



# PROJECT MANUAL

***Change in Scope Rebid:  
Upgrade Fire Alarm and Security Systems  
Center for Behavioral Medicine  
Kansas City, Missouri, Missouri***

Designed By: IMEG Corp  
1600 Baltimore, Suite 300  
Kansas City, MO, 64108

Date Issued: July 1, 2022

Project No.: M1903-01

STATE *of* MISSOURI

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OFFICE *of* ADMINISTRATION  
Facilities Management, Design & Construction

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Center for Behavioral Medicine, Kansas City, MO  
Change in Scope Rebid: Upgrade Fire Alarm and Security Systems #M1903-01

## **SECTION 000107 - PROFESSIONAL SEALS AND CERTIFICATIONS**

**PROJECT NUMBER:** (M1903-01)

**THE FOLLOWING DESIGN PROFESSIONALS HAVE SIGNED AND SEALED THE ORIGINAL PLANS AND SPECIFICATIONS FOR THIS PROJECT, WHICH ARE ON FILE WITH THE DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION:**



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## SECTION 000115 – LIST OF DRAWINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section provides a comprehensive list of the drawings that comprise the Bid Documents for this project.

### PART 2 - PRODUCTS (NOT APPLICABLE)

### PART 3 - EXECUTION

#### 3.1 LIST OF DRAWINGS

- A. The following list of drawings is a part of the Bid Documents:

	<u>TITLE</u>	<u>SHEET #</u>	<u>DATE</u>	<u>CAD #</u>
1.	Cover Sheet	G-001	07/01/22	G-001.dwg
2.	Location Map and Sheet List	G-002	07/01/22	G-002.dwg
3.	Electrical Symbols List & Abbreviations	E-001	07/01/22	E-001.dwg
4.	Power New Floor Plan Level 1	EP-101	07/01/22	EP-101.dwg
5.	Power New Floor Plan Level 1	EP-102	07/01/22	EP-102.dwg
6.	Power New Floor Plan Level 2	EP-105	07/01/22	EP-105.dwg
7.	Power New Floor Plan Level 2	EP-107	07/01/22	EP-107.dwg
8.	Power New Floor Plan Level 3	EP-109	07/01/22	EP-109.dwg
9.	Power New Floor Plan Level 3	EP-111	07/01/22	EP-111.dwg
10.	Power New Floor Plan Level 4	EP-112	07/01/22	EP-112.dwg
11.	Fire Alarm Demo Floor Plan Level 1	DF-101	07/01/22	DF-101.dwg
12.	Fire Alarm Demo Floor Plan Level 1	DF-102	07/01/22	DF-102.dwg
13.	Fire Alarm Demo Floor Plan Level 2	DF-103	07/01/22	DF-103.dwg
14.	Fire Alarm Demo Floor Plan Level 2	DF-104	07/01/22	DF-104.dwg

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15.	Fire Alarm Demo Floor Plan Level 2	DF-105	07/01/22	DF-105.dwg
16.	Fire Alarm Demo Floor Plan Level 2	DF-106	07/01/22	DF-106.dwg
17.	Fire Alarm Demo Floor Plan Level 2	DF-107	07/01/22	DF-107.dwg
18.	Fire Alarm Demo Floor Plan Level 3	DF-108	07/01/22	DF-108.dwg
19.	Fire Alarm Demo Floor Plan Level 3	DF-109	07/01/22	DF-109.dwg
20.	Fire Alarm Demo Floor Plan Level 3	DF-110	07/01/22	DF-110.dwg
21.	Fire Alarm Demo Floor Plan Level 3	DF-111	07/01/22	DF-111.dwg
22.	Fire Alarm Demo Floor Plan Level 4	DF-112	07/01/22	DF-112.dwg
23.	Fire Alarm Demo Floor Plan Level 5	DF-113	07/01/22	DF-113.dwg
24.	Fire Alarm Demo Floor Plan Level 6	DF-114	07/01/22	DF-114.dwg
25.	Fire Alarm New Floor Plan Level 1	EF-101	07/01/22	EF-101.dwg
26.	Fire Alarm New Floor Plan Level 1	EF-102	07/01/22	EF-102.dwg
27.	Fire Alarm New Floor Plan Level 2	EF-103	07/01/22	EF-103.dwg
28.	Fire Alarm New Floor Plan Level 2	EF-104	07/01/22	EF-104.dwg
29.	Fire Alarm New Floor Plan Level 2	EF-105	07/01/22	EF-105.dwg
30.	Fire Alarm New Floor Plan Level 2	EF-106	07/01/22	EF-106.dwg
31.	Fire Alarm New Floor Plan Level 2	EF-107	07/01/22	EF-107.dwg
32.	Fire Alarm New Floor Plan Level 3	EF-108	07/01/22	EF-108.dwg
33.	Fire Alarm New Floor Plan Level 3	EF-109	07/01/22	EF-109.dwg
34.	Fire Alarm New Floor Plan Level 3	EF-110	07/01/22	EF-110.dwg

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35.	Fire Alarm New Floor Plan Level 3	EF-111	07/01/22	EF-111.dwg
36.	Fire Alarm New Floor Plan Level 4	EF-112	07/01/22	EF-112.dwg
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41.	Security Demo Plan Site	DS-100	07/01/22	DS-400.dwg
42.	Security Demo Floor Plan Level 1	DS-101	07/01/22	DS-101.dwg
43.	Security Demo Floor Plan Level 1	DS-102	07/01/22	DS-102.dwg
44.	Security Demo Floor Plan Level 2	DS-103	07/01/22	DS-103.dwg
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46.	Security Demo Floor Plan Level 2	DS-105	07/01/22	DS-105.dwg
47.	Security Demo Floor Plan Level 2	DS-106	07/01/22	DS-106.dwg
48.	Security Demo Floor Plan Level 2	DS-107	07/01/22	DS-107.dwg
49.	Security Demo Floor Plan Level 3	DS-108	07/01/22	DS-108.dwg
50.	Security Demo Floor Plan Level 3	DS-109	07/01/22	DS-109.dwg
51.	Security Demo Floor Plan Level 3	DS-110	07/01/22	DS-110.dwg
52.	Security Demo Floor Plan Level 3	DS-111	07/01/22	DS-111.dwg
53.	Security Demo Floor Plan Level 4	DS-112	07/01/22	DS-112.dwg
54.	Security Demo Floor Plan Level 5	DS-113	07/01/22	DS-113.dwg
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56.	Security New Plan Site	ES-100	07/01/22	ES-100.dwg
57.	Security New Floor Plan Level 1	ES-101	07/01/22	ES-101.dwg
58.	Security New Floor Plan Level 1	ES-102	07/01/22	ES-102.dwg
59.	Security New Floor Plan Level 2	ES-103	07/01/22	ES-103.dwg
60.	Security New Floor Plan Level 2	ES-104	07/01/22	ES-104.dwg
61.	Security New Floor Plan Level 2	ES-105	07/01/22	ES-105.dwg
62.	Security New Floor Plan Level 2	ES-106	07/01/22	ES-106.dwg
63.	Security New Floor Plan Level 2	ES-107	07/01/22	ES-107.dwg
64.	Security New Floor Plan Level 3	ES-108	07/01/22	ES-108.dwg
65.	Security New Floor Plan Level 3	ES-109	07/01/22	ES-109.dwg
66.	Security New Floor Plan Level 3	ES-110	07/01/22	ES-110.dwg
67.	Security New Floor Plan Level 3	ES-111	07/01/22	ES-111.dwg
68.	Security New Floor Plan Level 4	ES-114	07/01/22	ES-114.dwg
69.	Security New Floor Plan Level 5	ES-115	07/01/22	ES-115.dwg
70.	Security New Floor Plan Level 6	ES-114	07/01/22	ES-114.dwg

END OF SECTION 000115



## SECTION 001116 - INVITATION FOR BID

### 1.0 OWNER:

- A. The State of Missouri  
Office of Administration,  
Division of Facilities Management, Design and Construction  
Jefferson City, Missouri

### 2.0 PROJECT TITLE AND NUMBER:

- A. Change in Scope Rebid: Upgrade Fire Alarm and Security Systems  
Center for Behavioral Medicine  
Kansas City, Missouri, Missouri  
**Project No.: M1903-01**

### 3.0 BIDS WILL BE RECEIVED:

- A. Until: 1:30 PM, Thursday, August 25, 2022
- B. **Only electronic bids on MissouriBUYS shall be accepted: <https://missouribuyss.mo.gov>. Bidder must be registered to bid.**

### 4.0 DESCRIPTION:

- A. Scope: The project includes replacement of the facility's existing fire alarm, access control and video surveillance systems.
- B. MBE/WBE/SDVE Goals: MBE 10%, WBE 10%, and SDVE 3%. **NOTE: Only MBE/WBE firms certified by the State of Missouri Office of Equal Opportunity as of the date of bid opening, or SDVE(s) meeting the requirements of Section 34.074, RSMo and 1 CSR 30-5.010, can be used to satisfy the MBE/WBE/SDVE participation goals for this project.**
- C. **\*\*NOTE:** Bidders are provided new Good Faith Effort (GFE) forms on MissouriBUYS.

