- A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

**SECTION 271000
STRUCTURED CABLING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Communications system design requirements.
- B. Communications pathways.
- C. Copper cable and terminations.
- D. Fiber optic cable and interconnecting devices.
- E. Communications equipment room fittings.
- F. Communications outlets.
- G. Communications grounding and bonding.
- H. Communications identification.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260533.13 - Conduit for Electrical Systems.
- D. Section 260533.16 - Boxes for Electrical Systems.
- E. Section 260553 - Identification for Electrical Systems: Identification products.
- F. Section 262726 - Wiring Devices.

1.03 REFERENCE STANDARDS

- A. EIA/ECA-310 - Cabinets, Racks, Panels, and Associated Equipment; 2005e.
- B. ICEA S-83-596 - Indoor Optical Cable; 2021.
- C. NECA/BICSI 568 - Standard for Installing Commercial Building Telecommunications Cabling; 2006.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. TIA-455-21 - FOTP-21 - Mating Durability of Fiber Optic Interconnecting Devices; 1988a (Reaffirmed 2012).
- F. TIA-492AAAD - Detail Specification for 850-nm Laser- Optimized, 50- μ m Core Diameter/125- μ m Cladding Diameter Class Ia Graded-Index Multimode Optical Fibers Suitable for Manufacturing OM4 Cabled Optical Fiber; 2009.
- G. TIA-526-14 - Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant; IEC 61280-4.1 Edition 3.1, Fiber Optic Communications Subsystem Test Procedures- Part 4-1: Installed Cable Plant- Multimode Attenuation Measurement; 2023d.
- H. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2024.
- I. TIA-568.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; 2018d, with Addenda (2020).
- J. TIA-568.3 - Optical Fiber Cabling and Components Standard; 2022e.
- K. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).
- L. TIA-598 - Optical Fiber Cable Color Coding; 2014d, with Addendum (2018).
- M. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2021d.
- N. TIA-607 - Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2024e.
- O. UL 444 - Communications Cables; Current Edition, Including All Revisions.
- P. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

- Q. UL 1651 - Fiber Optic Cable; Current Edition, Including All Revisions.
- R. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider. Pay for all utility work.
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
 - 3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Notify Engineer of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Arrange for Communications Service Provider to provide service.
- C. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Communications Service Provider representative.

1.05 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
- B. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
- C. Evidence of qualifications for installer.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.
- E. Test Plan: Complete and detailed plan, with list of test equipment, procedures for inspection and testing, and intended test date; submit at least 60 days prior to intended test date.
- F. Field Test Reports.
- G. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
 - 1. Record actual locations of outlet boxes and distribution frames.
 - 2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
 - 3. Identify distribution frames and equipment rooms by room number on drawings.
- H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.06 QUALITY ASSURANCE

- A. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- B. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
- C. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
 - 1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
 - 2. Supervisors and installers factory certified by manufacturers of products to be installed.
 - 3. Employing BICSI Registered Cabling Installation Technicians (RCIT) for supervision of all work.
- D. Products: Listed, classified, and labeled as suitable for the purpose intended.
- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.

- B. Keep stored products clean and dry.

1.08 WARRANTY

- A. Correct defective Work within a 5 year period after Date of Substantial Completion.
- B. Manufacturer warranty of 20 years on structured cabling system components (cable, jacks, patch panels, and connecting hardware) when installed in accordance with manufacturer certified program requirements.

PART 2 PRODUCTS

2.01 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 1. Comply with TIA-568 (SET) (cabling) and TIA-569 (pathways) (commercial standards).
 2. Comply with Communications Service Provider requirements.
 3. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
 4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external service provider.
 1. Locate main distribution frame as indicated on the drawings.
 2. Capacity: As required to terminate all cables required by design criteria plus minimum 25 percent spare space.
- C. Intermediate Distribution Frames (IDF): Support structures for terminating horizontal cables that extend to telecommunications outlets.
 1. Locate intermediate distribution frames as indicated on the drawings.
- D. Backbone Cabling: Cabling, pathways, and terminal hardware connecting intermediate distribution frames (IDF's) with main distribution frame (MDF), wired in star topology with main distribution frame at center hub of star.
- E. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.02 PATHWAYS

- A. Conduit: As specified in Section 260533.13; provide pull cords in all conduit.
- B. Underground Service Entrance: Rigid polyvinyl chloride (PVC) conduit, Schedule 40.

2.03 COPPER CABLE AND TERMINATIONS

- A. Copper Horizontal Cable:
 1. Unless otherwise indicated, all new horizontal copper cabling shall be Category 6 CMP.
 2. Description: 100 ohm, balanced twisted pair cable complying with TIA-568.2 and listed and labeled as complying with UL 444.
 3. Cable Type - Data: TIA-568.2 Category 6 UTP (unshielded twisted pair); 23 AWG.
 4. Cable Capacity: 4-pair.
 5. Cable Applications: Use listed NFPA 70 Type CMP plenum cable unless otherwise indicated.
 6. Cable Applications:
 - a. Plenum Applications: Use listed NFPA 70 Type CMP plenum cable.
 - b. Riser Applications: Use listed NFPA 70 Type CMR riser cable or Type CMP plenum cable.
- B. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.
- C. For this project, System Color Coding & Use
 1. Intercom/Paging: Cat6 CMP Plenum, Orange Jacket.
 2. Video Surveillance: Cat6 CMP Plenum, Green Jacket.

3. Access Control (network-connected controllers only): Cat 6 CMP Plenum, Jacket Color as directed by owner/engineer.
- D. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
 1. Performance: 500 mating cycles.
 2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.

2.04 FIBER OPTIC CABLE AND INTERCONNECTING DEVICES

- A. Fiber Optic Backbone Cable:
 1. New Fiber Optic Backbone Cable:
 - a. Description: Tight buffered, non-conductive fiber optic cable complying with TIA-568.3, TIA-598, ICEA S-83-596 and listed as complying with UL 444 and UL 1651.
 - b. Cable Type: Multimode, laser-optimized 50/125 um (OM4) complying with TIA-492AAAD.
 - c. Cable Capacity: 24-fiber.
- B. Fiber Optic Interconnecting Devices:
 1. Connector Type: Type LC duplex connectors, compliant with TIA-568.3
 2. Connector Performance: 500 mating cycles, when tested in accordance with TIA-455-21.
 3. Maximum Attenuation/Insertion Loss: 0.3 dB.

2.05 COMMUNICATIONS EQUIPMENT ROOM FITTINGS

- A. Copper Cross-Connection Equipment:
 1. Patch Panels
 - a. Provide rack-mounted patch panels to terminate all horizontal copper cabling.
 - b. Patch Panel Port Capacity: Size patch panels to accommodate 100% of installed terminations plus 20% spare port minimum. Do not terminate new system cabling on existing patch panels unless specifically approved by Owner/Engineer.
 - c. Panels shall be factory manufactured, modular type, with front-access jacks and rear termination blocks.
 - d. Panels shall be available in standard 48-port per 2U configuration or high-density configurations up to 96-ports per 1U, provided that:
 - 1) Each port is individually labeled and corresponds to TIA-606 structured cabling identification requirements.
 - 2) Terminations are IDC type, compatible with 110 punch-down tools.
 - 3) Panels maintain Category 6 performance for NEXT, FEXT, and return loss as defined by ANSI/TIA-568.2-D.
 - (a) Panels shall include rear cable management bars and front label fields with clear label covers.
 - (b) Acceptable manufacturers: Panduit, Leviton, Hubbell, Ortronics, Siemon, or approved equal.
- B. Fiber Optic Cross-Connection Equipment:
 1. Provide rack-mounted fiber distribution panels with front and rear access, designed for modular adapter plates or cassettes.
 2. All connectors shall be LC duplex type. SC and ST connectors are not permitted.
 3. Enclosures shall be sized to accommodate at least 24-fiber termination per rack unit, expandable to a minimum of 96 fibers per 4U rack space.
 4. Provide protective dust caps for all unused ports.
 5. Enclosures shall include integrated splice trays, strain relief, and cable management.
 6. Provide labeling fields in compliance with TIA-606, with permanent machine-printed labels for each port.
 7. Acceptable manufacturers: Panduit, Leviton, Hubbell, Corning, Siemon, or approved equal.
- C. Backboards: Interior grade plywood without voids, 3/4 inch (19 mm) thick; UL-labeled fire-retardant.
 1. Size: As indicated on drawings.

2. Do not paint over UL label.
- D. Equipment Frames, Racks and Cabinets:
 1. Component Racks: EIA/ECA-310 standard 19 inch (482.6 mm) wide.
 2. Floor Mounted Racks: Aluminum or steel construction with corrosion resistant finish; vertical and horizontal cable management channels, top and bottom cable troughs, and grounding lug.
- E. Cable Management:
 1. Manufacturers:
 - a. CommScope; _____: www.commscope.com/#sle.
 2. Product(s):
 - a. CommScope Cable Runway: www.commscope.com/#sle.
 - b. CommScope Horizontal/Vertical Cable Managers; HCM-SS-XX-XX/VCM-DS-XX-XX Series: www.commscope.com/#sle.
 - c. CommScope FiberGuide Raceway: www.commscope.com/#sle.

2.06 COMMUNICATIONS OUTLETS

- A. Outlet Boxes: Comply with Section 260533.16.
 1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
- B. Wall Plates:
 1. Comply with system design standards and UL 514C.
 2. Accepts modular jacks/inserts.
 3. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified in Section 262726.

2.07 GROUNDING AND BONDING COMPONENTS

- A. Comply with TIA-607.
- B. Comply with Section 260526.
- C. Provide Telecommunications Main Grounding Busbar (TMGB) in MDF and Telecommunications Grounding Busbar (TGB) in all IDFs, bonded with #6 AWG copper minimum.

2.08 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606.
- B. Comply with Section 260553.

2.09 SOURCE QUALITY CONTROL

- A. Factory test cables according to TIA-568 (SET).

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), NECA/BICSI 568, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. Comply with Communication Service Provider requirements.
- C. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.
- D. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.

3.02 INSTALLATION OF PATHWAYS

- A. Install pathways with the following minimum clearances:
 1. 48 inches (1220 mm) from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
 2. 12 inches (300 mm) from power conduits and cables and panelboards.
 3. 5 inches (125 mm) from fluorescent and high frequency lighting fixtures.
 4. 6 inches (150 mm) from flues, hot water pipes, and steam pipes.

- B. Conduit, in Addition to Requirements of Section 260533.13:
1. Arrange conduit to provide no more than the equivalent of two 90 degree bend(s) between pull points.
 2. Conduit Bends: Inside radius not less than 10 times conduit internal diameter.
 3. Arrange conduit to provide no more than 100 feet (30 m) between pull points.
 4. Minimum Cover - Underground Service Entrance: Comply with NFPA 70 and Communications Service Provider requirements.
 5. Conduits, sleeves, raceways, trays, and cable supports shall be sized to maintain a maximum initial fill of 40 percent at installation. Pathways shall include minimum of 25 percent spare capacity for future growth and be designed to allow additional pathways where future expansion is anticipated. Under no circumstance shall pathway fill exceed 60 percent of the cross-sectional area in accordance with ANSI/TIA-569-E and NEC Chapter 9, Tables 1 and C.
- C. Outlet Boxes:
1. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of telecommunications outlets provided under this section.
 - a. Mounting Heights: Unless otherwise indicated, as follows:
 - 1) Telephone and Data Outlets: 18 inches (450 mm) above finished floor.
 - b. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
 - c. Provide minimum of 24 inches (600 mm) horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
 - d. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.
 - e. Locate outlet boxes so that wall plate does not span different building finishes.
 - f. Locate outlet boxes so that wall plate does not cross masonry joints.

3.03 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
 2. Do not over-cinch or crush cables.
 3. Do not exceed manufacturer's recommended cable pull tension.
 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
1. At Distribution Frames: 180 inches (____ mm).
 2. At Outlets - Copper: 36 inches (____ mm).
- C. Copper Cabling:
1. Category 6 and Above: Maintain cable geometry; do not untwist more than 1/2 inch (12 mm) from point of termination.
 2. For 4-pair cables in conduit, do not exceed 25 pounds (110 N) pull tension.
 3. Use T568B wiring configuration.
- D. Fiber Optic Cabling:
1. Prepare for pulling by cutting outer jacket for 10 inches (250 mm) from end, leaving strength members exposed. Twist strength members together and attach to pulling eye.
 2. Support vertical cable at intervals as recommended by manufacturer.
- E. Floor-Mounted Racks and Enclosures: Permanently anchor to floor in accordance with manufacturer's recommendations.
- F. Identification:
1. Use wire and cable markers to identify cables at each end.
 2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.
 3. Use identification nameplate to identify cross-connection equipment, equipment racks, and cabinets.

- G. Cable Support in Accessible Ceilings: Support horizontal cabling on listed J-hooks or cable support systems. Space supports not greater than 5 feet. Size supports to maintain 60% maximum fill. No cable may rest on ceiling grid, ductwork, piping, or light fixtures.
- H. Horizontal Cabling Length Limit: Maximum permanent link length from patch panel to device outlet shall be 90 meters (295 feet).

3.04 FIELD QUALITY CONTROL

- A. Comply with inspection and testing requirements of specified installation standards.
- B. Visual Inspection:
 - 1. Inspect cable jackets for certification markings.
 - 2. Inspect cable terminations for color coded labels of proper type.
 - 3. Inspect outlet plates and patch panels for complete labels.
- C. Testing - Copper Cabling and Associated Equipment:
 - 1. Test backbone cables for DC loop resistance, shorts, opens, intermittent faults, and polarity between connectors and between conductors and shield, if cable has overall shield.
 - 2. Test operation of shorting bars in connection blocks.
 - 3. Category 6 and Above Backbone: Perform near end cross talk (NEXT) and attenuation tests.
 - 4. Category 6 and Above Links: Perform tests for wire map, length, attenuation, NEXT, and propagation delay.
- D. Testing - Fiber Optic Cabling:
 - 1. Backbone: Perform optical fiber end-to-end attenuation test using an optical time domain reflectometer (OTDR) and manufacturer's recommended test procedures; perform verification acceptance tests and factory reel tests.
 - 2. Multimode Backbone: Perform tests in accordance with TIA-526-14.
- E. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

**SECTION 275123
INTERCOMMUNICATIONS AND PAGING SYSTEMS**

EDUCATIONAL SYSTEM VOIP INTERCOM – BASIS OF DESIGN: BOGEN NYQUIST E7000

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.
- B. All bids shall be based on the equipment as specified herein. The catalog numbers and model designations are that of the Bogen Nyquist E7000 Series Educational System. The specifying authority must approve any alternative system.
- C. Contractors who wish to submit alternative equipment shall provide the specifying authority with the appropriate documentation at least 10 business days prior to bid opening. The submitted documentation must provide a feature-by-feature comparison identifying how the proposed equipment meets the operation and functionality of the system described in this specification. Prior to bid date, the contractor shall provide adequate and complete submittal information, which shall include but not be limited to specification sheets, working drawings, shop drawings, and system demonstration. The alternative supplier-contractor must also provide a list to include six installations identical to the proposed system.
- D. The contractor shall provide the FCC registration number of the proposed system, where applicable.
- E. Final approval of the alternative system shall be determined at the time of job completion. Failure to provide the "precise functional equivalent" shall result in the removal of the alternative system and installation of the originally specified system at the contractor's expense.
- F. The contractor for this work shall have read all the bidding requirements, the general requirements of division 00, and the contract proposal forms, and shall be held to the execution of this work. The contractor shall be bound by all the conditions and requirements therein.
- G. The contractor shall be responsible for providing a complete functional system, including all necessary components whether included in this specification or not.
- H. In preparing the bid, the contractor should consider that no claim will be made against the owner for any costs incurred by the contractor for any equipment demonstrations requested by the owner.
- I. Project Scope / Intent: Execute work in a phased, room-by-room cutover such that no occupied area is without intercom/paging beyond the minimum time required to cut over and test. Maintain existing system operation until new system is installed, configured, tested, and accepted. For each room/area: install and program new device(s), test and obtain owner acceptance, then remove existing devices.
- J. Intercom integration with video/access control shall be limited to supported and licensed client functions and/or secure APIs. Full cross-manufacturer 'single pane of glass' integration is not required unless explicitly indicated.

1.02 SCOPE OF WORK

- A. The contractor shall furnish and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating VoIP school communications system including but not limited to:
 - 1. Analog Station Bridge (ASB)
 - a. 24 station interface supporting analog speakers and call switches
 - b. Built-in 2x120W power amplifiers
 - c. Two speech links
 - d. Category wiring
 - e. 25/70-volt speaker(s), ceiling-mounted, wall-mounted, and paging horns
 - 1) Ceiling Mounted Speakers: CSD2X2U Drop-In Ceiling Speaker
 - 2) Ceiling Mounted Speakers: S810T725PG8U Ceiling Speaker
 - 3) Wall Baffle Speakers: MB8TSQ/SL Metal Box Speaker
 - f. Analog/Mechanical Call Switches capable of placing Normal, Urgent, or Emergency priority calls

- g. CA-15C rocker style momentary call button
- h. CAN Bus 2.0 interface designed for future support of Digital Call Switch (DCS) NQ-E7020 or NQ-E7020-G2 that can initiate Normal, Urgent, or Emergency priority calls, all with options for Privacy Mode
- 2. Matrix Mixer Pre-Amplifier (MMPA)
 - a. Four Mic/Line inputs that are user-configurable
 - b. Line-Level/Monitor output
 - c. Digital AES/EBU (AES3) input
- 3. Input/Output (I/O) Controller
 - a. Eight inputs to monitor third-party device events
 - b. Eight outputs to initiate third-party device actions
 - c. Power over Ethernet (PoE) Class-1 (IEEE 802.3af compliant)
- 4. Classroom VoIP Wall Baffle Speaker(s)
 - a. Adjustable volume via web browser, 100 steps minimum
 - b. Built-in 10W amplifier
 - c. MEMS digital microphone for full duplex talkback
- 5. PoE Class-3 (IEEE 802.3af compliant)
 - a. Connection to optional call switch, which is capable of placing Normal, Urgent, or Emergency priority calls and can provide station status and the ability for the user to enable and disable Privacy Mode
- 6. Classroom VoIP Ceiling Speaker(s)
 - a. Adjustable volume (100 steps minimum) via web browser
 - b. Built-in 10W amplifier
- B. MEMS digital microphone for full duplex talkback
 - 1. PoE Class-3 (IEEE 802.3af compliant)
 - a. Connection to optional call switch, which can place Normal, Urgent, or Emergency priority calls and can provide station status and the ability for the user to enable and disable Privacy Mode
 - 2. Built-in Master Clock with the following minimum features:
 - a. Unlimited Events
 - b. Unlimited Concurrent Schedules
 - c. Unlimited Holidays
 - 3. Software shall be installed on a dealer or a customer-supplied server with the following minimum specifications:
 - a. Web Server for full system configuration and operation
 - b. Web-based Administrative User Interface (Admin Web UI) for programming and day-to-day system operation, including but not limited to:
 - 1) Station intercom two-way calling
 - 2) Zone Paging with software-adjustable volume per zone
 - 3) Emergency Paging
 - 4) Playing Emergency Tones
 - 5) Playing Tones
 - 6) Playing Announcement Files
 - 7) Managing Bell Schedules
 - 8) Weekly Bell Schedule Review at-a-glance
 - 9) Audio Distribution
 - 10) System muting
 - 4. Teacher's Dashboard web-based UI for teachers, including but not limited to:
 - a. Directory
 - b. Dial Pad
 - c. Voicemail
 - d. Call Forwarding
 - e. Single-click or touch Normal or Emergency Calling
 - f. Single-click or touch 911 calling

5. VoIP Admin Phone, PoE, 7" 800 x 480-pixel color touch screen with backlight
6. VoIP Staff Station, PoE, 132 x 64-pixel graphical LCD with backlight
7. Owner Telephone System Connectivity
 - a. System shall be capable of connecting to the Public Switched Telephone Network (PSTN), analog Public Branch Exchange (PBX), or digital PBX/IP-PBX by connecting to an unlimited number of SIP trunks, analog FXO/FXS lines, or CO Trunks.
 - b. Telephone service with public utilities will be arranged by the owner in conjunction with the equipment supplier. Equipment supplier shall generate a one-page document that will provide the owner with the number of outside lines.

1.03 SUBMITTALS

- A. Spec sheets on all items including cable types
- B. Outline drawing of system control cabinet showing relative position of all major components.
- C. Shop drawings, detailing integrated electronic communications network system including, but not limited to, the following:
 1. Station wiring arrangement
 2. Equipment cabinet detail drawing
- D. Wiring diagrams showing typical connections for all equipment
- E. Coordinate network ports, VLA, IP addressing, QoS, authentication, and cybersecurity requirements with Owner IT prior to procurement and configuration.

1.04 QUALITY ASSURANCE

A. ALL ITEMS OF EQUIPMENT SHALL BE DESIGNED BY THE MANUFACTURER TO FUNCTION AS A COMPLETE SYSTEM AND SHALL BE ACCOMPANIED BY THE MANUFACTURER'S COMPLETE SERVICE NOTES AND DRAWINGS DETAILING ALL INTERCONNECTIONS.

THE CONTRACTOR SHALL BE AN ESTABLISHED COMMUNICATIONS AND ELECTRONICS CONTRACTOR THAT MAINTAINS A LOCALLY RUN AND OPERATED BUSINESS AND HAS DONE SO FOR AT LEAST 10 YEARS. THE CONTRACTOR SHALL BE A DULY AUTHORIZED DISTRIBUTOR OF THE EQUIPMENT SUPPLIED WITH FULL MANUFACTURER'S WARRANTY PRIVILEGES.

THE CONTRACTOR SHALL SHOW SATISFACTORY EVIDENCE, UPON REQUEST, THAT HE OR SHE MAINTAINS A FULLY EQUIPPED SERVICE ORGANIZATION CAPABLE OF FURNISHING ADEQUATE INSPECTION AND SERVICE TO THE SYSTEM. THE CONTRACTOR SHALL MAINTAIN AT HIS OR HER FACILITY THE NECESSARY SPARE PARTS IN THE PROPER PROPORTION AS RECOMMENDED BY THE MANUFACTURER TO MAINTAIN AND SERVICE THE EQUIPMENT BEING SUPPLIED.

1.05 SINGLE SOURCE RESPONSIBILITY

A. EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE, ALL EQUIPMENT SUPPLIED SHALL BE THE STANDARD PRODUCT OF A SINGLE MANUFACTURER OF KNOWN REPUTATION AND A MINIMUM OF 30 YEARS OF EXPERIENCE IN THE INDUSTRY. THE SUPPLYING CONTRACTOR SHALL HAVE ATTENDED THE MANUFACTURER'S INSTALLATION AND SERVICE TRAINING CLASSES. A CERTIFICATE OF THIS TRAINING SHALL BE PROVIDED WITH THE CONTRACTOR'S SUBMITTAL.

1.06 SAFETY / COMPLIANCE TESTING

- A. The communications system and its components shall, where applicable, bear the label of a Nationally Recognized Testing Laboratory (NRTL), such as Environmental Technology Laboratory (ETL), and shall be listed by their re-examination service. All work must be completed in strict accordance with all applicable electrical codes, under direction of a qualified and factory-approved contractor, and to the approval of the owner.

1.07 IN-SERVICE TRAINING

- A. The contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments, which will facilitate the training of individuals in the operation of this system. User Guides shall be provided at the time of this training.

1.08 WIRING

A. HORIZONTAL CABLING: PROVIDE (1) CAT 6 CMP PLENUM CABLE FROM EACH IP INTERCOM ENDPOINT TO THE NEAREST IDF/MDF AND TERMINATE ON NEW PATCH PANELS PER SECTION 271000. PROVIDE LABELING AT BOTH ENDS PER TIA-606/SECTION 27100

B. POE: PROVIDE POE POWER WHERE SUPPORTED; WHERE ENDPOINTS REQUIRE LOCAL POWER, PROVIDE DEDICATED CIRCUITS AS INDICATED AND COORDINATE WITH DIVISION 26.

1.09 PROTECTION

A. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRANSIENT PROTECTION ON THE AC POWER FEED AND ON ALL STATION LINES LEAVING OR ENTERING THE BUILDING.

B. THE CONTRACTOR SHALL NOTE ON THEIR SYSTEM DRAWINGS, THE TYPE AND LOCATION OF THESE PROTECTION DEVICES AND ALL WIRING INFORMATION. SUCH DEVICES ARE NOT TO BE INSTALLED ABOVE THE CEILING.

1.10 SERVICE AND MAINTENANCE

A. THE CONTRACTOR SHALL PROVIDE A FIVE-YEAR EQUIPMENT HARDWARE WARRANTY OF THE INSTALLED SYSTEM AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP. ALL MATERIALS SHALL BE PROVIDED AT NO EXPENSE TO THE OWNER DURING NORMAL WORKING HOURS. THE WARRANTY PERIOD SHALL BEGIN ON 1ST OF THE MONTH FOLLOWING THE DATE OF SHIPMENT.

B. THE CONTRACTOR SHALL, AT THE OWNER'S REQUEST, MAKE AVAILABLE A SERVICE CONTRACT OFFERING CONTINUING FACTORY AUTHORIZED SERVICE OF THIS SYSTEM AFTER THE INITIAL HARDWARE AND SOFTWARE WARRANTY PERIODS.

C. SYSTEM SHALL INCLUDE SOFTWARE MAINTENANCE THAT INCLUDES BUG FIXES AND NEW FEATURE RELEASES FOR A PERIOD OF SIX YEARS.

D. THE SYSTEM MANUFACTURER SHALL MAINTAIN ENGINEERING AND SERVICE DEPARTMENTS CAPABLE OF RENDERING ADVICE REGARDING INSTALLATION AND FINAL ADJUSTMENT OF THE SYSTEM.

PART 2 - SYSTEM SPECIFICATION**2.01 MANUFACTURERS**

- A. Manufacturers, subject to compliance with requirements specifications, provide the following system, as used for basis of design:
1. Bogen Nyquist E7000 Series Educational System manufactured by Bogen Communications LLC

11.01 THE SPECIFYING AUTHORITY MUST APPROVE ANY ALTERNATIVE SYSTEM 10 DAYS PRIOR TO BID DAY.

- A. The intent is to establish a standard of quality, function, and features. It is the responsibility of the contractor to ensure that the proposed product meets or exceeds every standard set forth in these specifications.
- B. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

2.02 EQUIPMENT**ANALOG STATION BRIDGE**

- A. 24 station support
- B. 120W of total available power; max. 40W per any individual port
- C. 25 Volt Speakers(s)
- D. Analog Call Switch(s)
- E. Software programmable configuration and operation
- F. Rack mounted, wall mounted, or shelf mounted
- G. CAN Bus 2.0 interface for future support for NQ-E7020/NQ-E7020-G2 DCS

MATRIX MIXER PRE-AMPLIFIER

No less than four Line/Microphone Level Inputs used for:

1. CD Player
2. AM/FM Tuner
3. Push-to-Talk Paging Microphone
4. MP3 Player
5. Digital AES/EBU (AES3) input

- A. Line Level output to drive external amplifier
- B. Software programmable configuration and operation
 1. Push-to-Talk Channel
 2. Push-to-Talk Type
 3. Push-to-Talk Zone
 4. Mixer Channels

C. MIXER CHANNELS WALL OR SHELF MOUNTED

INPUT/OUTPUT CONTROLLER

- A. Eight Dry Contact Inputs
- B. Eight Open Collector Outputs
- C. Software programmable configuration and operation including:
 1. Contact Type
 2. Extension
 3. Name
 4. Close Interval
 5. Actions including:
 - a. Audio
 - b. Alarm
 - c. Announcement
 - d. Disable-Audio
 - e. Other
 - f. Tone
 - g. Enable-Audio
 6. Action ID
 7. Zones
 8. Close Extension
 9. Dashboard Type
 10. Dashboard Title
 11. Dashboard Scope
 12. Dashboard Text
 13. Dashboard Style
 14. Email
- D. Wall or shelf mounted

STATION EQUIPMENT

NQ-T1100 VOIP ADMIN PHONE – COLOR TOUCH DISPLAY (AKA ADMIN STATION)

NQ-T1000/NQ-T2000 VOIP STAFF PHONE – LCD DISPLAY (AKA STAFF STATION)

NQ-S1810WT-G2 VOIP WALL BAFFLE SPEAKERS WITH TALKBACK

NQ-S1810CT-G2 VOIP CEILING SPEAKERS WITH TALKBACK

NQ-E7020/NQ-E7020-G2 DIGITAL CALL SWITCH

CSD2X2U DROP-IN CEILING SPEAKER

CA15C OR CA21B ANALOG CALL SWITCH

LIGHTSPEED TOPCAT (TCN) EQUIPMENT

TOPCAT ALL-IN-ONE CEILING AUDIO SYSTEM WITH INTEGRATED AMPLIFIER, SPEAKERS AND DECT 2-WAY WIRELESS AUDIO COMMUNICATION

FLEXMIKE (FMN) WIRELESS PENDANT MICROPHONE

OPTIONAL SHAREMIKE (SMN) WIRELESS HANDHELD MICROPHONE

FSC MICROPHONE CRADLE CHARGER

WIRELESS DECT (1.9 GHZ) MEDIA CONNECTOR WITH 2-WAY AUDIO INTERFACE.

OPTIONAL EQUIPMENT

TELEPHONY INTERFACE DEVICE(S) FOR FXO/FXS ANALOG PORT CONNECTIVITY

2.03 COMPONENTS AND DESCRIPTIONS

- A. The intercom system shall be a software-based VoIP paging and intercom system.
- B. The system must be capable of supporting existing IP wiring, 25-volt speakers and analog call-switches, and equivalent competitive systems utilizing the existing architectural numbering scheme. The VoIP capabilities of the system will enable the support of the features across the various appliances within the facility. The following sections define how the system handles each of the features in the system. Systems that do not allow the reuse of existing wiring or numbering scheme shall not be deemed acceptable. Systems that do not allow appliances to be seamlessly integrated via the LAN are not considered equal.

SERVER SOFTWARE

THE SERVER SOFTWARE SHALL BE INSTALLED ON A DEDICATED DEALER OR CUSTOMER SUPPLIED SERVER.

- A. Minimum Server Requirements
- B. Debian Linux OS (AMD 64-bit version) release 8.4.x – 8.8.0
- C. Quad-core Intel-based processor running at 3.0 GHz or higher
- D. 8 GB RAM
- E. One 250 GB disk drive
 - 1. Redundant Array of Independent Disks (RAID) is recommended for redundancy and high availability.
 - 2. Consider using a larger drive if large amounts of audio (for example, voice mail, announcements, recordings, and music) are being stored on the system. Other factors that should be considered are:
 - a. How often will backups be performed?
 - b. Will the system be backed up locally or remotely on a detachable drive, SAN/NAS, or NFS?
 - c. How many users will have voicemail ability?
 - d. How long will voicemail messages be stored?
 - e. Will voicemail messages be part of the local system backups?
- F. NIC 10/100/1000 MB Ethernet port
- G. One or more PCI/PCI Express (PCIe) slots if telephony network connectivity other than, or in addition to, SIP trunking

- H. One or more PCI/PCIe type third-party telephony interface cards (for example, FXO, FXS, etc.) if telephony network connectivity other than, or in addition to, SIP trunking

AUDIO SHALL BE TRANSMITTED BETWEEN THE SERVER AND THE APPLIANCES USING THE CUSTOMER SUPPLIED LAN/WAN USING BOTH G.722 AND OPUS 48K AUDIO ENCODING AND STREAMING TECHNOLOGY TO DELIVER HIGH-DEFINITION AUDIO QUALITY. SYSTEMS THAT DO NOT USE G.722 AND OPUS FOR AUDIO ENCODING AND STREAMING SHALL NOT BE DEEMED EQUIVALENT.

THE SERVER SOFTWARE AND APPLIANCES SOFTWARE SHALL BE UPGRADEABLE VIA THE WEB UI.

IT SHALL BE POSSIBLE FOR A FACILITY TO MAKE "STATION-TO-STATION" CALLS AND "REMOTE FACILITY" ALL-CALL PAGES TO A SINGLE FACILITY OR TO ALL FACILITIES IN A DISTRICT VIA THE WEB UI OR AN ADMIN STATION. SYSTEMS THAT REQUIRE REMOTE VIEWING SOFTWARE OR OTHER APPLICATION SOFTWARE TO BE INSTALLED/LOADED ON TO ADDITIONAL SERVERS OR PCS TO MAKE STATION-TO-STATION CALLS AND REMOTE FACILITY ALL-CALL OR DISTRICT PAGING SHALL NOT BE CONSIDERED EQUIVALENT.

THE SERVER SOFTWARE IS DESIGNED TO HANDLE ALL FACILITY AND DISTRICT-WIDE COMMUNICATIONS, INCLUDING BUT NOT LIMITED TO, INTER-FACILITY INTERCOM CALLING AND PAGING, DISTRICT-WIDE EMERGENCY ALL-CALL AND LOCAL FACILITY POINT-TO-POINT CALLS. VIA THE WEB UI, EVERY FACILITY SHALL BE CONFIGURED WITH THE IP ADDRESSES OF ALL THE OTHER REMOTE FACILITIES WITHIN THE DISTRICT.

SHALL BE ABLE TO SUPPORT AN UNLIMITED NUMBER OF FACILITIES

THE VOICE QUALITY OF THE FACILITY CALLS MAY VARY BASED ON THE WAN CONDITIONS. THE MAXIMUM NETWORK BANDWIDTH THAT ALL-CALL AND ZONE PAGING USES IS 64 KBPS (MULTICAST G.722), AND INTERCOM CALLS USE 128 KBPS (UNICAST, G.722).

THE SYSTEM SHALL FACILITATE THE REPETITIVE PLAYING OF NORMAL OR EMERGENCY AUDIO TONES OR ANNOUNCEMENTS DIRECTED TO A PAGING ZONE UNTIL STOPPED BY THE USER VIA THE WEB UI, AN ADMIN STATION, OR A DRY CONTACT CLOSURE CONNECTED TO THE I/O CONTROLLER NQ-E7010.

A BUILT-IN MASTER CLOCK SHALL BE INCLUDED TO AUTOMATICALLY CONTROL CLASS CHANGE BELLS OR OTHER TIME-BASED SIGNALS. THE MASTER CLOCK SHALL HAVE AN UNLIMITED NUMBER OF EVENTS THAT MAY BE PROGRAMMED INTO ANY OF THE UNLIMITED NUMBER OF SCHEDULES, AND UNLIMITED NUMBER OF HOLIDAYS. THE SCHEDULES SHALL BE NAMEABLE FOR EASY SELECTION WHEN ASSIGNING SCHEDULES TO DAYS OR OVERRIDING A SCHEDULE.

NETWORK TIME SYNCHRONIZATION. THE SYSTEM SHALL BE CAPABLE OF PERIODICALLY UPDATING/SYNCHRONIZING THE PROCESSOR'S TIME WITH A NETWORK TIME SERVER RUNNING NETWORK TIME PROTOCOL (NTP) VIA THE SCHOOL'S LAN NETWORK. SYSTEMS THAT DO NOT PROVIDE NETWORK TIME SYNCHRONIZATION WILL NOT BE DEEMED EQUIVALENT. THE SERVER CAN BE THE NTP SERVER FOR OTHER DEVICES ON THE LAN SUCH AS IP CLOCKS AND OTHER IP DEVICES.

SERVER APPLICATION

THE SOFTWARE IS INSTALLED ONTO THE SERVER, AND UPON BOOT-UP, USERS CAN LOG IN TO THE SERVER APPLICATION VIA A WEB BROWSER THAT SUPPORTS WEBRTC. SYSTEMS THAT REQUIRE COM PORT REDIRECT SOFTWARE, CLIENT PC APPLICATION, SOFTWARE OR SERIAL-TO-ETHERNET ADAPTERS FOR USER ACCESS ARE NOT DEEMED EQUAL. COMMUNICATIONS BETWEEN THE SERVER AND THE WEB UI(S) SHALL BE VIA SECURE HYPER TEXT TRANSFER PROTOCOL (HTTPS) CONNECTIONS (I.E., HTTPS://).

THE WEB UI SHALL BE CONFIGURED WITH FOUR DIFFERENT DEFAULT USER ACCESS LEVELS, BASED ON FOUR UNIQUE USER ROLES. SYSTEMS THAT DO NOT PROVIDE UNLIMITED ACCESS LEVELS AND UNLIMITED USER ROLES ARE NOT CONSIDERED EQUAL.

- A. The four default roles shall be: admin, optech, operator, and user. These roles provide a starting point/example for administrators to create additional roles.

ONLY A USER ASSIGNED THE ADMIN ROLE SHALL BE ABLE TO PROVIDE ACCESS TO USERS, GIVING THEM THE ABILITY TO CREATE, DELETE, EDIT, AND VIEW SYSTEM PARAMETERS.

ONLY AN ADMINISTRATOR SHALL HAVE THE ABILITY TO ADJUST ROLES AND CLASS OF SERVICE (COS) OF USERS. THE ROLES DETERMINE IF USERS CAN VIEW THE DEFINABLE DATA OBJECTS THAT CAN INCLUDE CONFIGURATION, ALARMS, AND PERFORMANCE DATA AND IF USERS CAN PERFORM CERTAIN OPERATIONS BASED ON THE USER'S ROLE AND STATION'S COS. ALL CHANGES TO ROLES AND COS ARE EFFECTIVE IMMEDIATELY, WITHOUT THE NEED TO RESTART THE BROWSER OR REBOOT THE SERVER.

THE WEB UI DASHBOARD SHALL PROVIDE FULL ADMINISTRATIVE CAPABILITIES TO MANAGE/OPERATE THE FOLLOWING SYSTEM FEATURES:

- A. Calling/Paging – User can initiate a call by accessing the directory or by dial pad and can receive calls, make Zone Page and All-Call Page, make a Prepending Page, Emergency All-Call paging.
- B. Call Forwarding
- C. District Calling/Paging – Used for District Facility Page, District All-Call, and District Emergency All-Call.
- D. Tones/Announcements – Used to play Tones, Announcements, and Alarms.
- E. View This Week's Schedule – Used to show the current interactive Bell Schedule.
- F. Audio Distribution – Used for entire facility or Audio Zones
- G. Enable or Disable Audio – Used to place the system into Page Exclusion mode (i.e., "mute" the system) when a contact closure is supplied from the fire alarm panel. Systems that do not provide this capability are deemed not equal.
 - 1. Systems that require application software to be installed on a PC to manage the above features shall not be considered equivalent.