### 5.0 PRE-BID MEETING:

- A. Place/Time: 10 AM, Thursday, August, 11, 2022, at Center for Behavioral Medicine, 1000 E 24th Street, Kansas City, MO 64108. All persons entering the building may be required to wear face coverings.
- B. Access to State of Missouri property requires presentation of a photo ID by all persons

### 6.0 HOW TO GET PLANS & SPECIFICATIONS:

- A. View Only Electronic bid sets are available at no cost or paper bid sets for a deposit of \$100.00 from American Document Solutions (ADS). MAKE CHECKS PAYABLE TO: American Document Solutions. Mail to: American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433, <https://www.adsplanroom.net>. NOTE: Prime contractors will be allowed a maximum of two bid sets at the deposit rate shown above. Other requesters will be allowed only one bid set at this rate. Additional bid sets or parts thereof may be obtained by any bidder at the cost of printing and shipping by request to American Document Solutions at the address shown above. **Bidder must secure at least one bid set to become a planholder.**
- B. **Refunds: Return plans and specifications in unmarked condition within 15 working days of bid opening to American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433. Deposits for plans not returned within 15 working days shall be forfeited.**
- C. Information for upcoming bids, including downloadable plans, specifications, Invitation for Bid, bid tabulation, award, addenda, and access to the ADS planholders list, is available on the Division of Facilities Management, Design and Construction's web site: <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans>.

### 7.0 POINT OF CONTACT:

- A. Designer: IMEG Corp, Lindsay Robertson, 816-652-0100, email: [lindsay.robertson@imegcorp.com](mailto:lindsay.robertson@imegcorp.com)
- B. Project Manager: Glenn Smith, 573-751-1367, email: [Glenn.Smith@oa.mo.gov](mailto:Glenn.Smith@oa.mo.gov)

### 8.0 GENERAL INFORMATION:

- A. The State reserves the right to reject any and all bids and to waive all informalities in bids. No bid may be withdrawn for a period of 20 working days subsequent to the specified bid opening time. The contractor shall pay not less than the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed, as determined by the Missouri Department of Labor and Industrial Relations and as set out in the detailed plans and specifications.
- B. Bid results will be available at <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans> after it is verified that at least one bid is awardable and affordable.

## Very Important MissouriBUYS Instructions to Help Submit a Bid Correctly

- A. The bidder shall submit his or her bid and all supporting documentation on MissouriBUYS eProcurement System. No hard copy bids shall be accepted. Go to <https://missouribuy.mo.gov> and register. The bidder must register and complete a profile fully with all required documents submitted prior to submitting a bid.
- B. Once registered, log in.
1. Under "Solicitation" select "View Current Solicitations."
  2. Under "Filter by Agency" select "OA-FMDC-Contracts Chapter 8", then click "Filter Solicitation" button.
  3. Select "Active Solicitations" tab.
  4. To see the Solicitation Summary, click on the Project Number and the summary will open. Click each heading to open detailed information.
- C. Here are simplified instructions for uploading the bid to MissouriBUYS:
1. Find the solicitation by completing Steps 1 through 4 above.
  2. Select the three dots under "Actions." Select "Add New Response."
  3. When the Quote box opens, give the response a title and select "OK."
  4. The detailed solicitation will open. Select "Check All" for the Original Solicitation Documents, open each document, and select "Accept." If this step is not completed, a bid cannot be uploaded. Scroll to the bottom of the page and select "Add Attachments." If you do not see this command, not all documents have been opened and accepted.
  5. The Supplier Attachments box will open. Select "Add Attachment" again.
  6. The Upload Documents box will open. Read the instructions for uploading. Disregard the "Confidential" check box.
  7. Browse and attach up to 5 files at a time. Scroll to bottom of box and select "Upload." The Supplier Attachments box will open. Repeat Steps 5 through 7 if more than 5 files are to be uploaded.
  8. When the Supplier Attachments box opens again and uploading is complete, select "Done." A message should appear that the upload is successful. If it does not, go to the Bidder Response tab and select "Submit."
  9. The detailed solicitation will open. At the bottom select "Close."
- D. Any time a bidder wants to modify the bid, he or she will have to submit a new one. FMDC will open the last response the bidder submits. The bidder may revise and submit the bid up to the close of the solicitation (bid date and time). Be sure to allow for uploading time so that the bid is successfully uploaded prior to the 1:30 PM deadline; we can only accept the bid if it is uploaded before the deadline.
- E. If you want to verify that you are uploading documents correctly, please contact Paul Girouard: 573-751-4797, [paul.girouard@oa.mo.gov](mailto:paul.girouard@oa.mo.gov) ; April Howser: 573-751-0053, [April.Howser@oa.mo.gov](mailto:April.Howser@oa.mo.gov) ; or Mandy Roberson: 573-522-0074, [Mandy.Roberson@oa.mo.gov](mailto:Mandy.Roberson@oa.mo.gov).
- F. If you are experiencing login issues, please contact Web Procure Support (Proactis) at 866-889-8533 anytime from 7:00 AM to 7:00 PM Central Time, Monday through Friday. If you try using a userid or password several times that is incorrect, the system will lock you out. Web Procure Support is the only option to unlock you! If you forget your userid or password, Web Procure Support will provide a temporary userid or password. Also, if it has been a while since your last successful login and you receive an "inactive" message, contact Web Procure (Proactis). If you are having a registration issue, you may contact Cathy Holliday at 573-751-3491 or by email: [cathy.holliday@oa.mo.gov](mailto:cathy.holliday@oa.mo.gov).

## IMPORTANT REMINDER REGARDING REQUIREMENT FOR OEO CERTIFICATION

A. SECTION 002113 – INSTRUCTIONS TO  
BIDDERS: Article 15.0, Section D1:

**As of July 1, 2020**, all MBE, WBE, and MBE/WBE contractors, subcontractors, and suppliers must be certified by the State of Missouri, Office of Equal Opportunity. No certifications from other Missouri certifying agencies will be accepted.

## **SECTION 002113 – INSTRUCTIONS TO BIDDERS**

### **1.0 - SPECIAL NOTICE TO BIDDERS**

- A. If awarded a contract, the Bidder's employees, and the employees of all subcontractors, who perform the work on the project must adhere to requirements in Section 013513 – Site Security and Health Requirements as applicable per Agency.
- B. The Bidder's prices shall include all city, state, and federal sales, excise, and similar taxes that may lawfully be assessed in connection with the performance of work, and the purchased of materials to be incorporated in the work. THIS PROJECT IS NOT TAX EXEMPT.

### **2.0 - BID DOCUMENTS**

- A. The number of sets obtainable by any one (1) party may be limited in accordance with available supply.
- B. For the convenience of contractors, sub-contractors and suppliers, copies of construction documents are on file at the office of the Director, Division of Facilities Management, Design and Construction and on the Division's web site - <https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans>.

### **3.0 - BIDDERS' OBLIGATIONS**

- A. Bidders must carefully examine the entire site of the work and shall make all reasonable and necessary investigations to inform themselves thoroughly as to the facilities available as well as to all the difficulties involved in the completion of all work in accordance with the specifications and the plans. Bidders are also required to examine all maps, plans and data mentioned in the specifications. No plea of ignorance concerning observable existing conditions or difficulties that may be encountered in the execution of the work under this contract will be accepted as an excuse for any failure or omission on the part of the contractor to fulfill in every detail all of the requirements of the contract, nor accepted as a basis for any claims for extra compensation.
- B. Under no circumstances will contractors give their plans and specifications to another contractor. Any bid received from a contractor whose name does not appear on the list of plan holders may be subject to rejection.

### **4.0 - INTERPRETATIONS**

- A. No bidder shall be entitled to rely on oral interpretations as to the meaning of the plans and specifications or the acceptability of alternate products, materials, form or type of construction. Every request for interpretation shall be made in writing and submitted with all supporting documents not less than five (5) working days before opening of bids. Every interpretation made to a bidder will be in the form of an addendum and will be sent as promptly as is practicable to all persons to whom plans and specifications have been issued. All such addenda shall become part of the contract documents.
- B. Approval for an "acceptable substitution" issued in the form of an addendum as per Paragraph 4A above, and as per Article 3.1 of the General Conditions; ACCEPTABLE SUBSTITUTIONS shall constitute approval for use in the project of the product.
- C. An "acceptable substitution" requested after the award of bid shall be approved if proven to the satisfaction of the Owner and the Designer as per Article 3.1, that the product is acceptable in design, strength, durability, usefulness, and convenience for the purpose intended. Approval of the substitution after award is at the sole discretion of the Owner.
- D. A request for "Acceptable Substitutions" shall be made on the Section 006325 Substitution Request Form. The request shall be sent directly to the project Designer. A copy of said request should also be mailed to the Owner, Division of Facilities Management, Design and Construction, Post Office Box 809, Jefferson City, Missouri 65102.