TO FACILITATE INSTALLATION AND CONFIGURATION OF THE SYSTEM, ADDITIONAL WEB UI MENUS ARE REQUIRED. THE MENUS SHALL ONLY BE VISIBLE TO USERS WITH THE CORRECT ROLES AND COS. THE NAVIGATION MENUS FOUND ON THE WEB UI SHALL BE AS FOLLOWS:

- A. System Parameters – Allow installers to adjust core system parameters.
- B. Zones – Allow installers to create and modify Paging, Time, and Audio Zones.
- C. Schedules – Allow installers and administrators to create bell schedules for the facility, predefine alternative schedules to run, prevent the bells from ringing on a holiday, and schedule an announcement to play. The system shall allow an unlimited number of schedules to operate simultaneously within a facility.
- D. Admin Groups – Allow the installer to create, modify, and delete software groupings of admin phones that can ring when a station calls in with a call switch.
- E. CoS Configuration – Allow the installer to create, modify, and delete CoS groups that control station access to the following features: Call-in Level, Zone Paging, All-Call Paging, Emergency All-Call, Inter-Facility Call/Page, Audio Distribution, Remote Pickup, Join Conversation, Call Forwarding, Walking Class of Service, External Call Routing, Call Transfer/3-way Calling, Manually Activate Tone Signals, Call Any Station, Manage Recording, Monitor Calls, Monitor Locations, Conference Admin, Conference User, Voicemail, Record Calls, Activate Alarm Signals, Disable Audio, Enable Audio, Allow Callee Auto-answer, District Paging, and Inter-Facility Features.
- F. Stations – Allow the installer to set up, modify, and delete stations; set up Page Exclusion; view Station Status; and add New Stations.
- G. Bridge Devices – Allow the installer to configure the ASBs.
- H. Audio – Allow the installer to upload and manage Announcements, Playlists, Songs, and Tones. The system must support the uploading of both MP3 and WAV files and make Audio file management simple for users. Systems that limit the size of Audio files shall not be considered equal.
- I. Users – Allow the installer to manage users by giving them the proper roles and assign extensions if needed.

- J. Roles – Allow the installer to grant users rights to Create, Delete, Edit, Restart Server, Sort Menu, Systems Update, Manage, Import/Export, Restore, Settings, or View.
- K. Facilities – Allow the installer to set up the district wide facilities for remote paging and calling.
- L. Outside Lines – Allow the installer to set up FXS and FXO ports for inbound and outbound system calling.
- M. SIP Trunks – Allow the installer to set up SIP trunks into the facility for inbound or outbound calling.
- N. Call Details – Allow the installer to review the historical system activities that can be used for incident investigation or system troubleshooting.
- O. System Backup/Restore – Allow the installer to preform system backups or restores and allow the backups to be schedule to run automatically.
- P. System Logs – Allow the installer to view and export Server, Intercom, and Web Server logs that can be used for troubleshooting and technical assistance.
- Q. Paging Exclusions – Allow the installer to view and edit stations that are excluded from paging.
- R. Firmware – Update firmware for speakers and appliances.
- S. Help – Provide information about the system, online help topics, and System Administrator Manual.
1. .
- T. Systems that do not provide these menus as a minimum shall not be considered equal.

ANALOG STATION BRIDGE

THE ASB ALLOWS FACILITIES WITH EXISTING MULTICOM OR QUANTUM OR COMPATIBLE INTERCOM SYSTEMS TO UPGRADE. EACH ASB SUPPORTS UP TO 24 SPEAKERS AND CALL SWITCHES WITH 120 WATTS OF EMBEDDED 25 VOLT POWER. THE ASB IS DESIGNED TO DRIVE ANY COMBINATION OF 25 VOLT SPEAKERS AND HORNS. FEATURES INCLUDE:

- A. 10/100 Ethernet
- B. 24 station interface - Supports connections to as many as 24 individual 25 Volt speakers with one 25 Volt speaker connection per interface
- C. 24 dry contact closure-type analog Call Switch connections
- D. Half-duplex talkback using speaker as pickup
- E. CAN Bus 2.0 Interface for future NQ-E7020/NQ-E7020-G2 DCS support and other accessory devices
- F. 120W of available power across all 24 channels; maximum 40W per channel
- G. 2 x RGB full spectrum LED status indicators
- H. USB 2.0 host port, type A connector (future use)
- I. Universal mains supply (100VAC – 240VAC)

THE ASB SHALL BE RACK, WALL, OR SHELF MOUNTABLE AND SHALL INCLUDE THE REQUIRED MOUNTING BRACKET HARDWARE.

MATRIX MIXER PRE-AMPLIFIER (MMPA)

THE MMPA IS DESIGNED TO BRING EXTERNAL AUDIO INTO THE SYSTEM. THE MMPA INTERFACES WITH A LOCAL SOUND SYSTEM BY ACCEPTING ONE OR MORE LOCAL AUDIO SOURCES, MIXING THEM, AND OUTPUTTING THEM TO EITHER, A) THE NETWORK FOR AUDIO DISTRIBUTION, OR B) THE MMPA'S LINE LEVEL OUTPUT THAT CAN THEN BE INSERTED INTO AN EXTERNAL AMPLIFIER TO DRIVE LOCAL SOUND SYSTEM IN GYMS, CAFETERIAS, AUDITORIUMS, ETC. THE MMPA SUPPORTS THE FOLLOWING:

- A. Four software selectable MIC or Line Input channels via three XLR connectors and four sets of screw-terminals. Any single input channel shall be capable of being configured to support a Push-to-Talk microphone. Channel-1 can be configured as a digital AES/EBU (AES3) input. Line/Monitor output – The MMPA becomes a station on the system, allowing users to call it directly or to include it in any of the Page, Time, or Audio Zones.

- B. The MMPA shall support the following features: Line-Level output to drive input on a local amplifier; One USB 2.0 host port (Type-A connector) for future use; 2 x RGB full spectrum LED status indicators.
- C. The MMPA is powered by Universal mains supply (100VAC – 240VAC).
- D. The MMPA shall be wall or shelf mountable and shall include the required mounting bracket hardware.

THE DEALER SHALL SUPPLY A MINIMUM OF ONE MMPA THAT ALLOWS FOR UP TO FOUR USER-CONFIGURABLE AUDIO INPUTS. THE MMPA SHALL SUPPORT LINE, MIC, AND DIGITAL AES/EBU (AES3) INPUT SOURCES. THE SYSTEM SHALL SUPPORT AN UNLIMITED NUMBER OF MMPAS.

INPUT/OUTPUT CONTROLLER

THE I/O CONTROLLER IS DESIGNED TO ACCEPT CONTACT CLOSURE INPUTS AND ACTIVATE OPEN-COLLECTOR OUTPUTS TO DRIVE RELAY COILS.

- A. PoE Class-1; IEEE 802.3af compliant with Optional 48VDC 15W power supply
- B. Eight Dry Contact Closure Inputs that can be used with Fire Alarm Override Relays, external event triggers (for example, Lockdown Buttons, etc.)
- C. Eight Relay Driver Outputs (Open-Collector) for use with Clock Correction (Sync Pulse), response to contact closure inputs, etc.
- D. USB 2.0 host port, Type-A connector (future use)
- E. 2 x RGB full spectrum LED status indicators

THE I/O CONTROLLER SHALL SUPPORT WALL OR SHELF-MOUNTING OPTIONS AND SHALL INCLUDE THE REQUIRED MOUNTING BRACKET HARDWARE.

THE I/O CONTROLLER SHALL BE DESIGNED FOR WALL OR SHELF MOUNTING.

VOIP ADMIN PHONE – COLOR TOUCH DISPLAY (ADMIN STATION)

THE ADMIN STATION SHALL HAVE THE FOLLOWING FEATURES:

- A. 7" 800 x 480-pixel color display with backlight
- B. Touch screen display for one touch operation
- C. Full-duplex hands-free speakerphone with AEC
- D. Call hold, mute
- E. Redial, call return, auto answer
- F. PoE (802.3af) Class-3 support
- G. Headset with EHS support
- H. Dual Gigabit Ethernet ports
- I. Desk Mountable
- J. Optional Wall mount capable

THE ADMIN STATION DISPLAY PANEL SHALL SHOW THE TIME OF DAY AND DAY OF WEEK, THE CURRENT BELL SCHEDULE(S), AND THE STATION NUMBERS AND CALL-IN PRIORITY OF STAFF STATIONS THAT ARE CALLING IN. DEPENDING UPON THE SYSTEM PROGRAMMING, AN ADMIN STATION SHALL DISPLAY MENUS TO ACTIVATE ZONE PAGING, ALL-CALL PAGING, EMERGENCY ALL-CALL PAGING, DISTRICT ALL-CALL PAGING, ALARM SIGNALS, AND EXTERNAL FUNCTIONS.

THE ADMIN STATION SHALL BE CAPABLE OF CALLING EITHER THE LOUDSPEAKER OR STAFF STATION AT EACH CLASSROOM LOCATION.

- A. The Admin Station shall display the classroom number of any station that calls 911. This allows front-office administrators to direct emergency personnel to the correct physical location in the building when they arrive. If a system is not connected to outside phone lines, then 911 calls can be routed to a designated station within the facility. The system shall automatically record all 911 calls made from any station. The 911 call recording shall begin as soon as 911 is dialed and continue until the call is terminated. Recorded calls shall be maintained on the system for later playback review and/or retrieval by authorized personnel and/or authorities. Systems that do not provide this feature will not be deemed equal.

STAFF VOIP PHONE – LCD DISPLAY (STAFF STATION)**STAFF STATION SHALL HAVE THE FOLLOWING FEATURES:**

- A. 132 x 64-pixel graphical LCD with backlight
- B. Two-port 10/100M Ethernet Switch
- C. Full-duplex hands-free speakerphone with AEC
- D. Call hold, mute
- E. Redial, call return, auto answer
- F. PoE (802.3af) Class-3 support
- G. Dual color (red or green) illuminated LEDs for line status information
- H. Two 10/100M Ethernet ports
- I. Wall or desk mountable

THE CLASSROOM STAFF STATION SHALL BE CAPABLE OF THE FOLLOWING FEATURES DEPENDING ON HOW THE STATION COS IS CONFIGURED:

- A. Emergency intercom call – Staff Stations shall be capable of making an Emergency intercom call, which is then routed to the assigned Admin Station. This requires the display of the architectural number and call-in level on the Admin Station. Systems that do not provide this feature are not equivalent.
- B. Speed dial
- C. Toggle audio distribution on and off
- D. Call Forward activation and deactivation for All-Calls/Busy/No Answer/Busy or No Answer
- E. Conference Calling
- F. Transfer Call
- G. Dial Administrative station– Staff Stations can allow the user to dial the station number to call to the Admin phone or its associated speaker. The call shall be routed to the Admin Station showing the architectural number that is calling.
- H. Emergency All-Call – An emergency page shall be broadcasted to all the stations in the facility.
- I. Place Outside Call
- J. Remote Answer
- K. Single-Zone/All-Station Page
- L. Call Waiting Tone for Outside Calls – It shall be possible to feed the call waiting tone to the Administrative Phone during a conversation.
- M. Transfer call from VoIP speaker in classroom down to an associated Staff Station
- N. Transfer call from analog speaker in classroom down to an associated Staff Station
- O. Transfer call from VoIP Staff Station in classroom up to an associated VoIP speaker
- P. Transfer call from Staff Station in classroom up to an associated analog speaker

VOIP CEILING SPEAKER WITH TALKBACK AND NQ-S1810WT-G2 VOIP WALL BAFFLE SPEAKER WITH TALKBACK

THE VOIP SPEAKERS SHALL NOT REQUIRE TRADITIONAL INTERCOM WIRING OR TRANSFORMER TAPS TO MANUALLY SET OR ADJUST VOLUME. SIMPLY CONNECTING THEM VIA CAT 5 TO A POE SWITCH OR POE INJECTOR ON THE SYSTEM'S NETWORK SHOULD ALLOW THEM TO BE READY TO PROGRAM INTO THE SYSTEM. VOLUME IS CONTROLLED VIA THE WEB UI. ALL AUDIO APPLIANCES SHALL USE A WIDEBAND OPUS CODEC FOR AUDIO DISTRIBUTION. USE OF THE OPUS CODEC, ALONG WITH G.722, ALLOWS FOR HIGH-DEFINITION AUDIO. VOIP SPEAKERS SHALL BE EQUIPPED WITH A DIGITAL MEMS MICROPHONE TO ACHIEVE SUPERIOR TALKBACK AUDIO. VOIP SPEAKERS THAT UTILIZE THE SPEAKER AS THE MICROPHONE SHALL NOT BE CONSIDERED EQUAL.

THE NQ-S1810WT-G2 VOIP WALL BAFFLE SPEAKER WITH TALKBACK DESIGN FACILITATES MOUNTING THE SPEAKER UP TO FOUR DIFFERENT WAYS:

- A. 2x2 Wall Mount
- B. Box Mount
- C. Corner Mount
- D. Tilted Mount

THE VOIP SPEAKERS PROVIDE CAN BUS 2.0 INTERFACE SUPPORT FOR THE NQ-E7020/NQ-E7020-G2 DCS.

THE VOIP SPEAKERS SHALL BE POE IEEE 802.3AF COMPLIANT. VOIP SPEAKERS MAY BE PLACED UP TO 100 METERS (328 FEET) FROM A POE SWITCH OR POE INJECTOR.

SOFTWARE PROVIDES ADJUSTABLE AUDIO OUTPUT LEVEL.

DHCP WITH OPTION 66 IS SUPPORTED FOR EASY NETWORK DEPLOYMENT.

THE VOIP SPEAKERS PROVIDE VLAN SUPPORT.

THE VOIP SPEAKERS ARE PRE-ASSEMBLED FOR FASTER INSTALLATION.

EACH VOIP SPEAKER INCLUDES A10 WATT INTEGRATED POWER AMPLIFIER.

EACH VOIP SPEAKER HAS A DIGITAL MEMS MICROPHONE TO SUPPORT TALKBACK.

DIGITAL CALL SWITCH

THE DCS HAS BEEN EXCLUSIVELY DESIGNED FOR USE WITH APPLIANCES EQUIPPED WITH A CAN BUS 2.0 INTERFACE. THE CAN BUS 2.0 INTERFACE PROVIDES POWER AND SIGNAL, AND MULTIPLE DCSS CAN CONNECT TO EACH CAN BUS 2.0 INTERFACE. THE DCS FITS INTO A SINGLE GANG/ LOW VOLTAGE INSTALLATION USING STANDARD 'DECORA-PLATE' COVERS (SUPPLIED).

THE DCS IS A CAPACITIVE TOUCH BUTTON DESIGN, SO IT DOESN'T HAVE ANY MOVING PARTS TO WEAR OUT. THE BEHAVIOR OF THIS SWITCH IS SOFTWARE DEFINABLE. SYSTEMS THAT REQUIRE MEMBRANE OR MECHANICAL ROCKER STYLE CALL SWITCHES THAT CAN WEAR OUT OVER TIME SHALL NOT BE ACCEPTABLE.

NORMAL CALL INITIATION INVOLVES TOUCHING THE DCS ONE TIME. WHEN A USER TOUCHES THE BUTTON ON THE DCS ONCE, ONE OF THE THREE LED SEGMENTS WILL LIGHT UP GREEN, A NORMAL CALL WILL BE PLACED, AND THE LIGHT WILL START BLINKING GREEN. THIS IS THE INDICATION THAT THE NORMAL CALL HAS BEEN PLACED TO THE VOIP ADMIN PHONE OR TO A GROUP OF VOIP ADMIN PHONES AND THAT THE PHONE OR PHONES ARE RINGING.

URGENT CALL INITIATION INVOLVES TOUCHING THE DCS ONE TIME. WHEN A USER TOUCHES THE BUTTON ON THE DCS ONCE, ONE OF THE THREE LED SEGMENTS WILL LIGHT UP YELLOW, AN URGENT CALL WILL BE PLACED, AND THE LIGHT WILL START BLINKING YELLOW. THIS IS THE INDICATION THAT THE URGENT CALL HAS BEEN PLACED TO THE VOIP ADMIN PHONE OR TO A GROUP OF VOIP ADMIN PHONES.

EMERGENCY CALL INITIATION INVOLVES TOUCHING THE DCS ONE OR THREE TIMES DEPENDING ON STATION PROGRAMMING. WHEN A USER TOUCHES THE BUTTON ON THE DCS ONCE OR THREE TIMES WITHIN THREE SECONDS, ALL THREE LED SEGMENTS WILL LIGHT UP RED, AN EMERGENCY CALL WILL BE PLACED, AND THE LIGHT WILL START BLINKING RED. THIS IS THE INDICATION THAT THE EMERGENCY CALL HAS BEEN PLACED TO THE VOIP ADMIN PHONE OR TO A GROUP OF VOIP ADMIN PHONES.

SINGLE PRESS EMERGENCY CALL, IF PROGRAMMED, INVOLVES TOUCHING THE DCS ONE TIME. WHEN A USER TOUCHES THE BUTTON ONCE, ALL THREE LED SEGMENTS WILL LIGHT UP RED ON THE DCS, AN EMERGENCY CALL WILL BE PLACED, AND THE LIGHT WILL START BLINKING RED. THIS IS THE INDICATION THAT THE EMERGENCY CALL HAS BEEN PLACED TO THE VOIP ADMIN PHONE OR TO A GROUP OF VOIP ADMIN PHONES.

NORMAL AND URGENT CALLS CAN EASILY BE UPGRADED TO AN EMERGENCY CALL AFTER THE DCS IS FLASHING BY TOUCHING THE BUTTON ON THE DCS ONE TIME. THE NORMAL OR URGENT CALL WILL BE CANCELED, AND AN EMERGENCY CALL WILL BE PLACED.

PRIVACY MODE – PRESSING AND HOLDING THE BUTTON ON THE DCS FOR FOUR SECONDS WILL PLACE THE SPEAKER INTO PRIVACY MODE. AS THE USER CONTINUALLY TOUCHES THE DCS BUTTON, ALL LED SEGMENTS WILL TURN PURPLE; WHEN ALL THREE LED SEGMENTS ARE LIT PURPLE, THE SPEAKER IS IN PRIVACY MODE. IF A CALL COMES INTO THE CLASSROOM WHEN THE STATION IS IN PRIVACY MODE, THE MICROPHONE WILL BE DISABLED; THE USER IN THE CLASSROOM CAN TOUCH THE DCS ONCE AND IT WILL ALLOW TALKBACK. ONCE THE CALL ENDS, THE CLASSROOM WILL NEED TO MANUALLY RETURN THE SPEAKER INTO PRIVACY MODE, IF DESIRED. THE USER CAN DISABLE PRIVACY MODE WITHOUT PLACING A CALL BY PRESSING AND HOLDING THE BUTTON ON THE DCS FOR FOUR SECONDS. AS THE USER CONTINUALLY TOUCHES THE DCS, ALL LED SEGMENTS WILL TURN BLUE. WHEN ALL THREE LED SEGMENTS ARE LIT BLUE, THE SPEAKER IS NO LONGER IN PRIVACY MODE. SYSTEMS THAT REQUIRE MECHANICAL OR MEMBRANE SWITCHES TO ACHIEVE PRIVACY MODE SHALL NOT BE CONSIDERED EQUAL.

THE COLORS SPECIFIED ABOVE ARE CREATED BY THREE RGB FULL SPECTRUM LED SEGMENTS TO PROVIDE INSTALLERS AND USERS WITH VISUAL STATUS AND FEEDBACK WHEN INSTALLING AND USING THE DCS. WHEN THE DCS IS BEING INSTALLED AND THE POWER IS CONNECTED BEFORE THE SIGNAL, THE LED WILL LIGHT RED. IT WILL ALSO LIGHT RED IF THE SPEAKER IN THE CLASSROOM STOPS COMMUNICATING WITH THE SERVER, INDICATING A PROBLEM WITH THE STATION.

IN ADDITION TO PROVIDING VISUAL CALL STATUS INDICATIONS, A CALL CONFIRMATION AUDIO FILE SHALL BE PLAYED ON THE ASSOCIATED LOUDSPEAKER WHEN A CALL IS PLACED VIA A DCS. THE THREE CALL-IN LEVELS SHALL HAVE DISTINCT AUDIO CONFIRMATION MESSAGES:

- A. Call Placed
- B. Urgent Call Placed
- C. Emergency Call Placed

EMERGENCY LINK TRANSFER – IF AN EMERGENCY CALL IS UNANSWERED BY THE VOIP ADMIN PHONE AND THE EMERGENCY LINK TRANSFER IS ACTIVE, THE EMERGENCY CALL WILL BE FORWARDED TO THE LOUDSPEAKER ASSOCIATED WITH THE EMERGENCY LINK STATION. ANY STATION EQUIPPED WITH A LOUDSPEAKER CAN BE PROGRAMMED AS THE EMERGENCY LINK STATION. SYSTEMS THAT DO NOT PROVIDE EMERGENCY LINK TRANSFER SHALL NOT BE CONSIDERED EQUAL.

ANALOG CALL SWITCH

THE MOMENTARY CALL SWITCH SHALL BE CAPABLE OF PLACING A COMBINATION OF NORMAL/URGENT/EMERGENCY CALLS BASED ON THE SOFTWARE CONFIGURATION OF THE CALL SWITCH.

NORMAL/EMERGENCY CALL CONFIGURATION: MAKING A NORMAL CALL IN THIS MODE INVOLVES PRESSING THE BUTTON ON THE CALL SWITCH ONCE. A CALL IS THEN PLACED TO THE DESIGNATED ADMIN STATION. AN EMERGENCY CALL INVOLVES PRESSING THE CALL SWITCH AT LEAST FOUR TIMES. THE EMERGENCY CALL IS THEN ROUTED TO THE DESIGNATED ADMIN STATION. IN BOTH SCENARIOS, THE CALLING STATION NUMBER AND CALL-IN LEVEL (NORMAL OR EMERGENCY) ARE DISPLAYED ON THE ADMIN STATION OR ON A GROUP OF ADMIN STATIONS. ADDITIONALLY, EMERGENCY CALLS CAN BE ROUTED TO AN ALTERNATIVE ADMIN STATION OR EMERGENCY LINK.

URGENT/EMERGENCY CALL CONFIGURATION: MAKING AN URGENT CALL IN THIS MODE INVOLVES PRESSING THE BUTTON ON THE CALL SWITCH ONCE. A CALL IS THEN PLACED TO THE DESIGNATED ADMIN STATION. AN EMERGENCY CALL INVOLVES PRESSING THE BUTTON ON THE CALL SWITCH AT LEAST FOUR TIMES. THE EMERGENCY CALL IS THEN ROUTED TO THE DESIGNATED ADMIN STATION. IN BOTH SCENARIOS, THE CALLING STATION NUMBER AND CALL-IN LEVEL (URGENT OR EMERGENCY) ARE DISPLAYED ON THE ADMIN STATION OR ON A GROUP OF ADMIN STATIONS. ADDITIONALLY, EMERGENCY CALLS CAN BE ROUTED TO AN ALTERNATIVE ADMIN STATION OR EMERGENCY LINK.

EMERGENCY ONLY CALL CONFIGURATION: MAKING AN EMERGENCY CALL IN THIS MODE INVOLVES PRESSING THE EMERGENCY CALL SWITCH WITH CALL LEVEL EMERGENCY ONE TIME. THE CALL IS THEN SWITCHED TO THE ADMIN STATION. THIS REQUIRES THE DISPLAY OF THE STATION NUMBER AND CALL-IN LEVEL ON THE ADMIN STATION OR ON A GROUP OF ADMIN STATIONS. ADDITIONALLY, EMERGENCY CALLS CAN BE ROUTED TO ANY ADMIN STATION, INCLUDING EMERGENCY LINK.

EMERGENCY LINK TRANSFER - IF AN EMERGENCY CALL GOES UNANSWERED BY THE ADMIN STATION AND THE EMERGENCY LINK TRANSFER IS ACTIVE, THE EMERGENCY CALL WILL BE FORWARDED TO THE LOUDSPEAKER ASSOCIATED WITH THE EMERGENCY LINK STATION. ANY STATION EQUIPPED WITH A LOUDSPEAKER CAN BE PROGRAMMED AS THE EMERGENCY LINK TRANSFER. SYSTEMS THAT DO NOT PROVIDE EMERGENCY LINK TRANSFER SHALL NOT BE CONSIDERED EQUAL.

IN ADDITION TO THE MECHANICAL CLICK OF A CALL SWITCH BUTTON PRESS, A CALL CONFIRMATION AUDIO FILE SHALL BE PLAYED ON THE ASSOCIATED LOUDSPEAKER WHEN A CALL IS PLACED. THE THREE CALL-IN LEVELS SHALL HAVE DISTINCT AUDIO CONFIRMATION MESSAGES:

- A. Call Placed
- B. Urgent Call Placed
- C. Emergency Call Placed

INSTRUCTIONAL AUDIO SYSTEM

ALL-IN-ONE CEILING AUDIO SYSTEM WITH INTEGRATED AMPLIFIER, SPEAKERS AND WIRELESS RECEIVER:

- A. Wireless communication: DECT Technology (1.9 GHz)
- B. Wireless transmission range: up to 200 ft (60m) open field
- C. Power output: 20 Watts RMS

- D. Acoustic frequency response: 60 Hz to 18 kHz -10dB
- E. AC Mains Power Input: 100-240V ~ 50/60Hz 1.5A
- F. DC Power Input: 24V/2.5A
- G. Signal-to-noise: >60 dB
- H. Total Harmonic Distortion: <1% @ 40 Watts (20W / Channel)
- I. Automatic power on when Flexmike is powered on and linked
- J. Dimensions (W x D x H): 24" x 12" x 3.7" (595mm x 295mm x 94mm)
- K. Weight: 13.5 oz. (6.1 kg)
- L. Controls:
 - 1. (1) Volume control with source selection for audio input and tone
 - 2. Page mute (PageFirst™) sensitivity level control
- M. Connections:
 - 1. (1) Direct AC mains power input
 - 2. (1) Optional DC Power Input
 - 3. (1) Audio input (Longer cable runs may require a ground loop isolator in order to prevent audio hum caused by a ground loop.)
 - 4. (1) S/PDIF Audio in from another Topcat
 - 5. (1) S/PDIF Audio out to another Topcat
 - 6. 6-pin euro-block system interface with:
 - 1) 24/70V page-sensing mute (PageFirst™)
 - 2) Contact closure input mute
 - 3) Contact closure output trigger
- N. Device Pairing: Infrared receiving diode to receive signal from microphone to initiate new device pairing process.

FLEXMIKE PENDANT-STYLE MICROPHONE / TRANSMITTER

- A. Description: the pendant-style Flexmike transmitter shall contain microphone volume control on the unit allowing users to adjust volume level from anywhere in the classroom. The Flexmike shall be capable of being worn around a teacher's neck as a hands-free microphone via the lavalier cord or to be used as a handheld student pass-around microphone. The Flexmike must be rechargeable via cradle charger or USB power. It must have a user replaceable, snap-in rechargeable battery pack.
- B. Lanyard: adjustable length with magnetic clasp
- C. Wireless communication: DECT Technology (1.9 GHz)
- D. Transmission range: up to 200 ft (60m)
- E. Audio distortion: <1%
- F. Integrated microphone type: unidirectional electret
- G. Digital audio interface: USB-C 2-way digital audio interface
- H. Earbud output: 3.5mm (for monitoring optional Activate Pods)
- I. Push button volume control: +/- 6dB (total range = 12 dB)
- J. Power: on/off/mute button
- K. Battery Power: 3.7V Li-Ion battery pack
- L. Battery run time: 8 hours (fully charged)
- M. Charging: via cradle charger or USB-C cable
- N. Cradle Charger: 2-slot drop-in cradle charger capable of charging 2 microphones
- O. Cradle Charger Power: 5V USB-C, charging off AC power or computer USB
- P. Pairing: IR emitter to enable one-button pairing with amplifier

- Q. Dimensions (L x W x H): 2.9" x 1.1" x 0.7" (74 x 28 x 18mm)
- R. Weight: 1.2 oz (34g)

OPTIONAL SHAREMIKE WIRELESS HANDHELD MICROPHONE

- A. Description: handheld wireless microphone for student pass-around use
- B. Wireless communication: DECT Technology (1.9 GHz)
- C. Transmission range: up to 200 ft (60m)
- D. Audio distortion: <1%
- E. Integrated microphone type: unidirectional electret
- F. Auxiliary Audio Input: 3.5mm
- G. Digital audio interface: USB-C 2-way digital audio interface
- H. Power: on/off/mute button
- I. Battery Power: 3.7V Li-Ion battery pack
- J. Battery run time: 8 hours (fully charged)
- K. Charging: via cradle charger or USB-C cable
- L. Cradle Charger: 2-slot drop-in cradle charger capable of charging 2 microphones
- M. Cradle Charger Power: 5V USB-C, charging off AC power or computer USB
- N. Pairing: IR emitter to enable one-button pairing with amplifier
- O. Dimensions (L x W x D): 6.0" x 1.0" x 1.0" (153 x 25 x 25mm)
- P. Weight (with batteries): 2.6 oz (73g)

WIRELESS MEDIA CONNECTOR

- A. Description: Wireless audio transmitter/receiver to integrate with classroom audio sources and send/receive the wireless to the Topcat system in the ceiling.
- B. Wireless Communication: DECT Technology (1.9 GHz)
- C. Analog Audio Inputs: (4) 3.5mm stereo jacks connect to classroom audio sources.
- D. Analog Audio Outputs: (2) 3.5mm jack with volume control
- E. Digital Audio Interface: 2-way digital audio via USB (USB-C)
- F. (1) Audio input volume control
- G. (1) Audio output volume control
- H. (1) Power button with LED
- I. (1) Tone control
- J. Audio frequency response: 80 Hz to 7 kHz \pm 3 dB
- K. Audio distortion: <1%
- L. DC Power Input: USB 5V/0.2A (type USB-C)
- M. Mounting: table-top or wall
- N. Dimensions (W x D x H): 7.6"x 4.1"x 1.1" (193 x 104 x 28mm)

2.04 SYSTEM CAPABILITIES

THE COMMUNICATION SYSTEM SHALL PROVIDE A COMPREHENSIVE COMMUNICATIONS NETWORK BETWEEN ADMINISTRATIVE AREAS AND STAFF LOCATIONS THROUGHOUT THE FACILITY.

THE SYSTEM SHALL PROVIDE NO LESS THAN THE FOLLOWING FEATURES AND FUNCTIONS:

SOFTWARE-BASED, STATE-OF-THE-ART, VOICE OVER IP (VOIP) PAGING AND INTERCOM SOLUTION.

THE SYSTEM SHALL PROVIDE A WEB USER INTERFACE (WEB UI) THAT SHALL ALLOW USERS TO CONFIGURE AND CONTROL THE SYSTEM, IN ACCORDANCE WITH THEIR ASSIGNED USER ROLE, FROM ANY WEB BROWSER ENABLED PC, MAC, OR ANDROID TABLET OR MOBILE DEVICE.

AMPLIFIED-VOICE COMMUNICATION WITH ANALOG LOUDSPEAKERS SHALL USE A SHIELDED AUDIO PAIR WHEN CONNECTED TO AN ASB.

THE SYSTEM SHALL SUPPORT ANY COMBINATION OF THE FOLLOWING VOIP PHONE STATION TYPES: NQ-T1100 ADMINISTRATIVE VOIP PHONE – COLOR TOUCH DISPLAY (ADMIN STATION) OR NQ-T1000/NQ-T2000 STAFF VOIP PHONE – LCD DISPLAY (STAFF STATION).

- A. All VoIP phone station types shall utilize the same type of field wiring.
- B. There shall be no limit to the number of Admin Stations that can be connected to a facility. Systems that require different head-end equipment to make Admin Stations function, or systems that limit the number of Admin or Staff Stations shall not be deemed acceptable.

FUTURE STATION ALTERATIONS SHALL ONLY REQUIRE THE STATION TYPE TO BE CHANGED IN SYSTEM PROGRAMMING. ALTERATIONS SHALL NOT REQUIRE FIELD WIRING OR SYSTEM HEAD-END ALTERATIONS, UNLESS AN ANALOG STATION DEVICE IS BEING REPLACED BY A VOIP STATION DEVICE OR VICE-VERSA.

THE SYSTEM SHALL BE A GLOBAL NON-BLOCKING SYSTEM. THE SYSTEM SHALL BE CAPABLE OF UNLIMITED AMPLIFIED INTERCOM PATHS PER FACILITY. TWO AMPLIFIED INTERCOM PATHS SHALL BE PROVIDED WITH EACH ASB FOR ITS COMPLEMENT OF 24 STATIONS. ALL HARDWARE, ETC., REQUIRED TO ACHIEVE THE NECESSARY NUMBER OF AMPLIFIED-VOICE INTERCOM CHANNELS FOR THIS SYSTEM SHALL BE INCLUDED IN THIS SUBMITTAL. ASB AMPLIFIED-VOICE INTERCOM CHANNELS SHALL PROVIDE VOICE-ACTIVATED SWITCHING. SYSTEMS REQUIRING THE USE OF A PUSH-TO-TALK SWITCH ON ADMINISTRATIVE TELEPHONES SHALL NOT BE ACCEPTABLE. THERE SHALL BE AN AUTOMATIC LEVEL CONTROL FOR RETURN SPEECH DURING AMPLIFIED-VOICE COMMUNICATIONS. THE INTERCOM AMPLIFIER SHALL ALSO PROVIDE CONTROL OVER THE VOICE SWITCHING SENSITIVITY AND DELAY TIMES OF THE VOX CIRCUITRY ON THE ASB.

THE SYSTEM SHALL PROVIDE 911 DIAL-THROUGH VIA OUTSIDE FXO/FXS LINES OR SIP TRUNKS TO ENSURE THAT ONE OR MORE LINES ARE ALWAYS AVAILABLE FOR 911 CALLS. THE 911 DIAL-THROUGH IS AVAILABLE TO ANY PROPERLY CONFIGURED STATION (VIA COS). WHEN A STATION DIALS 911, THE 911 CALL IS PROCESSED AS FOLLOWS:

- A. Call routes to an Emergency Group where the call can be answered.
- B. The 911 CO lines can be pre-configured and reserved. If the 911 reserved lines are busy, the normal CO lines will be connected to route the 911 calls. If all the normal CO lines are busy, then one of the ongoing calls shall be disconnected and the 911 call shall be placed.
- C. When 911 is dialed from any station, its designated Admin Station or Admin Group will receive a message that the station has dialed 911.
- D. The system shall automatically record all 911 calls made from any station. The 911 call recording shall begin as soon as 911 is dialed and shall continue until the call is terminated. Recorded calls shall be maintained on the system for later playback review and/or retrieval by authorized personnel and/or authorities.

IT IS OF HIGHEST IMPORTANCE THAT EMERGENCY CALLS FROM STATIONS RECEIVE PROMPT ATTENTION. THEREFORE, IT IS IMPORTANT THAT THERE BE AN ALTERNATIVE DESTINATION IN CASE THE EMERGENCY CALL DOES NOT GET ANSWERED AT THE PRIMARY LOCATION. DETAILS ARE AS FOLLOWS:

- A. Staff-generated Emergency Calls shall be treated as the second highest system priority. Therefore, all Emergency Calls shall announce at the top of the call queue of their respective Admin Station or Admin Group. Should that Emergency Call go unanswered for 15 seconds, the call shall be re-routed to an alternative speaker station. Then, a tone will prompt the caller to make a verbal call for help and announces to the Emergency link station "Emergency." During the transfer, the original administrative telephone shall continue to ring the distinctive Emergency Ring. Should the Emergency Transfer-to-Station have an associated Admin Station, it will also ring for the Emergency Call.
- B. The Emergency Transfer-to-Station shall be software configurable.
- C. Systems failing to transfer unanswered Emergency Calls or failing to immediately connect to the designated Admin Station shall not be deemed as equal.

THERE SHALL BE A FACILITY WIDE EMERGENCY ALL-CALL FEATURE. THE EMERGENCY ALL-CALL SHALL BE ACCESSED FROM DESIGNATED ADMIN STATIONS OR THE DASHBOARD OR BY THE ACTIVATION OF AN EXTERNAL CONTACT CLOSURE THAT SHALL GIVE A MICROPHONE INPUT EMERGENCY STATUS. THE EMERGENCY ALL-CALL FUNCTION SHALL HAVE THE HIGHEST SYSTEM PRIORITY AND SHALL OVERRIDE ALL OTHER LOUDSPEAKER-RELATED FUNCTIONS INCLUDING TIME TONES, NORMAL ALL-CALL OR ZONE PAGES, OR AUDIO DISTRIBUTION.

- A. Considering that Emergency Calls are to be treated with the highest level of concern, systems that do not regard Emergency All-Call with the highest priority shall not be deemed as equal.
- B. Upon touching the Directory icon, a menu shall appear on the Admin Station display prompting the user to select the desired menu.
- C. The Emergency All-Call shall capture the highest-level system priority and shall be transmitted over all speakers in the facility. It shall also be capable of activating an external control output, which can be used to activate external relays to automatically override volume controls, local sound systems, or strobe circuits.
- D. Systems without Emergency All-Call or systems with All-Call that cannot be activated by external means or that do not capture complete system priority or activate an external relay, shall not be acceptable.

THERE SHALL BE UNLIMITED ALARM TONES (FOUR BY DEFAULT). EACH MAY BE ACCESSED BY DIALING *91 AND THE TWO-DIGIT TONE NUMBER FROM ANY ADMIN STATION, SIP TRUNK, OR FXO/FXS SYSTEM INTERFACE. THESE ALARM TONES ARE SEPARATE FROM THE TIME TONES. USERS SHALL BE ABLE TO ADD AN UNLIMITED NUMBER OF ALARM TONES TO THE SYSTEM BY UPLOADING MP3 OR WAV FILES. SYSTEMS THAT DO NOT ALLOW THE USER TO UPLOAD MP3 AND WAV FILES TO CUSTOMIZE THE ALARM TONES OR NEED TO USE EXTERNAL ALARM/TONE GENERATORS OR SPECIAL SOFTWARE OR HAVE LESS THAN FOUR EMERGENCY ALARM TONES SHALL NOT BE ACCEPTABLE.

UPON TOUCHING THE DIRECTORY ICON ON AN ADMIN STATION, A MENU SHALL APPEAR ON THE DISPLAY PROMPTING THE USER TO SELECT FROM THE SUB-MENUS. THE ALARMS SUB-MENU IS THE FIRST AVAILABLE. THIS PRECLUDES THE USER FROM HAVING TO MEMORIZE COMPLICATED KEY SEQUENCES TO ACCESS ALARM TONES.