## **5.0 - BIDS AND BIDDING PROCEDURE**

- A. Bidders shall submit all submission forms and accompanying documents listed in SECTION 004113 – BID FORM, Article 5.0, ATTACHMENTS TO BID by the stated time or their bid will be rejected for being non-responsive.

Depending on the specific project requirements, **the following is a GENERIC list** of all possible bid forms that may be due with bid submittals and times when they may be due. Please check for specific project requirements on the proposal form (Section 004113). ***Not all of the following bid forms may be required to be submitted.***

### **Bid Submittal – due before stated date and time of bid opening (see IFB):**

004113	Bid Form (all pages are always required)
004322	Unit Prices Form
004336	Proposed Subcontractors Form
004337	MBE/WBE/SDVE Compliance Evaluation Form
004338	MBE/WBE/SDVE Eligibility Determination for Joint Ventures
004339	MBE/WBE/SDVE GFE Determination
004340	SDVE Business Form
004541	Affidavit of Work Authorization
004545	Anti-Discrimination Against Israel Act Certification form

- B. All bids shall be submitted without additional terms and conditions, modification or reservation on the bid forms with each space properly filled. Bids not on these forms will be rejected.
- C. All bids shall be accompanied by a bid bond executed by the bidder and a duly authorized surety company, certified check, cashier's check or bank draft made payable to the Division of Facilities Management, Design and Construction, State of Missouri, in the amount indicated on the bid form, Section 004113. Failure of the contractor to submit the full amount required shall be sufficient cause to reject his bid. The bidder agrees that the proceeds of the check, draft or bond shall become the property of the State of Missouri, if for any reason the bidder withdraws his bid after closing, or if on notification of award refuses or is unable to execute tendered contract, provide an acceptable performance and payment bond, provide evidence of required insurance coverage and/or provide required copies of affirmative action plans within ten (10) working days after such tender.
- D. The check or draft submitted by the successful bidder will be returned after the receipt of an acceptable performance and payment bond and execution of the formal contract. Checks or drafts of all other bidders will be returned within a reasonable time after it is determined that the bid represented by same will receive no further consideration by the State of Missouri. Bid bonds will only be returned upon request.

## **6.0 - SIGNING OF BIDS**

- A. A bid from an individual shall be signed as noted on the Bid Form.
- B. A bid from a partnership or joint venture shall require only one signature of a partner, an officer of the joint venture authorized to bind the venture or an attorney-in-fact. If the bid is signed by an officer of a joint venture or an attorney-in-fact, a document evidencing the individual's authority to execute contracts should be included with the bid form.
- C. A bid from a limited liability company (LLC) shall be signed by a manager or a managing member of the LLC.
- D. A bid from a corporation shall have the correct corporate name thereon and the signature of an authorized officer of the corporation manually written. Title of office held by the person signing for the corporation shall appear, along with typed name of said individual. Corporate license number shall be provided and, if a corporation organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached. In addition, for corporate proposals, the President or Vice-President should sign as the bidder. If the signator is other than the corporate president or vice president, the bidder must provide satisfactory evidence that the signator has the legal authority to bind the corporation.

- E. A bid should contain the full and correct legal name of the Bidder. If the Bidder is an entity registered with the Missouri Secretary of State, the Bidder's name on the bid form should appear as shown in the Secretary of State's records.
- F. The Bidder should include its corporate license number on the Bid Form and, if the corporation is organized in a state other than Missouri, a Certificate of Authority to do business in the State of Missouri shall be attached to the bid form.

#### **7.0 - RECEIVING BID SUBMITTALS**

- A. It is the bidder's sole responsibility to assure receipt by Owner of bid submittals by the date and time specified in the Invitation for Bid. Bids received after the date and time specified shall not be considered by the Owner.
- B. Bids must be submitted through the MissouriBUYS statewide eProcurement system (<https://www.missouribuy.com/>) in accordance with the instructions for that system. The Owner shall only accept bids submitted through MissouriBUYS. Bids received by the Owner through any other means, including hard copies, shall not be considered and will be discarded by the Owner unopened.
- C. To respond to an Invitation for Bid, the Bidder must first register with MissouriBUYS by going through the MissouriBUYS Home Page (<https://www.missouribuy.com/>), clicking the "Register" button at the top of the page, and completing the Vendor Registration. Once registered, the Bidder accesses its account by clicking the "Login" button at the top of the MissouriBUYS Home Page. Enter your USERID and PASSWORD, which the Bidder will select. Under Solicitations, select "View Current Solicitations." A new screen will open. Under "Filter by Agency" select "OA-FMDC-Contracts Chapter 8." Under "Filter by Opp. No." type in the State Project Number. Select "Submit." Above the dark blue bar, select "Other Active Opportunities." To see the Solicitation Summary, single click the Opp. No. (Project Number) and the summary will open. Single quick click each blue bar to open detailed information. The Bidder must read and accept the Original Solicitation Documents and complete all identified requirements. The Bidder should download and save all of the Original Solicitation Documents on its computer so that the Bidder can prepare its response to these documents. The Bidder should upload its completed response to the downloaded documents as an attachment to the electronic solicitation response.
- D. Step-by-step instructions for how a registered vendor responds to a solicitation electronically are provided in Section 001116 – Invitation For Bid.
- E. The Bidder shall submit its bid on the forms provided by the Owner on MissouriBUYS with each space fully and properly completed, including all amounts required for alternate bids, unit prices, cost accounting data, etc. The Owner may reject bids that are not on the Owner's forms or that do not contain all requested information.
- F. No Contractor shall stipulate in his bid any conditions not contained in the specifications or standard bid form contained in the contract documents. To do so may subject the Contractor's bid to rejection.
- G. The completed forms shall be without interlineations, alterations or erasures.

#### **8.0 - MODIFICATION AND WITHDRAWAL OF BIDS**

- A. Bidder may withdraw his bid at any time prior to scheduled closing time for receipt of bids, but no bidder may withdraw his bid for a period of twenty (20) working days after the scheduled closing time for receipt of bids.
- B. The Bidder shall modify his or her original bid by submitting a revised bid on MissouriBUYS.

#### **9.0 - AWARD OF CONTRACT**

- A. The Owner reserves the right to reject any and/or all bids and further to waive all informalities in bidding when deemed in the best interest of the State of Missouri.
- B. The Owner reserves the right to let other contracts in connection with the work, including but not by way of limitation, contracts for the furnishing and installation of furniture, equipment, machines, appliances and other apparatus.

- C. In awarding the contract the Owner may take into consideration the bidder's skill, facilities, capacity, experience, responsibility, previous work record, financial standing and the necessity of prompt and efficient completion of work herein described. Inability of any bidder to meet the requirements mentioned above may be cause for rejection of his bid. However, no contract will be awarded to any individual, partnership or corporation, who has had a contract with the State of Missouri declared in default within the preceding twelve months.
- D. Award of alternates, if any, will be made in numerical order unless all bids received are such that the order of acceptance of alternates does not affect the determination of the low bidder.
- E. No bid shall be considered binding upon the Owner until the written contract has been properly executed, a satisfactory bond has been furnished, evidence of required insurance coverage, submittal of executed Section 004541, Affidavit of Work Authorization form, documentation evidencing enrollment and participation in a federal work authorization program has been received and an affirmative action plan submitted. Failure to execute and return the contract and associated documents within the prescribed period of time shall be treated, at the option of the Owner, as a breach of bidder's obligation and the Owner shall be under no further obligation to bidder.
- F. If the successful bidder is doing business in the State of Missouri under a fictitious name, he shall furnish to Owner, attached to the Bid Form, a properly certified copy of the certificate of Registration of Fictitious Name from the State of Missouri, and such certificate shall remain on file with the Owner.
- G. Any successful bidder which is a corporation organized in a state other than Missouri shall furnish to the Owner, attached to the Bid Form, a properly certified copy of its current Certificate of Authority to do business in the State of Missouri, such certificate to remain on file with the Owner. No contract will be awarded by the Owner unless such certificate is furnished by the bidder.
- H. Any successful bidder which is a corporation organized in the State of Missouri shall furnish at its own cost to the Owner, if requested, a Certificate of Good Standing issued by the Secretary of State, such certificate to remain on file with the Owner.
- I. Transient employers subject to Sections 285.230 and 285.234, RSMo, (out-of-state employers who temporarily transact any business in the State of Missouri) may be required to file a bond with the Missouri Department of Revenue. No contract will be awarded by the Owner unless the successful bidder certifies that he has complied with all applicable provisions of Section 285.230-234.
- J. Sections 285.525 and 285.530, RSMo, require business entities to enroll and participate in a federal work authorization program in order to be eligible to receive award of any state contract in excess of \$5,000. Bidders should submit with their bid an Affidavit of Work Authorization (Section 004541) along with appropriate documentation evidencing such enrollment and participation. Section-004541, Affidavit of Work Authorization is located on the MissouriBUYS solicitation for this project. Bidders must also submit an E-Verify Memorandum before the Owner may award a contract to the Bidder. Information regarding a E-Verify is located at <https://www.uscis.gov/e-verify/>. The contractor shall be responsible for ensuring that all subcontractors and suppliers associated with this contract enroll in E-Verify.