THERE SHALL BE UNLIMITED I/O CONTROLLER RELAY DRIVER OUTPUTS ACCESSIBLE AND CONTROLLABLE BY PROPERLY AUTHORIZED USERS VIA AN ADMINISTRATIVE WEB UI. THESE OUTPUTS REMAIN SET UNTIL ACCESSED AND RESET. USERS SHALL HAVE THE ABILITY TO REVIEW THE STATUS OF EACH RELAY DRIVER OUTPUT. USERS SHALL BE PROMPTED THROUGH FIELDS VIA A PLAIN ENGLISH MENU, PRECLUDING USERS FROM HAVING TO REMEMBER ANY DIALING SEQUENCES TO CONTROL THIS FEATURE. THE SYSTEM SHALL SUPPORT AN UNLIMITED NUMBER OF I/O CONTROLLERS, AND EACH I/O CONTROLLER SHALL BE ABLE TO INTERACT WITH ANY AND ALL OTHER I/O CONTROLLERS ON THE SYSTEM (I.E., AN INPUT ON ONE I/O CONTROLLER CAN TRIGGER AN OUTPUT ON ONE OR MORE DIFFERENT I/O CONTROLLERS). SYSTEMS THAT REQUIRE THE USER TO REMEMBER COMPLICATED DIALING SCHEMES OR PROMPT THE USER VIA CRYPTIC COMMANDS SHALL NOT BE ACCEPTABLE.

- A. The I/O Controller can create a contact closure when the following operations are performed in the system:
- a. 911 call placed
 - b. Audio Distributed
 - c. Alarm is played
 - d. Announcement is played
 - e. All-Call preformed
 - f. District All-Call performed
 - g. District-Emergency-All-Call
 - h. Emergency-Call
 - i. Emergency-All-Call
 - j. Audio-Disabled
 - k. Page

THE SYSTEM SHALL PROVIDE SOFTWARE CONTROLLED AND PROGRAMMABLE CONTROL OUTPUTS FOR EXTERNAL RELAY ACTIVATION FOR USE WITH STROBE LIGHTS, MAGNETIC LOCKS, CARD ACCESS SYSTEMS, MOTION DETECTORS, CAMERAS, OR ANY LOW-VOLTAGE, DRY CONTACT CREATING DEVICE. SYSTEMS USING DEDICATED SECURITY STATIONS FOR CONTROL OF EXTERNAL FUNCTIONS SHALL NOT BE ACCEPTABLE.

THE SYSTEM SHALL BE CAPABLE OF INTERFACING TO PSTN/PBX/IPBX VIA BOTH FXO/FXS LINE AND SIP TRUNK CONNECTIVITY.

THE SYSTEM SHALL BE CAPABLE OF PROVIDING EACH FACILITY (I.E., AN UNLIMITED NUMBER OF INCOMING FXO/FXS OR SIP TRUNK LINES THAT CAN BE DESIGNATED BY THE USER TO RING THE DESIGNATED DAY ADMIN OR NIGHT ADMIN. WHERE AN ADMIN STATION IS DESIGNATED TO RECEIVE OUTSIDE LINE CALLS, THE INCOMING CALL'S CALLER ID INFORMATION SHALL APPEAR ON THE DISPLAY. THE SYSTEM SHALL ALSO PROVIDE THE ABILITY TO MAKE OUTSIDE LINE CALLS FROM ADMIN STATIONS. THIS ABILITY SHALL BE PROGRAMMABLE FOR EACH ADMIN STATION AND THERE SHALL BE AN UNLIMITED NUMBER OF COSS AVAILABLE TO ASSIGN TO ANY STATION.

THE SYSTEM SHALL BE CAPABLE OF SUPPORTING DID, DISA, AND SECURITY DISA FUNCTIONS.

- A. The system shall provide a password-protected Security DISA feature that shall only be accessible from authorized Police, Fire, Emergency personnel, or an off-premises security office that monitors the facility's security system. The Security DISA feature shall function as follows: Upon dialing the Security DISA phone number, the caller will receive a dial tone from the system, after which he or she must enter the assigned Security DISA passcode on the dial pad. Upon confirmation, the system will present the dial tone again and will allow the authorized personnel to dial any station/classroom on the system and monitor the activity without any pre-announce tone or privacy beep. This will allow the authorized personnel to audibly assess the situation and determine what actions need to be taken.
- B. All DISA and Security DISA calls shall be automatically recorded by the system for later playback review and/or retrieval by authorized personnel and/or authorities.

THE SYSTEM SHALL PROVIDE FOR FIELD-PROGRAMMABLE THREE-, FOUR-, FIVE-, OR SIX-DIGIT ARCHITECTURAL STATION NUMBERS.

THERE SHALL BE AN AUTOMATIC LEVEL CONTROL FOR RETURN SPEECH DURING AMPLIFIED-VOICE COMMUNICATIONS.

EACH STATION LOUDSPEAKER SHALL BE ASSIGNABLE TO ALL OR ANY COMBINATION OF PAGING, TIME, AND/OR AUDIO ZONES. SYSTEMS THAT DO NOT PROVIDE UNLIMITED PAGING, TIME, AND/OR AUDIO ZONES SHALL NOT BE ACCEPTABLE.

THERE SHALL BE UNLIMITED SCHEDULES WITH UNLIMITED PROGRAMMABLE EVENTS PER FACILITY. EACH EVENT SHALL SOUND ONE USER-SELECTED TONE OR EXTERNAL AUDIO SOURCE. IT SHALL BE POSSIBLE TO ASSIGN EACH SCHEDULE TO A DAY OF THE WEEK OR TO MANUALLY CHANGE SCHEDULES FROM AN AUTHORIZED USER VIA A WEB-BASED UI. SYSTEMS THAT DO NOT PROVIDE UNLIMITED SCHEDULES, EVENTS, AND TONES, OR THAT REQUIRE SOFTWARE TO BE INSTALLED ON A PC TO PERFORM THESE FUNCTIONS SHALL NOT BE ACCEPTABLE.

- A. The system shall provide multiple concurrent schedules per facility/location to accommodate split facilities (for example., combined Elementary and Middle School, combined Middle and High School, etc.).
- B. The system must be capable of providing Class Change Music to be played from an external audio source or audio files that are stored in playlists on the system during class change periods or whenever a facility wants music to be played in an area (i.e., (i.e., one or more Time Zones) on an automated schedule.
- C. Each event shall be able to be directed to any one or more of the unlimited Time Zones.
- D. Each of the unlimited Time Zones shall have a programmable, customizable Preannounce Tone and volume control that is unique unto itself.

- E. Each event shall play any of the Normal tones or external audio. Each event may utilize a different tone. For example, the system shall be capable of sending the gymnasium, shop classes, and pool a separate, unique time tone to indicate "clean up." Minutes later, the entire facility can be sent a different time tone to indicate class change.
- F. Each of the unlimited Time Tones may be manually activated by selected VoIP Admin Phones or via an authorized user with access to the Web UI. These tones shall remain active as long as the telephone remains off-hook or until canceled from the keypad or the Web UI.
- G. Systems that do not provide an unlimited number of schedules or do not provide automatic activation of schedules shall not be acceptable.

INTERNAL MASTER CLOCK SHALL BE INCLUDED, ALLOWING AN UNLIMITED NUMBER OF EVENTS PER FACILITY. SYSTEMS THAT DO NOT PROVIDE AN INTERNAL MASTER CLOCK OR THAT MUST SUPPLY AN EXTERNAL MASTER CLOCK TO MEET THESE SPECIFICATIONS SHALL NOT BE ACCEPTABLE.

THE SYSTEM IS CAPABLE OF SYNCHRONIZING WITH AN NTP SERVER AND AUTOMATICALLY ADJUSTING THE DAYLIGHT SAVINGS TIME FOR ANY TIME ZONE IN THE WORLD. THE SERVER THAT THE APPLICATION IS RUNNING ON CAN ALSO BE USED AS AN NTP SERVER FOR OTHER SYSTEMS ON THE LAN (FOR EXAMPLE, IP CLOCKS AND CONTROL SYSTEMS).

THERE SHALL BE A ZONE PAGE/ALL-CALL PAGE FEATURE THAT IS ACCESSIBLE BY SELECTED ADMIN PHONES AND FXO/FXS OR SIP CONNECTION TO THE PSTN OR PBX/IPBX.

THERE SHALL BE AN OPTION TO PLAY A PRE-ANNOUNCE TONE AT ANY LOUDSPEAKER SELECTED FOR VOICE PAGING.

THERE SHALL BE A VOICE-INTERCOM FEATURE THAT IS ACCESSIBLE BY COS AUTHORIZED STAFF PHONES, ALL ADMIN VOIP PHONES, AND ADMIN WEB UIS.

- A. There shall be a privacy beep played every 15 seconds at any selected loudspeaker to indicate that an intercom call is in progress.
- B. There shall be a pre-announce tone played at any selected loudspeaker for intercom call communication.
- C. For special applications, the privacy and pre-announce tone signals shall be capable of being disabled during system initialization.
- D. There shall be a switch over to private telephone communications should the person at the classroom loudspeaker pick up his or her Staff Station and dial *3 to transfer the call down to the associated classroom Staff Station.

THERE SHALL BE VARIOUS LEVELS OF TELEPHONIC COMMUNICATION ACCESSIBLE BY ALL ADMIN STATIONS AND STAFF STATIONS.

- A. Staff Stations must be capable of being programmed to ring one Admin Station during day hours and a different Admin Station during night hours. Day and Night start hours shall be configurable. Staff Stations shall be capable of being assigned to any Admin station. Systems that limit the number and assignment of staff call-ins to an Admin Station shall not be acceptable.

EACH VOIP SPEAKER OR ASB SPEAKER EQUIPPED WITH A CALL SWITCH (ANALOG OR DIGITAL) SHALL BE CONFIGURABLE AS ONE OF THREE CALL-IN TYPES, AS FOLLOWS:

- A. Normal/Emergency
- B. Urgent/Emergency
- C. Emergency

CALL BUTTONS PROGRAMMED FOR ACCESS NORMAL / EMERGENCY OR URGENT / EMERGENCY SHALL BE ABLE TO INITIATE AN EMERGENCY CALL BY REPEATED FLASHING OF THE PHONE'S HOOK SWITCH OR REPEATED PRESSING OF THE DCS OR THE CALL SWITCH. SYSTEMS THAT REQUIRE ADDITIONAL SWITCHES AND/OR CONDUCTORS TO INITIATE AN EMERGENCY CALL, SHALL NOT BE ACCEPTABLE.

NORMAL AND URGENT CALLS SHALL BE PLACED INTO THE QUEUE FOR THE DESIGNATED ADMIN STATION OR ADMIN WEB UI.

EACH ADMIN STATION CALL QUEUE SHALL FIRST BE SORTED PER CALL PRIORITY (FOR EXAMPLE, EMERGENCY, THEN URGENT, AND THEN NORMAL). CALLS ARE SORTED WITHIN EACH PRIORITY LEVEL ON A FIRST-IN, FIRST-OUT BASIS. WHEN A CALL IS ANSWERED, IT SHALL AUTOMATICALLY BE REMOVED FROM THE QUEUE. SYSTEMS THAT DO NOT SORT CALLS PER PRIORITY AND ORDER RECEIVED SHALL NOT BE ACCEPTABLE.

- A. The display shall simultaneously display a minimum of three intercom calls pending.
- B. Additional calls beyond three shall be indicated by a scrolling option on the right-hand side of the screen thus prompting the user that additional calls are waiting.

IT SHALL BE POSSIBLE TO ANSWER ANY INCOMING CALL BY PICKING UP THE HANDSET WHILE IT IS RINGING. IT SHALL NOT BE NECESSARY TO PRESS ANY BUTTONS TO ANSWER A CALL UNLESS THE CALL HAS DROPPED INTO THE QUEUE.

STAFF STATIONS

- A. Staff Stations shall receive a dial tone upon going off-hook. Outgoing calls are made by dialing the desired station. Incoming calls can be directed to the telephone or to the associated loudspeaker for a hands-free reply. There shall be a switchover from loudspeaker to private telephone communication when a person picks up the handset, dials *3, and presses Enter/OK.
- B. Staff Stations shall be programmable for any type of system access, provided by or restricted by the following CoS options:
 - C. Call-in Level
 - D. Zone Paging
 - E. All-Call Paging
 - F. Emergency All-Call
 - G. Inter-Facility Call/Page
 - H. Audio Distribution
 - I. Remote Pickup
 - J. Join Conversation
 - K. Call Forwarding
 - L. Walking Class of Service
 - M. External Call Routing
 - N. Call Transfer/3-way Calling
 - O. Manually Activate Tone Signals
 - P. Call Any Station
 - Q. Manage Recordings
 - R. Monitor Calls
 - S. Monitor Locations
 - T. Conference Admin
 - U. Conference User
 - V. Voicemail
 - W. Record Calls

- X. Activate Alarm Signals
- Y. Disable Audio
- Z. Enable Audio
- AA. Allow Callee Auto-answer
- BB. District Paging
- CC. Inter-Facility Features
- DD. Manage Output Contacts
- EE. Staff Stations shall be able to make a Normal Call to any Admin Station by dialing the Admin Station's extension number. Staff Stations shall also be able to initiate an Emergency Call by dialing ****. Emergency Calls shall ring the Designated Day/Night Admin Station. The system shall provide for each station to have a Personal Identification Number (PIN). By dialing the PIN at any system telephone, the administrator shall have access to Emergency paging regardless of the restrictions on the particular phone being used.

ADMIN STATIONS

- A. Admin Stations shall receive a dial tone upon going off-hook. Outgoing calls are made by dialing the desired stations. Incoming calls can be directed to the telephone or to the associated loudspeaker for a hands-free reply. There shall be an automatic switchover from loudspeaker to private telephone communication should the person pick up his or her handset.
- B. The display shall normally show the time of day and day of week, bell schedule name, and the numbers of a minimum of three stations calling-in, along with the call-in status of each station (Normal, Urgent, Emergency). The Admin Station's display shall indicate the station number being dialed from the Admin Station.
- C. The display shall also provide user-friendly menu selections to assist the operator when using the system. Displays shall be in English for maximum ease-of-use. Systems that require the operator to memorize long lists of operating symbols or control codes shall not be acceptable.
- D. Admin Stations shall be programmable for any type of system access, providing or restricting the following CoS options:
 - E. Call-in Level
 - F. Zone Paging
 - G. All-Call Paging
 - H. Emergency All-Call
 - I. Inter-Facility Call/Page
 - J. Audio Distribution
 - K. Remote Pickup
 - L. Join Conversation
 - M. Call Forwarding
 - N. Walking Class of Service
 - O. External Call Routing
 - P. Call Transfer/3-way Calling
 - Q. Manually Activate Tone Signals
 - R. Call Any Station
 - S. Manage Recordings
 - T. Monitor Calls
 - U. Monitor Locations
 - V. Conference Admin

- W. Conference User
- X. Voicemail
- Y. Record Calls
- Z. Activate Alarm Signals
- AA. Disable Audio
- BB. Enable Audio
- CC. Allow Callee Auto-answer
- DD. District Paging
- EE. Inter-Facility Features
- FF. Manage Output Contacts
- GG. Program selection and its distribution or cancellation shall be accomplished from a designated Admin Station with the assistance of the menu display system. Distribution and cancellation shall be to any one or combination of speakers, any Audio Zone or Audio Zones, or All Zones. It shall be possible to provide an unlimited number of program channels for the user to pick from.
- HH. It shall be possible via an Admin Station to manually initiate any of the unlimited Normal Tones or Emergency Tones. The Tones shall be separate and distinctly different from the Alarm Tones. The Tone selected shall be capable of being played one time, continuously until it is canceled, or until the administrative display phone is placed back on-hook.
- II. Each Admin Station shall maintain a unique queue of all stations calling that Admin VoIP phone.

VOIP WALL BAFFLE AND VOIP CEILING SPEAKERS SHALL BE CONFIGURABLE AS ONE OF TWO STATION TYPES: 1) VOIP SPEAKER ONLY, OR 2) VOIP SPEAKER WITH DCS.

- A. The VoIP speakers are powered via PoE. Use an 802.3af compliant PoE network switch port or PoE Injector to power these speakers. One PoE network switch port or PoE Injector is required per VoIP speaker.
- B. VoIP speakers can be equipped with a DCS that can be programmed as a Normal/Emergency, Urgent/Emergency, or Emergency Only and shall be able to initiate an Emergency Call by touching the DCS one, two, or three times depending on the CoS and current call state of the DCS. If the station is authorized for Privacy Mode, the users can touch and hold for 4 seconds to enable Privacy Mode or hold for four seconds to disable Privacy Mode. Systems that require mechanical, membrane, or an additional number of switches to initiate an Emergency Call, shall not be acceptable.
- C. Emergency Calls from VoIP Speaker with DCS shall have priority over the Normal and Urgent Calls in the queue on the Admin Stations and will show up at the top of the list. Systems that do not provide priority for Emergency Call shall not be acceptable.
- D. Normal and Urgent Calls shall be logged into queue for the designated Admin Stations.
- E. Admin Stations shall ring for when they receive a call, and then the call will be removed from the queue when the call is answered or when the Admin Queue times out (default is 30 minutes).
- F. Each queue call shall first be sorted by call priority (Emergency, then Urgent, and then Normal). Calls are sorted within each priority level on a first-in, first-out basis. When a call is answered, it shall automatically be removed from the queue. Systems that do not sort calls by priority and order received, shall not be acceptable. The display shall simultaneously show a minimum of three staff calls pending. Additional staff calls beyond three shall be indicated by an arrow pointing down thus prompting the Admin user that additional calls are waiting.
- G. It shall be possible to answer any incoming call simply by picking up the handset while it is ringing. It shall not be necessary to hit any buttons to answer a call unless the call has dropped into the queue.

SYSTEM PROGRAMMING SHALL BE FROM AN AUTHORIZED ADMIN USER VIA ANY WEB BROWSER. A VALID USERNAME AND PASSWORD SHALL BE REQUIRED TO GAIN ACCESS TO THE FOLLOWING PROGRAMMABLE FUNCTIONS:

- A. System Parameters – Allow installers to adjust core system parameters.

- B. Zones – Allow installers to create and modify Paging, Time, and Audio Zones.
- C. Schedules – Allow installers and administrators to create Bell Schedules for the facility, predefine alternative schedules to run. Holiday Events prevent the bells from ringing on a school holiday. The system shall allow an unlimited number of schedules to operate simultaneous within a facility.
- D. Admin Groups – Allow the installer to create, modify, and delete software groupings of admin phones that can ring when a station calls in with a call switch.
- E. CoS Configuration – Allow the installer to create, modify, and delete CoS groups that can have the following features defined: Call in Level, Zone Paging, All-Call Paging, Emergency All-Call, Inter-Facility Call/Page, Audio Distribution, Remote Pickup, Join Conversation, Call Forwarding, Walking Class of Service, External Call Routing, Call Transfer/3-way Calling, Manually Activate Tone Signals, Call any Station, Manage Recording, Monitor Calls, Monitor Locations, Conference Admin, Conference User, Voicemail, Record Calls, Activate Alarm Signals, Disable Audio, Enable Audio, Allow Callee Auto-answer, District Paging, and Inter-Facility Features.
- F. Stations – Allow the installer to set up, modify, delete stations, set up Page Exclusion, view stations' status, and add a station.
- G. Bridge Devices – Allow the installer to install the ASBs.
- H. Audio – Allow the installer to upload and manage Announcements, Playlists, Announcements, Songs, and Tones. The must support the uploading of both MP3 and WAV files making Audio file management simple for users. Systems that limit the size of Audio files shall not be considered equal.
- I. Users – Allow the installer to manage users by giving them the proper Role and assign an Extension if needed.
- J. Roles – Allow the installer to limit user to the following: create, delete, edit, restart server, sort menu, systems update, manage, import/export, restore, settings, or view.
- K. Facilities – Allow the installer to set up the district wide facilities for remote paging and calling.
- L. Outside Line – allow the installer to set up FXS and FXO ports for inbound and outbound system calling.
- M. SIP Trunks – allow the installer to set up SIP trunks into the facility for inbound or outbound calling.
- N. Call Details – allow the installer to review the historical system activities that can be used for incident investigation or system troubleshooting.
- O. System Backup/Restore – allow the installer to preform system backup or restores and allow the backups to be schedule to run automatically.
- P. System Logs – allow the installer to view and export Server, Intercom, and Web Server logs that can be used for trouble shooting and technical assistance.
- Q. Paging Exclusions – allow the installer to view and edit station that are excluded from paging.
- R. Firmware – is used to update appliances.
- S. Help –Provides information about the system, online help topics, and System Administrator Manual.
- T. Systems not capable of supporting web-based configuration and control, or require plugins or dedicated application software, shall not be deemed as equal.
- U. Systems that require a Serial-to-Ethernet converter, or require additional application software on a PC for configuration and/or control shall not be deemed as equal.

ADMIN GROUP

- A. Admin Stations can be placed into Admin Groups, which are used if incoming calls are not answered by the assigned Admin Station or the Day or Night Admin associated with the Admin Station. Admin Groups act as an always answer feature by providing an alternate list of Admin Stations. If an incoming call is not answered by the assigned Admin Station within 30 seconds for normal calls or 15 seconds for emergency calls, all Admin Stations in the Admin Group will ring.
- B. If Call Forwarding is enabled at the Admin Station, the system tries the forwarded extension. If that station does not answer or is busy, the call timeout is reduced to 15 seconds. After 15 seconds, the call rolls over to the Admin Group.

- C. If an Emergency level call receives no answer, the Admin Group will ring if the Day Admin or Night Admin does not answer.
- D. Admin Stations can be assigned to multiple Admin Groups. A Day or Night Admin can also be assigned to one or more Admin Groups.

CALL DETAIL REPORTING

- A. The Call Details feature allows the viewing and/or printing of detail records of every call in a facility in a call log format. Calls include scheduled announcements, paging, and internally and externally made or received telephone calls.

SYSTEM BACKUP/RESTORE

- A. The system backup feature allows users with access to back up the system database, voicemail, and recordings.
- B. The system restore allows users with access to perform a system restore of previously backed up database, voicemail, and/or recordings.
- C. The installer also can set up an automatic backup that can be performed daily, weekly, or monthly.

SYSTEM LOG FILES

- A. A log file records either events or messages that occur when software runs and is used when troubleshooting the system. The following parts of the system generate log files:
 - 1. Server (This provides access to the Debian Linux OS server log files.)
 - 2. Intercom (This provides access to the Intercom application server log files.)
 - 3. Web Server (This provides access to the web server log files.)
- B. From the web-based UI, system logs can be viewed directly or exported via download to a PC, Mac, or Android device and then copied to removable media or attached to an email to technical support.

PAGING EXCLUSIONS

- A. For school testing and exams, the administrators shall be able to put stations into Page Exclusion mode. During this time, the stations will only receive Emergency All-Call pages – not music, tones, or All-Calls. Emergency pages will still be heard at the station even if that station is set to exclude paging.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions, with the installer present, for compliance with requirements and other conditions affecting the performance of the System.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.02 EQUIPMENT MANUFACTURER'S REPRESENTATIVE

ALL WORK DESCRIBED HEREIN TO BE DONE BY THE MANUFACTURER'S AUTHORIZED REPRESENTATIVE SHALL BE PROVIDED BY A DOCUMENTED FACTORY AUTHORIZED REPRESENTATIVE OF THE BASIC LINE OF EQUIPMENT TO BE UTILIZED.

AS FURTHER QUALIFICATION FOR BIDDING AND PARTICIPATING IN THE WORK UNDER THIS SPECIFICATION, THE MANUFACTURER'S REPRESENTATIVE SHALL HOLD A VALID C-10 CONTRACTOR'S LICENSE ISSUED BY THE CONTRACTOR'S STATE LICENSE BOARD OF YOUR STATE. THE MANUFACTURER'S REPRESENTATIVE SHALL HAVE COMPLETED AT LEAST 10 PROJECTS OF EQUAL SCOPE, GIVING SATISFACTORY PERFORMANCE, AND SHALL HAVE BEEN IN THE BUSINESS OF FURNISHING AND INSTALLING SOUND SYSTEMS OF THIS TYPE FOR AT LEAST FIVE YEARS. THE MANUFACTURER'S REPRESENTATIVE SHALL BE CAPABLE OF BEING BONDED TO ENSURE THE OWNER OF PERFORMANCE AND SATISFACTORY SERVICE DURING THE GUARANTEE PERIOD.

THE MANUFACTURER'S REPRESENTATIVE SHALL PROVIDE A LETTER WITH SUBMITTALS FROM THE MANUFACTURER OF ALL MAJOR EQUIPMENT STATING THAT THE MANUFACTURER'S REPRESENTATIVE IS AN AUTHORIZED DISTRIBUTOR. THIS LETTER SHALL ALSO STATE THAT THE MANUFACTURER GUARANTEES SERVICE PERFORMANCE FOR THE LIFE OF THE EQUIPMENT AND THAT THERE WILL ALWAYS BE AN AUTHORIZED DISTRIBUTOR ASSIGNED TO SERVICE THE AREA IN WHICH THE SYSTEM HAS BEEN INSTALLED.

THE CONTRACTOR SHALL FURNISH A LETTER FROM THE MANUFACTURER OF THE EQUIPMENT. THIS LETTER SHALL CERTIFY THAT THE EQUIPMENT HAS BEEN INSTALLED ACCORDING TO FACTORY INTENDED PRACTICES, THAT ALL THE COMPONENTS USED IN THE SYSTEM ARE COMPATIBLE, AND THAT ALL NEW PORTIONS OF THE SYSTEMS ARE OPERATING SATISFACTORILY. FURTHER, THE CONTRACTOR SHALL FURNISH A WRITTEN UNCONDITIONAL GUARANTEE, GUARANTEEING ALL PARTS AND ALL LABOR FOR A PERIOD OF FIVE YEARS AFTER FINAL ACCEPTANCE OF THE PROJECT BY THE OWNER.

3.03 DIVISION OF WORK

31.01 WHILE ALL WORK INCLUDED UNDER THIS SPECIFICATION IS THE COMPLETE RESPONSIBILITY OF THE CONTRACTOR, THE FOLLOWING DIVISION OF ACTUAL WORK LISTED SHALL OCCUR:

- A. The conduit, outlets, terminal cabinets, etc., which form part of the rough-in work, shall be furnished and installed completely by the electrical contractor.
- B. The balance of the system, including installation of speakers and equipment, making all connections, etc., shall be performed by the manufacturer's authorized representative. The entire responsibility of the system, its operation, function, testing and complete maintenance for one year after final acceptance of the project by the owner, shall also be the responsibility of the manufacturer's authorized representative.

3.04 INSTALLATION

A. THE INSTALLATION, ADJUSTMENT, TESTING, AND FINAL CONNECTION OF ALL CONDUIT, WIRING, BOXES, CABINETS, ETC., SHALL CONFORM TO LOCAL ELECTRICAL REQUIREMENTS AND SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S APPROVED SHOP DRAWINGS.

B. LOW-VOLTAGE WIRING MAY BE RUN EXPOSED ABOVE CEILING AREAS WHERE THEY ARE EASILY ACCESSIBLE.

C. THE CONTRACTOR SHALL INSTALL THE NEW SYSTEM AT THE LOCATION SHOWN ON THE PLANS.

D. ALL STAFF STATIONS AND CALL SWITCHES SHALL BE WALL-MOUNTED:

Mount at 54" AFF.

- 1. All wiring should be concealed where possible. If surface mounting is required, utilize Wiremold 700 series, color matched to mounting surface.
- 2. Verify exact location with engineer and owner.

E. ADMIN STATIONS CAN BE DESK OR WALL MOUNTED.

F/SPEAKER AND TELEPHONE LINES RUN ABOVE CEILING AND NOT IN CONDUIT SHALL BE TIE-WRAPPED TO A CEILING JOIST WITH A MAXIMUM SPACING OF 8' BETWEEN SUPPORTS. NO WIRES SHALL BE LAID ON TOP OF CEILING TILE.

G. CONNECT FIELD CABLE TO EACH ANALOG SPEAKER TRANSFORMER USING UL BUTT SPLICES FOR #22 AWG WIRE.

H. CONTRACTOR SHALL PROVIDE A MINIMUM OF EIGHT HOURS OF CONFIGURATION AND OPERATIONAL INSTRUCTION TO SCHOOL PERSONNEL.

VoIP manufacturer shall provide online "How To" videos for instructing the teaching staff on how to operate the Teacher Dashboard aspect of the system.

I. ON THE FIRST SCHOOL DAY FOLLOWING INSTALLATION OF THE SYSTEM, THE CONTRACTOR SHALL PROVIDE A TECHNICIAN TO STAND BY AND ASSIST IN SYSTEM OPERATION.

J. MARK AND LABEL ALL DEMARKS IDF AND MDF POINTS WITH DESTINATION POINT NUMBERS. ROOMS WITH MORE THAN ONE OUTLET SHALL BE MARKED XXX-1, XXX-2, XXX-3, ETC. WHERE XXX IS THE ROOM NUMBER.

K. NO GRAPHIC ROOM NUMBER SHALL EXCEED THE SEQUENCE FROM 000001 THROUGH 899999.

All outside speakers shall be on a separate Page Zone and Time Zone.

All zones shall be laid out not to exceed 40 Watts (@25V) maximum per zone.

All hallway speakers shall be tapped at 1 Watt (@25V) maximum.

All outside horns shall be tapped at 3.75 Watts (@25V) maximum.

All classroom speakers shall be tapped at ½ Watt (@25V) maximum.

Large rooms, such as cafeterias, shall be tapped at 2 Watts (@25V) maximum.

L. PLUG DISCONNECT: ALL MAJOR EQUIPMENT COMPONENTS SHALL BE FULLY PLUGGABLE BY MEANS OF MULTI-PIN RECEPTACLES AND MATCHING PLUGS TO PROVIDE FOR EASE OF MAINTENANCE AND SERVICE.

M. PROTECTION OF CABLES: CABLES WITHIN TERMINAL CABINETS, EQUIPMENT RACKS, ETC., SHALL BE GROUPED AND BUNDLED (HARNESSED) AS TO TYPE AND LACED WITH NO. 12 CORD WAXED LINEN LACING TWINE OR T AND B WIRE-TIES, OR HOOK AND LOOP CABLE MANAGEMENT. EDGE PROTECTION MATERIAL SHALL BE INSTALLED ON EDGES OF HOLES, LIPS OF DUCTS, OR ANY OTHER POINT WHERE CABLES OR HARNESSES CROSS A METALLIC EDGE.

N. CABLE IDENTIFICATION: CABLE CONDUCTORS SHALL BE COLOR-CODED AND INDIVIDUAL CABLES SHALL BE INDIVIDUALLY IDENTIFIED. EACH CABLE IDENTIFICATION SHALL HAVE A UNIQUE NUMBER LOCATED APPROXIMATELY 1-1/2" FROM CABLE CONNECTION AT BOTH ENDS OF CABLE. NUMBERS SHALL BE APPROXIMATELY 1/4" IN HEIGHT. THESE UNIQUE NUMBERS SHALL APPEAR ON THE AS-BUILT DRAWINGS.

O. SHIELDING: CABLE SHIELDING SHALL BE CAPABLE OF BEING CONNECTED TO COMMON GROUND AT POINT OF LOWEST AUDIO LEVEL AND SHALL BE FREE FROM GROUND AT ANY OTHER POINT. CABLE SHIELDS SHALL BE TERMINATED IN THE SAME MANNER AS CONDUCTORS.

P. PROVIDE COMPLETE "IN SERVICE" INSTRUCTIONS OF SYSTEM OPERATION TO SCHOOL PERSONNEL. ASSIST IN PROGRAMMING OF TELEPHONE SYSTEM.

3.03 GROUNDING

A. THE CONTRACTOR SHALL PROVIDE EQUIPMENT GROUNDING CONNECTIONS FOR INTEGRATED TELECOMMUNICATIONS/TIME/AUDIO/MEDIA SYSTEM AS INDICATED. TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUES SPECIFIED IN UL STANDARD 486A TO ENSURE PERMANENT AND EFFECTIVE GROUNDS.

B. THE CONTRACTOR SHALL PROVIDE GROUND EQUIPMENT, CONDUCTOR, AND CABLE SHIELDS TO ELIMINATE SHOCK HAZARD AND TO MINIMIZE THE GREATEST EXTENT POSSIBLE, GROUND LOOPS, COMMON MODE RETURNS, NOISE PICKUP, CROSS TALK, AND OTHER IMPAIRMENTS.

C. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY TRANSIENT PROTECTION ON THE AC POWER FEED AND ON ALL STATION LINES LEAVING OR ENTERING THE BUILDING.

D. THE CONTRACTOR SHALL NOTE ON THEIR DRAWINGS THE TYPE AND LOCATIONS OF THESE PROTECTION DEVICES AND ALL WIRING INFORMATION.

E. THE CONTRACTOR SHALL FURNISH AND INSTALL A DEDICATED, ISOLATED EARTH GROUND FROM THE CENTRAL EQUIPMENT RACK AND BOND TO THE INCOMING ELECTRICAL SERVICE GROUND BUSS BAR.

4.04 DOCUMENTATION

PROVIDE THE FOLLOWING DIRECTLY TO THE SUPERVISOR OF TECHNOLOGY SERVICES.

}ONE PRINTED COPY OF ALL FIELD PROGRAMMING FOR ALL COMPONENTS IN SYSTEM

- A. One copy of all diagnostic software with a copy of field programming data for each unit
- B. One copy of all field wiring runs, location, and end designation of system

END OF SECTION

**SECTION 281000
– ACCESS CONTROLS****PRODUCTS****1.01 GENERAL**

- A. The basis of design in the I-Pro MonitorCast v4 system. Any alternate system shall be approved 10 days prior to bid.
- B. The security management system shall be deployed through IP network infrastructure with a two-tiered hardware hierarchy. The IP Door Controller shall be capable of running on an existing TCP/IP network and shall be accessible,configurable, and manageable from any network-connected PC with a browser.
- C. Browser access for configuration and administration of the system shall be possible from a PC on the same subnet, through routers and gateways from other subnets, and from the Internet. Control and management of the system shall therefore be geographically independent.
- D. The top hardware tier shall be the MonitorCast v4 Server based platform. Installed applications on the MonitorCast v4 Server is to be an operating system, a web MonitorCast v4 Server, security application software, and the database of personnel and system activity.
- E. The bottom hardware tier shall be the IP Door Controller. The IPDoor Controller shall make and manage accesscontrol decisions with data provided by the MonitorCast v4 Server, and it shall control the communication between the IPDoor Controller and door hardware connected to the IP Door Controller inputs, outputs, and readers. This modular design shall make it possible for the system to continue to manage access control and store system activity logs, even during network downtime. When network connectivity is re-established, the systemactivity logs shall be automatically re-integrated to the host server.

THE SYSTEM SHALL INTEGRATE, WITHIN A BROWSER INTERFACE; ACCESS CONTROL AND VIDEO MONITORING. THESE APPLICATIONS SHALL BE A FULLY BI-DIRECTIONAL INTEGRATED SOFTWARE ARCHITECTURE. INTEGRATION SHALL BE LIMITED TO MANUFACTURER-SUPPORTED AND PROPERLY LICENSED CAPABILITIES.

- A. The database tier shall use Microsoft SQL Server residing on the Server. Microsoft SQL Server on the Server shall be a full featured, high performance database management system. This shall provide a small footprint, low administration, and a highreliability relational database that is embedded without requiring the use of a separate PC Server.
- B. The Server tier shall be based on a Microsoft™ Server. This application shall provide a graphically rich security management application through a standard web browser.

- 2.02 ALL EQUIPMENT AND MATERIALS USED SHALL BE STANDARD COMPONENTS, REGULARLY MANUFACTURED, AND REGULARLY UTILIZED IN THE MANUFACTURER'S SYSTEM.**
- 2.03 ALL SYSTEMS AND COMPONENTS SHALL HAVE BEEN THOROUGHLY TESTED AND PROVEN IN ACTUAL USE.**
- 2.04 ALL SYSTEMS AND COMPONENTS SHALL BE PROVIDED WITH A MANUFACTURER WARRANTY OF ONE YEAR FOR SOFTWARE AND TWO YEARS FOR HARDWARE.**

OVERALL SYSTEM CAPABILITY

- 3.01 THE SECURITY MANAGEMENT SYSTEM SHALL MEET THE REQUIREMENTS OF BUSINESS AND GOVERNMENT ACCESS CONTROL SYSTEMS. THE SYSTEM SHALL MONITOR AND CONTROL FACILITY ACCESS AND SHALL PERFORM ALARM MONITORING AND INTEGRATION TO CAMERA AND VIDEO MONITORING. THE SYSTEM SHALL ALSO MAINTAIN A DATABASE OF SYSTEM ACTIVITY, PERSONNEL ACCESS CONTROL INFORMATION, AND SYSTEM USER PASSWORDS AND USER ROLE PERMISSIONS. THE SYSTEM SHALL BE CONTROLLED FROM A WEB BROWSER AND REQUIRE NO SOFTWARE INSTALLATION OR CLIENT LICENSES. THE SYSTEM SHALL PROVIDE CONTROL AND ACCESS TO USERS ON LOCAL AREA NETWORKS (LAN), WIDE AREA NETWORKS (WAN), WIRELESS NETWORKS, AND THE INTERNET. THE SYSTEM SHALL PROVIDE EMAIL AND/OR TEXT MESSAGE ALERTS FOR ALL ALARM CONDITIONS AND THREATS.**
- 3.02 SYSTEM PARTITIONING: THE SYSTEM ADMINISTRATOR SHALL HAVE THE ABILITY TO DIVIDE THE SYSTEM INTO PARTITIONS, ALLOWING SUBSETS OF THE OVERALL POPULATION AND/OR RESOURCES TO BE MANAGED SEPARATELY.**
FROM THE DEFAULT MASTER PARTITION, ONE OR MORE ADDITIONAL PARTITIONS SHALL BE ABLE TO BE CREATED.
 - A. Each partition shall contain some number of administrators, card holders with their credentials, and resources.
 - B. When performing administrative functions, the administrator of a partition shall have the ability to create or modify only the cardholders and resources in that partition. However, resources shall be able to be shared across partitions through the mapping of access levels from one partition to another.
 - C. System partitioning shall have a precision feature that allows administrators in one or more partitions to view and perform edit functions on person records that belong to another partition.
 - D. Administrators shall have the ability to search for person records across all partitions to which they have access. The system administrator shall have the ability to make such cross-partition searches the default for users who have access to multiple partitions.
 - E. After finding a personnel group record located in another partition, an administrator shall be able to click a button to switch to that partition directly from the personnel group record—and possibly edit the record, depending on his or her access rights in that partition. Alternatively, an option for making every person record seamlessly visible across all partitions shall be provided.