#### **10.0 - CONTRACT SECURITY**

- A. The successful bidder shall furnish a performance/payment bond as set forth in General Conditions Article 6.1 on a condition prior to the State executing the contract and issuing a notice to proceed.

#### **11.0 - LIST OF SUBCONTRACTORS**

- A. If required by "Section 004113 – Bid Form," each bidder must submit as part of their bid a list of subcontractors to be used in performing the work (Section 004336). The list must specify the name of the single designated subcontractor, for each category of work listed in "Section 004336 - Proposed Subcontractors Form." If work within a category will be performed by more than one subcontractor, the bidder must provide the name of each subcontractor and specify the exact portion of the work to be done by each. Failure to list the Bidder's firm, or a subcontractor for each category of work identified on the Bid Form or the listing of more than one subcontractor for any category without designating the portion of work to be performed by each shall be cause for rejection of the bid. If the bidder intends to perform any of the designated subcontract work with the use of his own employees, the bidder shall make that fact

clear, by listing his own firm for the subject category. **If any category of work is left vacant, the bid shall be rejected.**

#### **12.0 - WORKING DAYS**

- A. Contract duration time is stated in working days and will use the following definition in determining the actual calendar date for contract completion:
  - 1. Working days are defined as all calendar days except Saturdays, Sundays and the following State of Missouri observed holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday, Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day.

#### **13.0 - AMERICAN AND MISSOURI - MADE PRODUCTS AND FIRMS**

- A. By signing the bid form and submitting a bid on this project, the Bidder certifies that it will use American and Missouri products as set forth in Article 1.7 of the General Conditions. Bidders are advised to review those requirements carefully prior to bidding.
- B. A preference shall be given to Missouri firms, corporations or individuals, or firms, corporations or individuals that maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less.
- C. Pursuant to Section 34.076, RSMo, a contractor or Bidder domiciled outside the boundaries of the State of Missouri shall be required, in order to be successful, to submit a bid the same percent less than the lowest bid submitted by a responsible contractor or Bidder domiciled in Missouri as would be required for such a Missouri domiciled contractor or Bidder to succeed over the bidding contractor or Bidder domiciled outside Missouri on a like contract or bid being let in the person's domiciliary state and, further, the contractor or Bidder domiciled outside the boundaries of Missouri shall be required to submit an audited financial statement as would be required of a Missouri domiciled contractor or Bidder on a like contract or bid being let in the domiciliary state of that contractor or Bidder.

#### **14.0 – ANTI-DISCRIMINATION AGAINST ISRAEL ACT CERTIFICATION:**

- A. Pursuant to section 34.600, RSMo, if the Bidder meets the section 34.600, RSMo, definition of a “company” and the Bidder has ten or more employees, the Bidder must certify in writing that the Bidder is not currently engaged in a boycott of goods or services from the State of Israel as defined in section 34.600, RSMo, and shall not engage in a boycott of goods or services from the State of Israel, if awarded a contract, for the duration of the contract. The Bidder is requested to complete and submit the applicable portion of Section 004545 - Anti-Discrimination Against Israel Act Certification with their Bid Form. The applicable portion of the exhibit must be submitted prior to execution of a contract by the Owner and issuance of Notice to Proceed. If the exhibit is not submitted, the Owner shall rescind its Intent to Award and move to the next lowest, responsive, responsible bidder.

#### **15.0 - MBE/WBE/SDVE INSTRUCTIONS**

- A. Definitions:
  - 1. “**MBE**” means a Minority Business Enterprise.
  - 2. “**MINORITY**” has the same meaning as set forth in 1 C.S.R. 10-17.010.
  - 3. “**MINORITY BUSINESS ENTERPRISE**” has the same meaning as set forth in section 37.020, RSMo.
  - 4. “**WBE**” means a Women’s Business Enterprise.
  - 5. “**WOMEN’S BUSINESS ENTERPRISE**” has the same meaning as set forth in section 37.020, RSMo.
  - 6. “**SDVE**” means a Service-Disabled Veterans Enterprise.
  - 7. “**SERVICE-DISABLED VETERAN**” has the same meaning as set forth in section 34.074, RSMo.



8. **“SERVICE-DISABLED VETERAN ENTERPRISE”** has the same meaning as “Service-Disabled Veteran Business” set forth in section 34.074, RSMo.

B. MBE/WBE/SDVE General Requirements:

1. For all bids greater than \$100,000, the Bidder shall obtain MBE, WBE and SDVE participation in an amount equal to or greater than the percentage goals set forth in the Invitation for Bid and the Bid Form, unless the Bidder is granted a Good Faith Effort waiver by the Director of the Division, as set forth below. If the Bidder does not meet the MBE, WBE and SDVE goals, or make a good faith effort to do so, the Bidder shall be non-responsive, and its bid shall be rejected.
2. The Bidder should submit with its bid all of the information requested in the MBE/WBE/SDVE Compliance Evaluation Form for every MBE, WBE, or SDVE subcontractor or material supplier the Bidder intends to use for the contract work. The Bidder is required to submit all appropriate MBE/WBE/SDVE documentation before the stated time and date set forth in the Invitation for Bid. If the Bidder fails to provide such information by the specified date and time, the Owner shall reject the bid.
3. The Director reserves the right to request additional information from a Bidder to clarify the Bidder’s proposed MBE, WBE, and/or SDVE participation. The Bidder shall submit the clarifying information requested by the Owner within two (2) Working Days of receiving the request for clarification.
4. Pursuant to section 34.074, RSMo, a Bidder that is a SDVE doing business as Missouri firm, corporation, or individual, or that maintains a Missouri office or place of business, shall receive a three-point bonus preference in the contract award evaluation process. The bonus preference will be calculated and applied by reducing the bid amount of the eligible SDVE by three percent of the apparent low responsive bidder’s bid. Based on this calculation, if the eligible SDVE’s evaluation is less than the apparent low responsive bidder’s bid, the eligible SDVE’s bid becomes the apparent low responsive bid. This reduction is for evaluation purposes only, and will have no impact on the actual amount(s) of the bid or the amount(s) of any contract awarded. In order to be eligible for the SDVE preference, the Bidder must complete and submit with its bid the Missouri Service Disabled Veteran Business Form, and any information required by the form. The form is available on the MissouriBUYS solicitation for this project.

C. Computation of MBE/WBE/SDVE Goal Participation:

1. A Bidder who is a MBE, WBE, or SDVE may count 100% of the contract towards the MBE, WBE or SDVE goal, less any amounts awarded to another MBE, WBE or SDVE. (NOTE: A MBE firm that bids as general contractor must obtain WBE and SDVE participation; a WBE firm that bids as a general contractor must obtain MBE and SDVE participation; and a SDVE firm that bids as general contractor must obtain MBE and WBE participation.) In order for the remaining contract amount to be counted towards the MBE, WBE or SDVE goal, the Bidder must complete the MBE/WBE/SDVE Compliance Evaluation Form (Section 004337) identifying itself as an MBE, WBE or SDVE.
2. The total dollar value of the work granted to a certified MBE, WBE or SDVE by the Bidder shall be counted towards the applicable goal.
3. Expenditures for materials and supplies obtained from a certified MBE, WBE, or SDVE supplier or manufacturer may be counted towards the MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE assumes the actual and contractual responsibility for the provision of the materials and supplies.
4. The total dollar value of the work granted to a second or subsequent tier subcontractor or a supplier may be counted towards a Bidder’s MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE properly assumes the actual and contractual responsibility for the work.
5. The total dollar value of work granted to a certified joint venture equal to the percentage of the ownership and control of the MBE, WBE, or SDVE partner in the joint venture may be counted towards the MBE/WBE/SDVE goals.
6. Only expenditures to a MBE, WBE, or SDVE that performs a commercially useful function in the work may be counted towards the MBE, WBE and SDVE goals. A MBE, WBE, or SDVE performs a commercially useful function when it is responsible for executing a distinct element of the work

and carrying out its responsibilities by actually performing, managing and supervising the work or providing supplies or manufactured materials.