3.01 CONTROLLED OPENINGS

- A. Provide complete device sets per opening: reader, DPS, REX, push-to-exit (where required), lock/strike/panic electrification, door loops/transfer hinges, and all terminations.
- B. Maglocks: Fail-safe; provide UL 294 listed lock power supply with battery backup meeting 24-hour minimum (or Owner standard if greater).
- C. Strikes; Fail-safe/fail-secure as required by door hardware set and code.
- D. Electrified panic hardware: Provide electrified trim and/or latch retraction as scheduled; coordinate with Division 08.
- E. Fire Alarm interface: unlock/release as required by code and I/O matrix.

3.02 THE SYSTEM SHALL PROVIDE THE FOLLOWING ACCESS CONTROL CAPABILITIES:

- A. Integrated photo ID creation capability with video verification.
- B. User interface secured access under encrypted password control.
- C. Multiple Site Control.

- D. System-wide timed anti-pass back function.
- E. "First-in-unlock" rule enforcement.
- F. Multiple access levels and cards per person.
- G. Detailed time specifications.
- H. Simultaneous support for multiple card data formats.
- I. Compatibility with various input devices, including biometric readers.
- J. Activation/expiration date/time by person with one-minute resolution.
- K. Access level disable for immediate lockdown.
- L. Multiple holiday schedules.
- M. Timed unlock schedules.
- N. Dual-reader portal support.
- O. Reader communications shall be OSDP Secure Channel as standard. Wiegand shall be allowed only where specifically approved for retrofit constratings.
- P. Pin/keypad functions shall be supported where provided by the selected reader platform and configured in accordance with manufactuer's requirements.

3.03 THE SYSTEM SHALL PROVIDE THE FOLLOWING NATIVE OR VMS INTEGRATED MONITORING CAPABILITIES:

- A. The Home page shall allow users to view a full systemssummary, including an Activity Log, Auto-Monitor, and dashboardfunctions.
- B. Common alarm panel integration for disarm on access, and arm on egress.
- C. Integrated real-time IP-based NVR systems with stored video replay for events.
- D. Provides alarms on communication loss.
- E. Provides the ability to record video and link to video for alarm events.
- F. A monitoring desktop that integrates video, systemactivity logs, floorplans, ID photos, and alarm notifications.
- G. Graphic floorplans with active icons of monitor and access control points.
- H. Secure access to the user interface under encrypted password control.
- I. Delivery of alerts via VMS Rules Manager or Automation and email.
- J. Remote logging of system messages to local host.

3.04 THE SYSTEM SHALL PROVIDE THE FOLLOWING INTEGRATED VMS VIDEO MANAGEMENT CAPABILITIES:

- A. Playback of event-related video.
- B. Integrated alarm inputs from the video management system.
- C. Digital playback of video events.
- D. Linking of video and events based on triggers provided by the system or video system.
- E. Support for multiple NVRs.
- F. Multiple pre-programmed supportedcameras.
- G. Monitoring and control through a web browser interface.

3.05 THE SYSTEM SHALL PROVIDE THE FOLLOWING SECURITY DATABASE CAPABILITIES:

- A. Maintain data of system activity, personnel access control information, system user passwords and custom user role permissions for whole or partial access to system resources and data.
- B. LDAP integration for single-user logon authentication.
- C. Network-secure API for external application integration.

- D. Easy to use custom report generator.
- E. Record recall by vehicle tag, name, or card.
- F. An API for adding to, deleting from, and modifying the database.
- G. Storage of system user passwords and permissions.
- H. Storage and recall of ID photos and emergency personal information.
- I. Pre-defined reports on system configuration, system activity history, and people.
- J. Custom report writer interface that allows the interactive creation of custom reports. Reports may be saved for later reuse. No third-party software (such as Crystal Reports) shall be necessary.
- K. Selectable custom report output formats, including PDF & CSV.
- L. Custom report repository location. Users shall be able to review, cancel and delete reports from this data storage location.
- M. Email and text messaging (SMS) alert notifications.

HARDWARE REQUIREMENTS

4.01 THE SECURITY MANAGEMENT SYSTEM SHALL EMPLOY A MODULAR HARDWARE CONCEPT THAT ENABLES SIMPLE SYSTEM EXPANSION AND UTILIZES A TWO-TIERED HARDWARE HIERARCHY:

- A. At the top tier shall be a Server, which shall contain the data base engine, web Server, application software, and configuration data. It is at this level that System Users, through a browser interface, shall interact with the system, set configurations, monitor activities, run reports, and manage alarms.
- B. At the bottom tier shall be the IP Door Controller, an intelligent device with native TCP/IP & PoE support, which shall make and manage access control decisions, a set of inputs, outputs and readers.
- C. The network device shall run on existing building TCP/IP PoE networks and shall be configurable for access from separate subnets, through gateways and routers, and from the Internet.

4.02 A SYSTEM SERVER SHALL CONTAIN A PROCESSOR, FLASH MEMORY, AND STORAGE. EXTERNAL BATTERY BACKUP SHALL BE USED TO PROVIDE UNINTERRUPTED OPERATION FOR 2 HOURS IN THE EVENT OF EXTERNAL POWER LOSS. THE IP DOOR CONTROLLER SHALL CONTAIN IIS FOR COMMUNICATION WITH THE IP DOOR CONTROLLERS AND A NETWORK INTERFACE PORT. THE SYSTEM SERVER SHALL HAVE THE FOLLOWING CAPABILITIES:

Door Controller (Mercury EP/LP boards) (AD-400/AD-300 Wireless locks)	512
Access Cards	No Limit
Card Formats	15 per Controller
Alarm Input Points	2,048 per Controller
Control Point Outputs	2,048 per Controller
Ethernet Ports	1
Time Specifications	512 per Controller
Holidays	255 per Controller
Access Levels per Person	15 per Person (32,000 per Controller)
Cards per Person	No Limit
Concurrent System Users	Unlimited

4.03 THE IP DOOR CONTROLLER SHALL MAKE AND MANAGE ACCESS CONTROL DECISIONS WITH DATA PROVIDED BY THE SERVER, AND IT SHALL MANAGE THE COMMUNICATION BETWEEN THE IP DOOR CONTROLLER CONNECTED TO THE SYSTEM'S INPUTS, OUTPUTS, AND READERS. THE IP DOOR CONTROLLER SHALL BE POWERED WITH POE POWER INPUT 12.95 W (802.3 AF OR 12V DC 900 MA POWER SUPPLY) PROTOCOL. EACH IP DOOR CONTROLLER SHALL HAVE THE FOLLOWING CAPABILITIES:

Access Control doors	1
Readers	2

Supervised Inputs	2
General Input	2
Relay Outputs	2
Connectivity	10/100 Ethernet
Credential storage	20,000
Activity Logrecords	27,000

4.04 THE IP DOOR SUB-CONTROLLER SINGLE DOOR SHALL MAKE AND MANAGE ACCESS CONTROL DECISIONS WITH DATA PROVIDED BY THE SERVER THROUGH THE IP DOOR SUB-CONTROLLER, AND IT SHALL MANAGE THE COMMUNICATION BETWEEN THE IP DOOR SUB-CONTROLLER CONNECTED TO THE SYSTEM’S INPUTS, OUTPUTS, AND READERS. THE IP DOOR CONTROLLER SHALL BE POWERED WITH POE POWER INPUT 12.95 W(802.3AF OR 12V DC 900MA POWER SUPPLY) PROTOCOL. EACH IP DOOR CONTROLLER SHALL HAVE THE FOLLOWING CAPABILITIES:

Access controdoors	1
Readers	1
Supervised Input	4
Relay Outputs	2
Connectivity	10/100 Ethernet

4.05 THE DOOR SUB-CONTROLLER SINGLE DOOR SHALL MAKE AND MANAGE ACCESS CONTROL DECISIONS WITH DATA PROVIDED BY THE SERVER THROUGH THE IP DOOR CONTROLLER, AND IT SHALL MANAGE THE COMMUNICATION BETWEEN THE IP DOOR SUB-CONTROLLER CONNECTED TO THE SYSTEM’S INPUTS, OUTPUTS, AND READERS.THE IP DOOR SUB-CONTROLLER SHALL BE CONNECTED TO IP DOOR CONTROLLER USING RS-485 PROTOCOL. EACH IP DOOR SUB-CONTROLLER SHALL HAVE THE FOLLOWING CAPABILITIES:

Access Control Doors	1
Readers	1
General Input	2 (Programmable)
Dedicated Input	1
Relay Outputs	2
Connectivity	RS-485

4.06 THE DOOR SUB-CONTROLLER TWO DOOR SHALL MAKE AND MANAGE ACCESS CONTROL DECISIONS WITH DATA PROVIDED BY THE SERVER THROUGH THE IP DOOR CONTROLLER, AND IT SHALL MANAGE THE COMMUNICATION BETWEEN THE IP DOOR SUB-CONTROLLER CONNECTED TO THE SYSTEM’SINPUTS, OUTPUTS AND READERS. THE IP DOOR SUB-CONTROLLER SHALL BE CONNECTED TO IP DOOR CONTROLLER USING RS-485 PROTOCOL. EACH IP DOOR SUB-CONTROLLER SHALL HAVE THE FOLLOWING CAPABILITIES:

Access Control Doors	2
Readers	1
General Input	8 (Programmable)
Dedicated Input	2
Relay Outputs	6
Connectivity	RS-485

4.07 THE SERIAL INPUT SUB-CONTROLLER SHALL MAKE AND MANAGE ACCESSCONTROL DECISIONS WITH DATA PROVIDED BY THE SERVER THROUGH THE IP DOOR CONTROLLER, AND IT SHALL MANAGE THE COMMUNICATION BETWEEN THE IP SERIAL INPUT SUB-CONTROLLER CONNECTED TO THE SYSTEM’S INPUTS AND OUTPUTS.THE IP SERIAL INPUT SUB-CONTROLLER SHALL BE CONNECTED TO IP DOOR CONTROLLER USING RS-485 PROTOCOL. EACH IP SERIAL INPUT SUB-CONTROLLER SHALL HAVE THE FOLLOWING CAPABILITIES:

General Input	16 (Programmable)
Deedicated Input	2

Relay Outputs	2
Connectivity	RS-485

4.08 THE SERIAL OUTPUT SUB-CONTROLLER SHALL MAKE AND MANAGE ACCESS CONTROL DECISIONS WITH DATA PROVIDED BY THE SERVER THROUGH THE IP DOOR CONTROLLER, AND IT SHALL MANAGE THE COMMUNICATION BETWEEN THE IP SERIAL OUTPUT SUB-CONTROLLER CONNECTED TO THE SYSTEM'S INPUTS & OUTPUTS. THE IP SERIAL OUTPUT SUB-CONTROLLER SHALL BE CONNECTED TO IP DOOR CONTROLLER USING RS-495 PROTOCOL. EACH IP SERIAL OUTPUT SUB-CONTROLLER SHALL HAVE THE FOLLOWING CAPABILITIES:

General Output	16
Dedicated Inputs	2
Connectivity	RS-485

HARDWARE PACKAGING REQUIREMENTS

5.01 THE SECURITY MANAGEMENT SYSTEM SHALL HAVE VARIOUS HARDWARE ENCLOSURES AND CONFIGURATIONS AVAILABLE TO SUPPORT DIFFERENT INSTALLATION REQUIREMENTS. ENCLOSURES SHALL BE AVAILABLE FOR WALL OR RACK MOUNTING. THE WALL-MOUNT ENCLOSURES SHALL HAVE A LOCK REQUIRING A KEY.

SYSTEM SERVER AND IP DOOR CONTROLLER SPECIFICATIONS

5.01 THE SERVER SHALL BE POWERED BY PLATINUM EFFICIENCY HOT PLUG REDUNDANT 495W OR 750W POWER SUPPLY.

OS	Current manufacturer-supported OS compatible with Owner IT security requirements (no EOL operating systems permitted)
Storage	200 GB (Minimum)
Processor	Intel I5 Class Processor or Higher
RAM	8 GB
Ethernet Ports	1
Warranty	3 Years

5.02 EACH IP DOOR CONTROLLER SHALL BE POWERED BY POE IN ACCORDANCE WITH IEEE 802.33 STANDARD. WITH POE AS THE POWER SOURCE THE TOTAL POWER AVAILABLE FOR ALL EXTERNAL OUTPUTS IS 12V DC @ 650MA. IP DOOR CONTROLLERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

TTL Reader Connectors	2
RS-485 Reader Connectors	1
Power Available for Output	650 Milliamps
Input Connectors	2
Output Connectors	2

5.03 EACH IP DOOR SUB-CONTROLLER SHALL BE POWERED BY POE IN ACCORDANCE WITH IEEE 802.3AF STANDARD. WITH POE AS THE POWER SOURCE THE TOTAL POWER AVAILABLE FOR ALL EXTERNAL 12V IP DOOR CONTROLLERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

TTL Reader Connectors	1
Power Available to Readers	150 Milliamps
Input Connectors	4
Output Connections	2

5.04 EACH SINGLE DOOR SUB-CONTROLLER SHALL BE POWERED BY MAY BE SUPPLIED WITH 12-24VDC AT 3 AMPS. WITH A 12 V DC 3A POWER SUPPLY, THE TOTAL POWER AVAILABLE FOR ALL EXTERNAL OUTPUTS SHALL BE 1100 MA (13 WATTS). IP DOOR CONTROLLERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

TTL Reader Connectors	1
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Power Available to Readers	150 Milliamps
Input Connectors	3
Output Connections	2
Communication Protocol	RS-485

5.05 EACH TWO DOOR SUB-CONTROLLER SHALL BE POWERED BY MAY BE SUPPLIED WITH 12-24V DC AT 3 AMPS. WITH A 12V DC 3A POWER SUPPLY THE TOTAL POWER AVAILABLE FOR ALL EXTERNAL OUTPUT SHALL BE 1100 MA (13 WATTS). IP DOOR CONTROLLERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

TTL Reader Connectors	2
Power Available to Readers	150 Milliamps
Input Connectors	10
Output Connections	2
Communication Protocol	RS-485

5.06 EACH SERIAL INPUT SUB-CONTROLLER SHALL BE POWERED BY MAY BE SUPPLIED WITH 12-24V DC AT 3 AMPS. WITH A 12V DC 3A POWER SUPPLY THE TOTAL POWER AVAILABLE FOR ALL EXTERNAL OUTPUT SHALL BE 1100 MA (13 WATTS). IP DOOR CONTROLLERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

General Input Connectors	16
Dedicated Input Connectors	2
Output Connections	2
Communication Protocol	RS-485

5.07 EACH SERIAL INPUT SUB-CONTROLLER SHALL BE POWERED BY MAY BE SUPPLIED WITH 12-24V DC AT 3 AMPS. WITH A 12V DC 3A POWER SUPPLY THE TOTAL POWER AVAILABLE FOR ALL EXTERNAL OUTPUT SHALL BE 1100 MA (13 WATTS). IP DOOR CONTROLLERS SHALL HAVE THE FOLLOWING CHARACTERISTICS:

General Output Connectors	16
Input Connections	2
Communication Protocol	RS-485

SOFTWARE REQUIREMENTS

6.01 OPERATING SYSTEM AND APPLICATION SOFTWARE SHALL HAVE THE FOLLOWING CHARACTERISTICS:

- A. The Server operating system shall be current manufacturer-supported and compatible with Owner IT security requirements (no EOL operating systems permitted).
- B. The system database shall be SQL Server Express requiring a small footprint and providing high reliability. The Server shall provide users with access and operate the system using a standard web browser.
- C. The system shall support the following web browsers:
 - 1. For the security management system, the listed browsers shall include Internet Explorer, Firefox, Chrome and Safari.
- D. Software Licensing shall have the following characteristics:
 - 1. Software licensing shall be based upon the number of cameras licenses you have per server and individual lifetime licensing in situations where doors out number cameras at the project site.
 - 2. Licensing shall be controlled by a Serial Key and an Activation Code. The Serial Key shall contain the licensed system limits. System upgrade licensing to enable more cameras or more doors shall require a Serial Key re-activation. The key shall be locked to the system license number.
- E. Software upgrades shall be possible from a browser on any network-connected PC, by uploading a software update to the IP Door Controller. No client software installation shall be necessary.

- F. Online Help and Documentation - The system shall be provided with complete online documentation. The online documentation shall include:
1. Technical Support Notes - These documents shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.
 2. Installation Guides - These documents shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.
 3. Video Integration Guides - These documents shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.
 4. End-User Task Guide - This document shall be in PDF format, shall be printable, and shall be linked to from the Help system table of contents, index, and related topics.
- G. Language Support - The system shall be provided with multiple language support. The ability to switch from one language to another shall be accomplished through the user interface. Translation of the user interface, online help and documentation into other languages shall be available. The languages supported shall include:
1. English
- H. Date Formats - The system shall support global date formats as follows:
1. mm/dd/yyyy
 2. dd/mm/yyyy
 3. yyyy/mm/dd
- I. Floor plans - The system shall provide graphic floorplan capability including graphic display of door status and entry direction. Floor plans shall have the following characteristics:
1. The Network Administrator shall be able to graphically configure device icons onto the floorplan images, and to upload additional floorplan images. JPEG images shall be supported, and the maximum size for a floorplan image shall be 256K.
- J. Personnel Data - The system shall maintain person data relating to access control, system user privileges, photo identification, system activity, and contact information.
1. All person data in the system shall be integrated onto one page for viewing, editing, and deletion by system users.
 2. A system user holding at least an "Administrator" user role shall be able to create, delete, and modify person records, including access levels, schedules & resource groups.
 3. A system user holding at least a "Administrator" user role shall be able to configure the display of person records.
- K. Access Control:
1. The system shall be able to make access control decisions, define a variety of access levels and time specifications, write system activity into a log file, maintain a personnel enrollment database, receive signals from input devices such as door switch monitors, card readers and motion detectors, energize devices such as door locks and alarms via outputs.
 2. Card Formats - The system shall support the use of readers that use the Wiegand Reader Interface. The system shall also support the use of the Magnetic Stripe ABA track 2 card data formats.
 - a. It shall be possible to create new card formats, designate start bits and bit lengths for facility codes and card ID numbers, as well as designate parity bits. The system shall support up to 32 different card formats.
- L. Access Levels - The system shall be capable of storing unlimited access levels in each partition.
- a. The definition of an access level shall require the assignment of a reader or reader group, and a time specification.
- M. First-in Unlock Rule - The system shall support the use of a First-in unlock rule. It shall be possible to use this rule to control the unlock behavior of portal groups with assigned unlock time specs.
1. The First-in unlock rule shall require a card read of a specified access level. The portals in the group shall unlock only when the rule is satisfied and the unlock time spec is valid.
- N. Holidays - The system shall be capable of storing up to 5 holidays per system. Each holiday shall be assigned a unique alphanumeric name. The definition of a holiday shall require a start date and an end date. Holidays shall have the ability to span several days using only one holiday slot. Holiday definitions shall support the designation of a start time and an end time. If no start time is designated, then the

system shall default to 00:00 (start-of-day). If no end time is designated, then the system shall default to 24:00 (end-of-day). Holidays shall require the use of 24-hour time format, e.g. 17:00 is 5:00PM.