D. Certification of MBE/WBE/SDVE Subcontractors:

1. In order to be counted towards the goals, an MBE or WBE must be certified by the State of Missouri Office of Equal Opportunity and an SDVE must be certified by the State of Missouri, Office of Administration, Division of Purchasing and Material Management or by the Department of Veterans Affairs.
2. The Bidder may determine the certification status of a proposed MBE or WBE subcontractor or supplier by referring to the Office of Equal Opportunity (OEO)'s online MBE/WBE directory (<https://apps1.mo.gov/MWBCertifiedFirms/>). The Bidder may determine the eligibility of a SDVE subcontractor or supplier by referring to the Division of Purchasing and Materials Management's online SDVE directory (<https://oa.mo.gov/sites/default/files/sdvelisting.pdf>) or the Department of Veterans Affairs' directory (<https://vetbiz.va.gov/basic-search/>).
3. Additional information, clarifications, etc., regarding the listings in the directories may be obtained by calling the Division at (573)751-3339 and asking to speak to the Contract Specialist of record as shown in the Supplementary Conditions (Section 007300).

E. Waiver of MBE/WBE/SDVE Participation:

1. If a Bidder has made a good faith effort to secure the required MBE, WBE and/or SDVE participation and has failed, the Bidder shall submit with its bid the information requested in MBE/WBE/SDVE Good Faith Effort (GFE) Determination form. The GFE forms are located on the MissouriBUYS solicitation for this project. The Director will determine if the Bidder made a good faith effort to meet the applicable goals. If the Director determines that the Bidder did not make a good faith effort, the bid shall be rejected as being nonresponsive to the bid requirements. Bidders who demonstrate that they have made a good faith effort to include MBE, WBE, and/or SDVE participation will be determined to be responsive to the applicable participation goals, regardless of the percent of actual participation obtained, if the bid is otherwise acceptable.
2. In determining whether a Bidder has made a good faith effort to obtain MBE, WBE and/or SDVE participation, the Director may evaluate the factors set forth in 1 CSR 30-5.010(6)(C) and the following:
  - a. The amount of actual participation obtained;
  - b. How and when the Bidder contacted potential MBE, WBE, and SDVE subcontractors and suppliers;
  - c. The documentation provided by the Bidder to support its contacts, including whether the Bidder provided the names, addresses, phone numbers, and dates of contact for MBE/WBE/SDVE firms contacted for specific categories of work;
  - d. If project information, including plans and specifications, were provided to MBE/WBE/SDVE subcontractors;
  - e. Whether the Bidder made any attempts to follow-up with MBE, WBE or SDVE firms prior to bid;
  - f. Amount of bids received from any of the subcontractors and/or suppliers that the Bidder contacted;
  - g. The Bidder's stated reasons for rejecting any bids;
3. If no bidder has obtained any participation in a particular category (MBE/WBE/SDVE) or made a good faith effort to do so, the Director may waive that goal rather than rebid.

F. Contractor MBE/WBE/SDVE Obligations

1. If awarded a contract, the Bidder will be contractually required to subcontract with or obtain materials from the MBE, WBE, and SDVE firms listed in its bid, in amounts equal to or greater than the dollar amount bid, unless the amount is modified in writing by the Owner.
2. If the Contractor fails to meet or maintain the participation requirements contained in the Contractor's bid, the Contractor must satisfactorily explain to the Director why it cannot comply with the requirement and why failing meeting the requirement was beyond the Contractor's control. If the Director finds the Contractor's explanation unsatisfactory, the Director may take any appropriate action including, but not limited to:
  - a. Declaring the Contractor ineligible to participate in any contracts with the Division for up to twelve (12) months (suspension); and/or
  - b. Declaring the Contractor be non-responsive to the Invitation for Bid, or in breach of contract and rejecting the bid or terminating the contract.
3. If the Contractor replaces an MBE, WBE, or SDVE during the course of this contract, the Contractor shall replace it with another MBE, WBE, or SDVE or make a good faith effort to do so. All MBE, WBE and SDVE substitutions must be approved by the Director.
4. The Contractor shall provide the Owner with regular reports on its progress in meeting its MBE/WBE/SDVE obligations. At a minimum, the Contractor shall report the dollar-value of work completed by each MBE, WBE, or SDVE during the preceding month and the cumulative total of work completed by each MBE, WBE or SDVE to date with each monthly application for payment. The Contractor shall also make a final report, which shall include the total dollar-value of work completed by each MBE, WBE, and SDVE during the entire contract.

**STATE OF MISSOURI**  
**DIVISION OF FACILITIES MANAGEMENT,**  
**DESIGN AND CONSTRUCTION**  
***MBE/WBE/SDVE DIRECTORY***

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The MBE/WBE Directory for goods and services is maintained by the Office of Equal Opportunity (OEO). The current Directory can be accessed at the following web address:

<https://apps1.mo.gov/MWBCertifiedFirms/>

Please note that you may search by MBE, WBE, or both as well as by region, location of the business by city or state, as well as by commodity or service.

The SERVICE DISABLED VETERAN ENTERPRISE (SDVE) Directory (s) may be accessed at the following web addresses:

<https://oa.mo.gov/sites/default/files/sdvelisting.pdf>

<https://vetbiz.va.gov/basic-search/>



# State of Missouri Construction Contract

**THIS AGREEMENT** is made (DATE) by and between:

## ***Contractor Name and Address***

hereinafter called the "Contractor,"

and the **State of Missouri**, hereinafter called the "**Owner**", represented by the Office of Administration, Division of Facilities Management, Design and Construction, on behalf of the Department of Mental Health.

WITNESSETH, that the Contractor and the Owner, for the consideration stated herein agree as follows:

## **ARTICLE 1. STATEMENT OF WORK**

The Contractor shall furnish all labor and materials and perform all work required for furnishing and installing all labor, materials, equipment and transportation and everything necessarily inferred from the general nature and tendency of the plans and specifications for the proper execution of the work for:

**Project Name:**                      **Change in Scope Rebid:  
Upgrade Fire Alarm and Security Systems  
Center for Behavioral Medicine  
Kansas City, Missouri, Missouri**

**Project Number:**                **M1903-01**

in strict accordance with the Contract Documents as enumerated in Article 7, all of which are made a part hereof.

## **ARTICLE 2. TIME OF COMPLETION**

The contract performance time is **280 working days** from the transmittal date of this agreement. The contract completion date is **MONTH, DAY, YEAR**. This time includes ten (10) working days for the Contractor to receive, sign and return the contract form along with required bonding and insurance certificates. Failure of the Contractor to provide correct bonding and insurance within the ten (10) working days shall not be grounds for a time extension. Receipt of proper bonding and insurance is a condition precedent to the formation of the contract and if not timely received, may result in forfeiture of the Contractor's bid security. Work may not commence until the Owner issues a written Notice to Proceed and must commence within seven (7) working days thereafter.

## **ARTICLE 3. LIQUIDATED DAMAGES**

Whenever time is mentioned in this contract, time shall be and is of the essence of this contract. The Owner would suffer a loss should the Contractor fail to have the work embraced in this contract fully completed on or before the time above specified. THEREFORE, the parties hereto realize in order to adjust satisfactorily the damages on account of such failure that it might be impossible to compute accurately or estimate the amount of such loss or damages which the Owner would sustain by reason of failure to complete fully said work within the time required by this contract. The Contractor hereby covenants and agrees to pay the Owner, as and for **liquidated damages, the sum of \$700** per day for each and every day, Sunday and legal holidays excepted, during which the work remains incomplete and unfinished. Any sum which may be due the Owner for such damages shall be deducted and retained by the Owner from any balance which may be due the Contractor when said work shall have been finished and accepted. But such provisions shall not release the Bond of the Contractor from liability according to its terms. In case of failure to complete, the Owner will be under no obligation to show or prove any actual or specific loss or damage.

#### ARTICLE 4. CONTRACT SUM

The Owner shall pay the Contractor for the prompt, faithful and efficient performance of the conditions and undertakings of this contract, subject to additions, and deductions as provided herein, in current funds the sum of:

Base Bid: \$

Alternate No. 1: \$

Alternate No. 2: \$

**TOTAL CONTRACT AMOUNT: (\$CONTRACT AMOUNT)**

#### ARTICLE 5. PREVAILING WAGE RATE

**MISSOURI PREVAILING WAGE LAW (Sections 290.210 to 290.340, RSMo):** The Contractor shall pay not less than the specified hourly rate of wages, as set out in the wage order attached to and made part of the specifications for work under this contract, to all workers performing work under the contract, in accordance with sections 290.210 to 290.340, RSMo. The Contractor shall forfeit a penalty to the Owner of one hundred dollars per day (or portion of a day) for each worker that is paid less than the specified rates for any work done under the contract by the Contractor or by any subcontractor, in accordance with section 290.250, RSMo.