- O. Reports:
 - 1. The system shall be capable of producing a variety of predefined reports regarding software and security hardware configuration, event history, and the administration of people within the system.
- P. The system shall support a graphic interface for interactively building custom reports from either historical or personnel data. These reports shall be savable for later reuse. Parameters shall be inserted into reports to prompt for data input at report runtime. Report results shall be printed, output to a PDF file or put into a spreadsheet.
 - 1. The system shall be capable of sorting users by various criteria, including email address, and allow for email groups to be selected for auto-distribution.
 - 2. Report generation shall not affect the real-time operation of the system.
 - 3. The specific reports provided shall include the following:
 - a. Configuration Reports
 - 1) Access History - Displays access history based on an entered query. The system user can specify the query using either the keyboard or point-and-click selection.
 - 2) Custom Report - This provides the capability to create custom reports of historical data.
 - 3) General Event History - Displays time, type of activity, and activity details for a variety of event types. The system user can select the specific event types for the report.
 - 4) Audit Trail: Displays an audit trail of system changes and the name of the system user that made the changes. It shall be possible to specify the dates and times covered in the report.
 - b. People Reports
 - 1) Access Levels - Displays all access levels entered into the system including time specification, reader/reader group, and floor group.
 - 2) Credential Audit - Lists existing credentials by their current status settings (such as Active, Damaged, Lost, or Not Used). Before running the report, users can filter the data to see only credentials with a particular status setting, or only credentials that were not used with a specific number of days from the date they were issued.
 - 3) Current Users - Displays a list of all security system users currently logged in to the security system website.
 - 4) Custom Report - This provides the capability to create custom reports of personnel data. A graphic interface provides the user with the ability to interactively create and save reports for later use. Parameters can be inserted into reports to prompt for data input at report runtime. Custom report configuration shall include page size, orientation, column width and shall automatically notify the user if the selected configuration exceeds the selected page size.
 - 4. Administration - The system shall provide for the performance of system administration tasks from any network-connected computer with a browser. These administrative tasks shall include but not be limited to:
 - a. Generating reports:
 - 1) The system shall be capable of producing a variety of predefined reports regarding software and security hardware configuration, event history, and the administration of people within the system.
 - 2) Alternatively, the system shall support a graphic interface for interactively building custom reports from either historical or personnel data. These reports shall be savable for later reuse. Parameters can be inserted into reports to prompt for data input at report runtime. Report results can be printed, output to a PDF file or put into a spreadsheet.
 - 3) A system user holding "Administrator" permissions shall be able to view and create reports.
 - 5. Database backups:
 - a. It shall also be possible for the system users to create such database backups at any time. Any database backups onboard the Server may also be downloaded to IP Door Controller storage by the system user at any time.
 - 6. System restore:

- a. The system shall be able to restore its database, or the full system data, from a backup. Restoration of the system shall only be possible from a backup copy onboard the Server. It shall, therefore, be possible to upload a copy of a database backup from any network attached storage.
7. Software updates:
 - a. Software updates, upgrades and patches shall be provided from time to time. The system shall be able to update its software from these files. Update of the application software shall only be possible from an update file onboard the Server. It shall, therefore, be possible to upload a copy of the software update from any network attached storage or from any PC drive or desktop.
 - b. Software updates may involve the Server only or may include updates for the IP Door Controller also. The monitoring of the security system may be unavailable for several minutes during this process.
8. Enrolling new people - All person data entered into the system shall be held in the system database and shall be available only to system users holding at least the Administer user role. Person data can be added, deleted, and edited by such system users.
9. Configuring network resources:
 - a. DNS - The system shall support setting IP addresses for up to two domain name Servers.
 - b. Email settings - The system shall support the use of email notifications of alarm events. The system user must setup the email Server IP address or DNS name and the email address of the Network Controller. A network administrator must setup the network mail Server to relay email for the IP address of the Network Controller.
 - c. Time Servers - The system shall support the use of network time Servers. Up to three Servers can be designated. Use of a network time Server ensures that the Network Controller and its nodes will be regularly synchronized with the exact time used by all other network resources.
 - d. A system user holding "Setup" permissions shall be able to configure network resources.
10. LDAP - It shall be possible to configure an Active Directory Server with the system.
 - a. This shall provide single user-login capability.
 - b. Password rules and authentication shall be governed by the LDAP Server.

CERTIFICATIONS

7.01 UL 294 LISTED.

7.02 ISO 9000 LISTED.

7.03 CE COMPLIANT.

7.04 ROHS.

END OF SECTION

**SECTION 282300
– VIDEO SURVEILLANCE SYSTEM****PART 1 – GENERAL****1.01 SUMMARY**

- A. Provide a complete IP-based video surveillance system for the school campus.
- B. Basis of Design: Video Insight VMS software and Panasonic IP network cameras. Equivalent systems must demonstrate compliance with this specification and obtain prior approval.
- C. System shall integrate with the Intercom/EPIC system (Section 27 51 23) where applicable for event-triggered camera call-up and emergency coordination.

1.02 REFERENCES

- A. NFPA 70 – National Electrical Code
- B. NFPA 72 – National Fire Alarm and Signaling Code (coordination for emergency override)
- C. ONVIF Profile S, G, and T – for interoperability
- D. IEEE 802.3 – Ethernet Standards
- E. TIA/EIA-568 – Structured Cabling Standards
- F. UL 60950 / UL 62368 – IT and Communication Equipment
- G. NDAA Section 889 compliance; equipment shall not contain banned SoCs or OEMs
- H. UL 2900-1(cybersecurity) where available for IT/networked components.
- I. NTP time synchronization with the district's time source (same source used by Intercom and Fire Alarm graphics work station)

1.03 SUBMITTALS

- A. Shop drawings showing camera locations, fields of view, headend/server room layouts, and integration with EPIC system.
- B. Camera lens schedules (FOV, resolution, lux rating, IR requirements).
- C. Server/storage sizing calculations for 30 days retention minimum.
- D. I/O integration matrix with Fire Alarm and Intercom/EPIC.
- E. As-built drawings, programming files, admin credentials, and O&M manuals.

1.04 QUALITY ASSURANCE

- A. Manufacturer shall have a minimum of 10 years' experience in IP-based surveillance.
- B. Installer shall be certified by Video Insight and/or Panasonic.
- C. System testing shall verify full coverage of all critical areas (entries, corridors, parking, playgrounds, gym, cafeteria).

1.05 COORDINATION

- A. Coordinate with Division 27 Structured Cabling for Cat 6/6A drops and PoE switch capacity.
- B. Coordinate with Division 26 Electrical for UPS and power requirements.
- C. Coordinate with Division 28 Fire Alarm/Intercom:
 - 1. Fire/MNS or lockdown events may trigger camera call-up in Video Insight.
 - 2. Intercom call stations may display associated video feed on admin console.
 - 3. System shall be fail-safe: loss of CCTV shall not impair Fire Alarm/MNS or Intercom functionality.
- D. Intercom/Fire Alarm precedence: On Fire Alarm/EVAC/MNS events, Fire Alarm and Intercom functions remain system of record; CCTV integrations (call-ups, overlays) shall not inhibit or delay FA/MNS audio or control.
- E. Cross-system integrations shall be limited to functions supported and licensed by the applicable manufacturers.

- F. Pathway separation: CCTV shall not share power, speaker circuits, or raceways with Fire Alarm/EVAC/MNS. Any I/O bridging shall be via listed low-voltage interfaces or secure API, physically and logically separated from the FA Circuits.
- G. Mass Notification Linkage: Mass Notification System lockdown/weather events shall trigger VI rules to:
 1. Auto-Popup designated cameras
 2. Boost recording to full stream rate for greater than or equal to 15 minutes.
 3. Bookmark the event for instant retrieval
- H. Mass Notification Linkage: Mass Notification System lockdown event shall trigger automatic tag read bookmarking at campus entry and exits.
- I. Coordinate camera locations with Intercom stations to ensure fields of view cover intercom stations, door access points, and critical circulation areas.
- J. Terminate all new CCTV cabling on new rack-mounted patch panels sized for 100% terminations plus 20% spare ports. Do not terminate on existing patch panels unless specifically approved.
- K. UPS equipment is contractor-furnished unless noted otherwise; Contractor shall coordinate power connection and receptacle requirements and confirm runtime basis with On

1.06 COMPLIANCE

- A. NDAA 889 Compliance is mandatory for all cameras, encoders, NVRS/VMS servers, and switches.
- B. CJIS-compatible export: VMS shall support tamper-evident, watermarked exports with hash validation and an audit log (who/when/what) retained for greater than or equal to 1 year.

PART 2 – PRODUCTS

2.01 SYSTEM DESCRIPTION

- A. IP-based video management system (VMS) with centralized recording and distributed viewing.
- B. Provide 30 days minimum retention at the design frame rate and resolution for all cameras. Where motion-based recording is used, include minimum 5 second pre-event and 15 seconds post-event buffers. Contractor shall submit storage calculations showing bitrate per stream, codec, fps, % motion, and a minimum 20% safety factor.
- C. The system may utilize motion-based recording with pre-event and post-event buffers (minimum 5 seconds pre-event, 15 seconds post-event) to optimize storage without degrading coverage of critical incidents. Cameras at entrances, cash-handling, administrative offices, and other high-security zones shall record continuously regardless of motion.
- D. The Contractor shall submit a detailed storage calculation for review and approval showing:
 1. Assumed average bitrate per stream at design resolution and frame rate.
 2. Frames per second (fps) and code type (H.264/H.265)
 3. Assumed percentage of motion activity per camera (day and night)
 4. Total calculated storage capacity required for 30 days retention.
 5. Safety factor of not less than twenty percent (20%) applied to the final storage requirement.
- E. Storage calculations shall be based on manufacturer's published sizing tools or industry-accepted calculators and shall be provided with submittals.
- F. Final acceptance testing shall verify that actual retention capacity meets or exceeds 30 days with the installed camera count, resolution, fps, and recording method.
- C. Support web-based and mobile client access.

2.02 VIDEO MANAGEMENT SOFTWARE (BASIS OF DESIGN: VIDEO INSIGHT)

- A. Server-based VMS with unlimited client licenses.
- B. Support ONVIF, H.264/H.265, MJPEG streaming.
- C. Provide event rules for integration with intercom and fire alarm (e.g., auto-popup of cameras on alarm).
- D. Provide health monitoring and failure alerts.

- E. Security hardening: TLS 1.2+, role-based access, AD/SSO integration, password policy (min length, rotation), failed-login lockout, and system health alerts (camera offline/bitrate drops/storage failure) to designated email/syslog.
- F. Clock & Watermarking: Single NTP source (same as Intercom & Fire Alarm), watermark + hash for exports; administrator-selectable privacy masking.

2.03 CAMERAS (BASIS OF DESIGN: PANASONIC)

- A. Classroom Cameras: Fixed dome type, vandal-resistant, PoE-powered. Minimum 4 MP resolution, WDR ≥ 120 dB, integrated microphone optional. Basis of Design: Panasonic WV-S22500 dome camera.
- B. Corridor Cameras: Fixed dome type, vandal-resistant, PoE-powered. Minimum 4 MP resolution, corridor mode enabled, IR range ≥ 20 m. Basis of Design: Panasonic WV-S2236L.
- C. Office/Admin Cameras: Compact dome type, 4 MP resolution, discreet design. Basis of Design: Panasonic WV-S2136L.
- D. Gymnasium / Commons Cameras: PTZ type, 30x optical zoom, 1080p/60 fps, WDR ≥ 120 dB, IR range ≥ 100 m. Basis of Design: Panasonic WV-X6533LN.
- E. Exterior Building Cameras: Vandal-resistant bullet or dome type, 8 MP resolution, IR ≥ 50 m, IP66, IK10 rated. Basis of Design: Panasonic WV-X1551LN.
- F. Light Pole Mounted Cameras: Outdoor vandal-resistant bullet type or multi-sensor dome. Minimum 8 MP resolution, IR ≥ 50 m, IP66/NEMA 4X, IK10 rated, pole mount hardware included. PTZ may be provided for large parking areas. Basis of Design: Panasonic WV-X1551LN (bullet) and WV-S8530N (multi-sensor).
- G. Parking Lot / Stadium Corners: Multi-sensor panoramic dome, 4 \times 1080p sensors, WDR ≥ 108 dB, IR ≥ 40 m. Basis of Design: Panasonic WV-S8530N.
- H. Microphones disabled by default unless approved by Owner; enable only where policy permits. Privacy masking required at perimeter views that capture public right-of-way if the School District mandates.
- I. Exterior and pole-mounted cameras shall provide usable color video in low-light conditions typical of campus parking lots illuminated by LED luminaires. Minimum performance shall be:
 1. Color mode operation at less than or equal to 0.02 lux (F1.6, 1/30s shutter, with WDR active)
 2. Integrated IR illumination with a range of not less than 50 meters, providing clear facial and vehicle recognition within design coverage.
 3. Cameras shall transition smoothly between day/night modes without image dropout, excessive noise, or color shift.
 4. Manufacturer test data shall be submitted verifying compliance with these low-light specifications under controlled conditions.
- J. License Plate Recognition (LPR) Cameras
 1. Provided dedicated IP-based license plate recognition cameras at all designated ingress/egress points (Campus entry/exit points). Minimum 2 MP, shutter 1/500-12000 sec, IR optimized for plates, accuracy greater than or equal to 95% under design traffic. Basis of Design: Panasonic WV-S1511L or equivalent. Integrate metadata with Video Insight.
 2. Cameras shall be designed specifically for license plate capture and meet the following minimum criteria:
 - a. Resolution: 2 MP or higher, with optimized optics for plate clarity.
 - b. Shutter Speed: Configurable to 1/500 to 1/2000 sec to freeze motion of vehicles to 60 mph.
 - c. IR illumination: Integral or external, optimized for retroreflective license plates, with a minimum range of 25 meters.
 - d. Field of View: Optimized for single or dual lane capture, 12-16 ft. lane width typical.
 - e. WDR greater than or equal to 120 dB to handle headlights, sunlight, and high-contrast conditions.
 - f. Operation: Reliable capture in daylight, dusk, night, rain, fog, and under LED Parking Lot Lighting.
 3. LPR cameras shall be network-addressable, PoE-powered, and compatible with Video Insight VMS., storing both video stream and plate capture metadata.

4. Contractor shall provide aiming diagrams and test results verifying minimum 95% plate read accuracy under design traffic conditions.
5. LPR camera housing shall be outdoor-rated (IP66), vandal-resistant (IK10), with pole or wall-mount kits included.

2.04 STORAGE & SERVERS

- A. Rack-mounted servers with RAID-5 or better storage arrays.
- B. Scalable storage sized for retention requirements.
- C. Redundant power supplies, UPS-backed for 4 hours.
- D. Video Insight VMS pre-installed.

2.05 WORKSTATIONS / CLIENTS

- A. Administrative monitoring stations with dual monitors.
- B. Map-based navigation interface showing campus plan.
- C. Integration to EPIC admin console for simultaneous paging + video display.

2.06 NETWORKING

- A. 1 Gbps Ethernet minimum.
- B. Segregated VLAN for video traffic with QoS.
- C. PoE switches sized for camera loads.

2.07 LIGHT POLE CAMERA ASSEMBLIES

- A. Mounting Height: 16-20 ft above finished grade typical; coordinate to avoid luminaire glare; aim to achieve greater than or equal to 40 PPF at primary drive lanes and lot entries at night.
- B. Hardware: Manufacturer-approved pole clamps/backs, safety tether, UV-rated service loops, and quick-disconnect at head for maintenance.
- C. Enclosures/PoE: Any injectors/extenders/switches at poles shall be in NEMA 40X gasketed, -20 to +50 degree C min, with condensation management.
- D. Surge & Grounding: Type 2 SPD on branch; data-line SPD on copper where used; bond camera, enclosure and mounting hardware to pole ground; provide #6 CU bond to pole ground electrode system.
- E. Conduit & media: Underground PVC Sch. 40 with RGS stub-ups; pull boxes less than or equal to 200 ft spacing; fiber to pole with media conversion in enclosure to isolate lightning.
- F. Wind/EPA: Verify pole capacity for added EPA and weight; coordinate with pole manufacturer.
- G. Aiming/reference: Provide daytime and nighttime aiming snapshots in closeout packaging.

2.08 IMAGE PERFORMANCE CRITERIA

- A. Pixels-per-foot (PPF) targets at design distance:
 1. Entrances/vestibules: Greater than or equal to 80 PPF (identification)
 2. Corridors/admin counters: Greater than or equal to 60 PPF (recognition)
 3. Parking lots/bus loops: Greater than or equal to 40 PPF (detection/recognition)
- B. Frame Rate:
 1. Corridors/Entries: Greater than or equal to 15 fps; critical points (admin entrance, cash handling) greater than or equal to 20 fps.
- C. WDR: Greater than or equal to 120 dB (corridors with daylight, vestibules, exterior facing doors)

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Install cameras per manufacturer's instructions and NEC.
 - B. Provide all cabling in conduit/tray as specified in Section 27 10 00.
 - C. Provide surge protection on exterior camera cabling.
- B. Provide all cabling in conduit/tray as specified in Section 271000.

- C. Provide surge protection on exterior camera cabling.
- D. Grounding and Bonding: Bond all system cabinets, racks, controllers, power supplies, and cable shields to the telecommunication grounding busbar (TGB/TMGB) in accordance with Section 260526 – Grounding and Bonding. Coordinate with Division 26 Electrical contractor for proper conductor sizing, routing, and terminations.
- E. Cabling shall be Cat6 CMP plenum, green jacket, from camera to IDF/MDF patch panel.
- F. Maximum permanent link length from patch panel to camera device shall be 90 meters (295 feet) in accordance with TIA/EIA-568.

3.02 FIELD QUALITY CONTROL

- A. Factory-trained technician shall perform system startup.
- B. Demonstrate:
 - 1. Camera coverage and image quality in all locations.
 - 2. Integration with EPIC intercom (event-driven video popup).
 - 3. Video playback and export to law enforcement standards.
 - 4. Failover and redundancy.
- C. Night test: Demonstrate target PPF/fps under nighttime lighting (no high-beam washout).
- D. Event integration Test: Prove MNS lockdown triggers VI auto-call-ups and bookmark.
- E. Failover drill: Simulate server storage failure and camera outage; verify alerting and continuity.
- F. Cyber check: Verify password policy, TLS, AD integration, time-sync, and audio logs.

3.03 TRAINING

- A. Provide 4 hours Facilities training: system administration, storage management, user account control.
- B. Provide 2 hours Administrative training: live view, playback, video export, linking video to intercom events.
- C. Record all training and provide digital copy to Owner.

3.04 CLOSEOUT DOCUMENTS

- A. O&M manuals including final camera map, IP addressing, storage sizing.
- B. As-programmed VMS configuration files.
- C. Provide administrative access documentation and credential turnover in accordance with Owner IT cybersecurity requirements. Passwords shall be transferred securely and changed to Owner-controlled credentials at commissioning.
- D. Maintenance schedule and recommended firmware upgrade procedures.
- E. Storage math worksheet matching as-built camera counts/resolution/fps/retention.
- F. Aiming snapshots (day & night) and final camera naming convention keyed to floor plans.
- G. Admin guide with retention policy, export SOP, and chain-of-custody steps.

END OF SECTION