**DAVIS-BACON ACT:** If this Project is financed in whole or in part from Federal funds (as indicated in the Instructions to Bidders or other bid or contract documents for this Project), then this contract shall be subject to all applicable federal labor statutes, rules and regulations, including provisions of the Davis-Bacon Act, 40 U.S.C. §3141 et seq., and the “Federal Labor Standards Provisions,” as further set forth in Section 007333 – Supplementary General Conditions for Federally Funded/Assisted Construction Projects, which is incorporated into the contract by reference. Where the Missouri Prevailing Wage Law and the Davis-Bacon Act require payment of different wages for work performed under this contract, the Contractor and all Subcontractors shall pay the greater of the wages required under either law, on a classification by classification basis.

#### ARTICLE 6. MINORITY/WOMEN/SERVICE DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION

The Contractor has been granted a waiver of the 10% MBE and 10% WBE and 3% SDVE participation goals. The Contractor agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows: (OR)

The Contractor has met the MBE/WBE/SDVE participation goals and agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows:

MBE/WBE/SDVE Firm:	Subcontract Amt:\$
MBE/WBE/SDVE Firm:	Subcontract Amt:\$
MBE/WBE/SDVE Firm:	Subcontract Amt:\$

Total \$

MBE/WBE/SDVE assignments identified above shall not be changed without a contract change signed by the Owner.

The Director of the Division of Facilities Management, Design and Construction or his Designee shall be the final authority to resolve disputes and disagreements between the Contractor and the MBE/WBE/SDVE firms listed above when such disputes impact the subcontract amounts shown above.

#### ARTICLE 7. CONTRACT DOCUMENTS

The following documents are hereby incorporated into this contract by reference (all division/section numbers and titles are as utilized in the Project Manual published by the Owner for this Project):

1. Division 0 – Procurement and Contracting Information, including, but not limited to:
  - a. Invitation for Bid (Section 001116)
  - b. Instructions to Bidders (Section 002113)
  - c. Supplementary Instructions to Bidders (if applicable) (Section 002213)
  - d. The following documents as completed and executed by the Contractor and accepted by the Owner, if applicable:

- i. Bid Form (Section 004113)
  - ii. Unit Prices (Section 004322)
  - iii. Proposed Contractors Form (Section 004336)
  - iv. MBE, WBE, SDVE Compliance Evaluation Form(s) (Section 004337)
  - v. MBE, WBE, SDVE Eligibility Determination Form for Joint Ventures (Section 004338)
  - vi. MBE, WBE, SDVE Good Faith Effort (GFE) Determination Form (Section 004339)
  - vii. Missouri Service Disabled Veteran Business Form (Section 004340)
  - viii. Affidavit of Work Authorization (Section 004541)
  - ix. Affidavit for Affirmative Action (Section 005414)
- e. Performance and Payment Bond, completed and executed by the Contractor and surety (Section 006113)
- f. General Conditions (Section 007213)
- g. Supplementary Conditions (Section 007300)
- h. Supplementary General Conditions for Federally Funded/Assisted Construction Projects (Section 007333)
- i. Wage Rate(s) (Section 007346)
- 2. Division 1 – General Requirements
- 3. All Drawings identified in the Project Manual
- 4. All Technical Specifications included in the Project Manual
- 5. Addenda, if applicable

By signature below, the parties hereby execute this contract document.

**APPROVED:**

\_\_\_\_\_  
 Brenda L. Verslues, Interim Director  
 Division of Facilities Management,  
 Design and Construction

\_\_\_\_\_  
 Contractor's Authorized Signature

I, Corporate Secretary, certify that I am Secretary of the corporation named above and that (CONTRACTOR NAME), who signed said contract on behalf of the corporation, was then (TITLE) of said corporation and that said contract was duly signed for and in behalf of the corporation by authority of its governing body, and is within the scope of its corporate powers.

\_\_\_\_\_  
 Corporate Secretary



STATE OF MISSOURI  
OFFICE OF ADMINISTRATION  
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION  
**AFFIDAVIT FOR AFFIRMATIVE ACTION**

PROJECT NUMBER

NAME

First being duly sworn on oath states: that

he/she is the ☐ sole proprietor ☐ partner ☐ officer or ☐ manager or managing member of

NAME

a ☐ sole proprietorship ☐ partnership  
☐ limited liability company (LLC)

or ☐ corporation, and as such, said proprietor, partner, or officer is duly authorized to make this  
affidavit on behalf of said sole proprietorship, partnership, or corporation; that under the contract known as

PROJECT TITLE

Less than 50 persons in the aggregate will be employed and therefore, the applicable Affirmative Action  
requirements as set forth in Article 1.4 of the General Conditions of the State of Missouri have been met.

PRINT NAME & SIGNATURE

DATE

**NOTARY INFORMATION**

NOTARY PUBLIC EMBOSSER SEAL	STATE OF	COUNTY (OR CITY OF ST. LOUIS)	USE RUBBER STAMP IN CLEAR AREA BELOW
	SUBSCRIBED AND SWORN BEFORE ME, THIS		
	DAY OF	YEAR	
	NOTARY PUBLIC SIGNATURE	MY COMMISSION EXPIRES	
	NOTARY PUBLIC NAME (TYPED OR PRINTED)		



**SECTION 006113 - PERFORMANCE AND PAYMENT BOND FORM**

KNOW ALL MEN BY THESE PRESENTS, THAT we \_\_\_\_\_

as principal, and \_\_\_\_\_

\_\_\_\_\_ as Surety, are held and firmly bound unto the

STATE OF MISSOURI. in the sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_ )

for payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

WHEREAS, the Principal has, by means of a written agreement dated the \_\_\_\_\_

day of \_\_\_\_\_, 20\_\_\_\_\_, enter into a contract with the State of Missouri for

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Insert Project Title and Number)

NOW, THEREFORE, if the Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the State of Missouri, with or without notice to the Surety and during the life of any guaranty required under the contract; and shall also faithfully perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made with or without notice to the Surety; and shall also promptly make payment for materials incorporated, consumed or used in connection with the work set forth in the contract referred to above, and all insurance premiums, both compensation and all other kinds of insurance, on said work, and for all labor performed on such work, whether by subcontractor or otherwise, at not less than the prevailing hourly rate of wages for work of a similar character (exclusive of maintenance work) in the locality in which the work is performed and not less than the prevailing hourly rate of wages for legal holiday and overtime work (exclusive of maintenance work) in the locality in which the work is performed both as determined by the Department of Labor and Industrial Relations or determined by the Court of Appeal, as provided for in said contract and in any and all duly authorized modifications of said contract that may be hereafter made, with or without notice to the Surety, then, this obligation shall be void and of no effect, but it is expressly understood that if the Principal should make default in or should fail to strictly, faithfully and efficiently do, perform and comply with any or more of the covenants, agreements, stipulations, conditions, requirements or undertakings, as specified in or by the terms of said contract, and with the time therein named, then this obligation shall be valid and binding upon each of the parties hereto and this bond shall remain in full force and effect; and the same may be sued on at the instance of any material man, laborer, mechanic, subcontractor, individual, or otherwise to whom such payment is due, in the name of the State of Missouri, to the use of any such person.

AND, IT IS FURTHER specifically provided that any modifications which may hereinafter be made in the terms of the contract or in the work to be done under it or the giving by the Owner of any extension of the time for the performance of the contract or any other forbearance on the part of either the Owner or the Principal to the other, shall not in any way release the Principal and the Surety, or either or any of them, their heirs, executors, administrators and successors, from their liability hereunder, notice to the Surety of any such extension, modifications or forbearance being hereby waived.

IN WITNESS WHEREOF, the above bounden parties have executed the within instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

**AS APPLICABLE:**

**AN INDIVIDUAL**

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

**A PARTNERSHIP**

Name of Partner: \_\_\_\_\_

Signature of Partner: \_\_\_\_\_

Name of Partner: \_\_\_\_\_

Signature of Partner: \_\_\_\_\_

**CORPORATION**

Firm Name: \_\_\_\_\_

Signature of President: \_\_\_\_\_

**SURETY**

Surety Name: \_\_\_\_\_

Attorney-in-Fact: \_\_\_\_\_

Address of Attorney-in-Fact: \_\_\_\_\_

Telephone Number of Attorney-in-Fact: \_\_\_\_\_

Signature Attorney-in-Fact: \_\_\_\_\_

**NOTE:** Surety shall attach Power of Attorney



STATE OF MISSOURI  
OFFICE OF ADMINISTRATION  
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION  
**PRODUCT SUBSTITUTION REQUEST**

PROJECT NUMBER

PROJECT TITLE AND LOCATION

CHECK APPROPRIATE BOX

- ☐ **SUBSTITUTION PRIOR TO BID OPENING**  
(Minimum of (5) working days prior to receipt of Bids as per Article 4 – Instructions to Bidders)
- ☐ **SUBSTITUTION FOLLOWING AWARD**  
(Maximum of (20) working days from Notice to Proceed as per Article 3 – General Conditions)

FROM: BIDDER/CONTRACTOR (PRINT COMPANY NAME)

TO: ARCHITECT/ENGINEER (PRINT COMPANY NAME)

Bidder/Contractor hereby requests acceptance of the following product or systems as a substitution in accordance with provisions of Division One of the Bidding Documents:

SPECIFIED PRODUCT OR SYSTEM

SPECIFICATION SECTION NO.

SUPPORTING DATA

- ☐ Product data for proposed substitution is attached (include description of product, standards, performance, and test data)
- ☐ Sample ☐ Sample will be sent, if requested

**QUALITY COMPARISON**

	SPECIFIED PRODUCT	SUBSTITUTION REQUEST
NAME, BRAND		
CATALOG NO.		
MANUFACTURER		
VENDOR		

**PREVIOUS INSTALLATIONS**

PROJECT	ARCHITECT/ENGINEER
LOCATION	DATE INSTALLED

**SIGNIFICANT VARIATIONS FROM SPECIFIED PRODUCT**

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**REASON FOR SUBSTITUTION**

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**DOES PROPOSED SUBSTITUTION AFFECT OTHER PARTS OF WORK?**☐ YES ☐ NO

IF YES, EXPLAIN

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**SUBSTITUTION REQUIRES DIMENSIONAL REVISION OR REDESIGN OF STRUCTURE OR A/E WORK**☐ YES ☐ NO**BIDDER'S/CONTRACTOR'S STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT:**

We have investigated the proposed substitution. We believe that it is equal or superior in all respects to specified product, except as stated above; that it will provide the same Warranty as specified product; that we have included complete implications of the substitution; that we will pay redesign and other costs caused by the substitution which subsequently become apparent; and that we will pay costs to modify other parts of the Work as may be needed, to make all parts of the Work complete and functioning as a result of the substitution.

BIDDER/CONTRACTOR

DATE

**REVIEW AND ACTION**☐ Resubmit Substitution Request with the following additional information:

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☐ Substitution is accepted.☐ Substitution is accepted with the following comments:

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☐ Substitution is not accepted.

ARCHITECT/ENGINEER

DATE



STATE OF MISSOURI  
OFFICE OF ADMINISTRATION  
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION  
**FINAL RECEIPT OF PAYMENT AND RELEASE**

PROJECT NUMBER

KNOW ALL MEN BY THESE PRESENT THAT:                    hereinafter called "Subcontractor" who heretofore entered into an agreement with                    hereinafter called "Contractor", for the performance of work and/or furnishing of material for the construction of the project entitled

(PROJECT TITLE, PROJECT LOCATION, AND PROJECT NUMBER)

at

(ADDRESS OF PROJECT)

for the State of Missouri (Owner) which said subcontract is by this reference incorporated herein, in consideration of such final payment by Contractor.

DOES HEREBY:

1. ACKNOWLEDGE that they have been **PAID IN FULL** all sums due for work and materials contracted or done by their Subcontractors, Material Vendors, Equipment and Fixture Suppliers, Agents and Employees, or otherwise in the performance of the Work called for by the aforesaid Contract and all modifications or extras or additions thereto, for the construction of said project or otherwise.
2. RELEASE and fully, finally, and forever discharge the Owner from any and all suits, actions, claims, and demands for payment for work performed or materials supplied by Subcontractor in accordance with the requirements of the above referenced Contract.
1. REPRESENT that all of their Employees, Subcontractors, Material Vendors, Equipment and Fixture Suppliers, and everyone else has been **paid in full** all sums due them, or any of them, in connection with performance of said Work, or anything done or omitted by them, or any of them in connection with the construction of said improvements, or otherwise.

DATED this                    day of                    , 20                    .

NAME OF SUBCONTRACTOR

BY (TYPED OR PRINTED NAME)

SIGNATURE

TITLE

ORIGINAL: FILE/Closeout Documents



STATE OF MISSOURI  
OFFICE OF ADMINISTRATION  
DIVISION OF FACILITIES MANAGEMENT,  
DESIGN AND CONSTRUCTION

**MBE/WBE/SDVE PROGRESS REPORT**

Remit with ALL Progress and Final Payments

(Please check appropriate box) ☐CONSULTANT ☐CONSTRUCTION

PAY APP NO.	PROJECT NUMBER
CHECK IF FINAL <input type="checkbox"/> <b>FINAL</b>	DATE

PROJECT TITLE			
PROJECT LOCATION			
FIRM			
ORIGINAL CONTRACT SUM (Same as Line Item 1. on Form A of Application for Payment) \$		TOTAL CONTRACT SUM TO DATE (Same as Line Item 3. on Form A of Application for Payment) \$	
THE TOTAL MBE/WBE/SDVE PARTICIPATION DOLLAR AMOUNT OF THIS PROJECT AS INDICATED IN THE ORIGINAL CONTRACT: \$			
SELECT MBE, WBE, SDVE	TOTAL AMOUNT OF SUBCONTRACT	\$ AMOUNT PAID-TO-DATE (include approved contract changes)	CONSULTANT/SUBCONSULTANT OR CONTRACTOR/SUBCONTRACTOR/SUPPLIER COMPANY NAME
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	
<input type="checkbox"/> MBE <input type="checkbox"/> WBE <input type="checkbox"/> SDVE	\$	\$	

## **INSTRUCTIONS FOR MBE/WBE/SDVE PROGRESS REPORT**

### **CONTRACTOR OR CONSULTANT TO FILL OUT AND REMIT WITH EACH PAY APPLICATION:**

The MBE/WBE/SDVE Progress Report for the project is issued with the contract comprising values reported in the consultant's Proposal or on the successful contractor's Section 004337 Compliance Evaluation Forms.

At Initial Pay Application fill in the following:

1. Pay App No. Start with 1.
2. Fill in the Project Number and Date.
3. Enter Project Title, Project Location, and Firm.
4. Fill in the "Original Contract Sum" and "Total Contract Sum To Date" (Reference applicable Line Items on Form A of Application for Payment).
5. Indicate the Total Participation Dollar Amount from the Original Contract.
6. Select MBE, WBE, or SDVE for each Consultant/Subconsultant or Contractor/Subcontractor/Supplier.
7. Enter the "Total Amount of Subcontract", "\$ Amount (Paid-To-Date)", and Company Name.

For all subsequent Pay Applications fill in the following:

1. Pay App No.
2. If Final Pay App, check box.
3. Fill in the Project Number and Date.
4. Enter Project Title, Project Location, and Firm
5. At each Pay App fill in the "Original Contract Sum" and "Total Contract Sum To Date" (reference applicable Line Items on Form A of Application for Payment).
6. Indicate the Total Participation Dollar Amount from the Original Contract.
7. Select MBE, WBE, or SDVE for each Consultant/Subconsultant or Contractor/Subcontractor/Supplier
8. Enter the "Total Amount of Subcontract", "\$ Amount (Paid-To-Date)", and Company Name.



STATE OF MISSOURI  
OFFICE OF ADMINISTRATION  
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION  
**AFFIDAVIT – COMPLIANCE WITH PREVAILING WAGE LAW**

PROJECT NUMBER

Before me, the undersigned Notary Public, in and for the County of \_\_\_\_\_

State of \_\_\_\_\_ personally came and appeared \_\_\_\_\_

(NAME)

of the \_\_\_\_\_

(POSITION)

(NAME OF THE COMPANY)

(a corporation) (a partnership) (a proprietorship) and after being duly sworn did depose and say that all provisions and requirements set out in Chapter 290, Sections 290.210 through and including 290.340, Missouri Revised Statutes, pertaining to the payment of wages to workmen employed on public works project have been fully satisfied and there has been no exception to the full and completed compliance with said provisions and requirements

and with Wage Determination No: \_\_\_\_\_ issued by the

Department of Labor and Industrial Relations, State of Missouri on the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_

in carrying out the contract and working in connection with \_\_\_\_\_

(NAME OF PROJECT)

Located at \_\_\_\_\_ in \_\_\_\_\_ County

(NAME OF THE INSTITUTION)

Missouri, and completed on the \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_

SIGNATURE

**NOTARY INFORMATION**

NOTARY PUBLIC EMBOSSER OR  
BLACK INK RUBBER STAMP SEAL

STATE

COUNTY (OR CITY OF ST. LOUIS)

SUBSCRIBED AND SWORN BEFORE ME, THIS

DAY OF

YEAR

**USE RUBBER STAMP IN CLEAR AREA BELOW**

NOTARY PUBLIC SIGNATURE

MY COMMISSION  
EXPIRES

NOTARY PUBLIC NAME (TYPED OR PRINTED)

FILE: Closeout Documents



# GENERAL CONDITIONS

## INDEX

### ARTICLE:

#### 1. General Provisions

- 1.1. Definitions
- 1.2. Drawings and Specifications
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- 1.5. Anti-Kickback
- 1.6. Patents and Royalties
- 1.7. Preference for American and Missouri Products and Services
- 1.8. Communications
- 1.9. Separate Contracts and Cooperation
- 1.10. Assignment of Contract
- 1.11. Indemnification
- 1.12. Disputes and Disagreements

#### 2. Owner/Designer Responsibilities

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- 3.1. Acceptable Substitutions
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#### 6.1. Bond

#### 6.2. Insurance

#### 7. Termination or Suspension of Contract

#### 7.1. For Site Conditions

#### 7.2. For Cause

#### 7.3. For Convenience

## SECTION 007213 - GENERAL CONDITIONS

- A. These General Conditions apply to each section of these specifications. The Contractor is subject to the provisions contained herein.
- B. The General Conditions are intended to define the relationship of the Owner, the Designer and the Contractor thereby establishing certain rules and provisions governing the operation and performance of the work so that the work may be performed in a safe, orderly, expeditious and workmanlike manner.

## ARTICLE 1 – GENERAL PROVISIONS

### ARTICLE 1.1 - DEFINITIONS

As used in these contract documents, the following terms shall have the meanings and refer to the parties designated in these definitions.

- 1. **"COMMISSIONER"**: The Commissioner of the Office of Administration.
- 2. **"CONSTRUCTION DOCUMENTS"**: The "Construction Documents" shall consist of the Project Manual, Drawings and Addenda.
- 3. **"CONSTRUCTION REPRESENTATIVE"**: Whenever the term "Construction Representative" is used, it shall mean the Owner's Representative at the work site.
- 4. **"CONTRACTOR"**: Party or parties who have entered into a contract with the Owner to furnish work under these specifications and drawings.
- 5. **"DESIGNER"**: When the term "Designer" is used herein, it shall refer to the Architect, Engineer, or Consultant of Record specified and defined in Paragraph 2.0 of the Supplemental Conditions, or his duly authorized representative. The Designer may be either a consultant or state employee.
- 6. **"DIRECTOR"**: Whenever the term "Director" is used, it shall mean the Director of the Division of Facilities Management, Design and Construction or his Designee, representing the Office of Administration, State of Missouri. The Director is the agent of the Owner.
- 7. **"DIVISION"**: Shall mean the Division of Facilities Management, Design and Construction, State of Missouri.

- 8. **"INCIDENTAL JOB BURDENS"**: Shall mean those expenses relating to the cost of work, incurred either in the home office or on the job-site, which are necessary in the course of doing business but are incidental to the job. Such costs include office supplies and equipment, postage, courier services, telephone expenses including long distance, water and ice and other similar expenses.
- 9. **"JOINT VENTURE"**: An association of two (2) or more businesses to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills and knowledge.
- 10. **"OWNER"**: Whenever the term "Owner" is used, it shall mean the State of Missouri.
- 11. **"PROJECT"**: Wherever the term "Project" is used, it shall mean the work required to be completed by the construction contract.
- 12. **"PROJECT MANUAL"**: The "Project Manual" shall consist of Introductory Information, Invitation for Bid, Instructions to Bidders, Bid Documents, Additional Information, Standard Forms, General Conditions, Supplemental General Conditions, General Requirements and Technical Specifications.
- 13. **"SUBCONTRACTOR"**: Party or parties who contract under, or for the performance of part or this entire Contract between the Owner and Contractor. The subcontract may or may not be direct with the Contractor.
- 14. **"WORK"**: Labor, material, supplies, plant and equipment required to perform and complete the service agreed to by the Contractor in a safe, expeditious, orderly and workmanlike manner so that the project shall be complete and finished in the best manner known to each respective trade.
- 15. **"WORKING DAYS"**: are all calendar days except Saturdays, Sundays and the following holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday (observed), Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day (observed), Thanksgiving Day, Christmas Day.

### ARTICLE 1.2 DRAWINGS AND SPECIFICATIONS

- A. In case of discrepancy between drawings and specifications, specifications shall govern. Should discrepancies in architectural drawings, structural drawings and mechanical drawings occur,

architectural drawings shall govern and, in case of conflict between structural and mechanical drawings, structural drawings shall govern.

- B. Specifications are separated into titled divisions for convenience of reference only and to facilitate letting of contracts and subcontracts. The Contractor is responsible for establishing the scope of work for subcontractors, which may cross titled divisions. Neither the Owner nor Designer will establish limits and jurisdiction of subcontracts.
- C. Figured dimensions take precedence over scaled measurements and details over smaller scale general drawings. In the event of conflict between any of the documents contained within the contract, the documents shall take precedence and be controlling in the following sequence: addenda, supplementary general conditions, general conditions, division 1 specifications, technical division specifications, drawings, bid form and instructions to bidders.
- D. Anything shown on drawings and not mentioned in these specifications or vice versa, as well as any incidental work which is obviously necessary to complete the project within the limits established by the drawings and specifications, although not shown on or described therein, shall be performed by the Contractor at no additional cost as a part of his contract.
- E. Upon encountering conditions differing materially from those indicated in the contract documents, the Contractor shall promptly notify the Designer and Construction Representative in writing before such conditions are disturbed. The Designer shall promptly investigate said conditions and report to the Owner, with a recommended course of action. If conditions do materially differ and cause an increase or decrease in contract cost or time required for completion of any portion of the work, a contract change will be initiated as outlined in Article 4 of these General Conditions.
- E. Only work included in the contract documents is authorized, and the Contractor shall do no work other than that described therein or in accordance with appropriately authorized and approved contract changes.

#### **ARTICLE 1.3 - COMPLIANCE WITH LAWS, PERMITS, REGULATIONS AND INSPECTIONS**

- A. Since the Owner is the State of Missouri, municipal or political subdivisions, zoning ordinances, construction codes (other than licensing of trades), and other like ordinances are not applicable to construction on Owner's property, and Contractor will not be required to submit drawings and specifications to any municipal or political subdivision, authority, obtain

construction permits or any other licenses (other than licensing of trades) or permits from or submit to inspections by any municipality or political subdivision relating to the construction for this project. All permits or licenses required by municipality or political subdivision for operation on property not belonging to Owner shall be obtained by and paid for by Contractor. Each Contractor shall comply with all applicable laws, ordinances, rules and regulations that pertain to the work of this contract.

- B. Contractors, subcontractors and their employees engaged in the businesses of electrical, mechanical, plumbing, carpentry, sprinkler system work, and other construction related trades shall be licensed to perform such work by the municipal or political subdivision where the project is located, if such licensure is required by local code. Local codes shall dictate the level (master, journeyman, and apprentice) and the number, type and ratio of licensed tradesmen required for this project within the jurisdiction of such municipal or political subdivision.
- C. Equipment and controls manufacturers and their authorized service and installation technicians that do not maintain an office within the jurisdiction of the municipal or political subdivision but are a listed or specified contractor or subcontractor on this project are exempt from Paragraph 1.3 B above.
- D. The Contractor shall post a copy of the wage determination issued for the project and included as a part of the contract documents, in a prominent and easily accessible location at the site of construction for the duration of the project.
- E. Any contractor or subcontractor to such contractor at any tier signing a contract to work on this project shall provide a ten-hour Occupational Safety and Health Administration (OSHA) construction safety program for their on-site employees which includes a course in construction safety and health approved by OSHA or a similar program approved by the Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. The contractor shall forfeit as a penalty to the public body on whose behalf the contract is made or awarded, two thousand five hundred dollars plus one hundred dollars for each employee employed by the contractor or subcontractor, for each calendar day, or portion thereof, such employee is employed without the required training.

#### **ARTICLE 1.4 - NONDISCRIMINATION IN EMPLOYMENT**

- A. The Contractor and his subcontractors will not discriminate against individuals based on race,

color, religion, national origin, sex, disability, or age, but may use restrictions which relate to bona fide occupational qualifications. Specifically, the Contractor and his subcontractors shall not discriminate:

1. Against recipients of service on the basis of race, color, religion, national origin, sex, disability or age.
2. Against any employee or applicant, for employment on the basis of race, color, religion, national origin, sex or otherwise qualified disability status.
3. Against any applicant for employment or employee on the basis of age, where such applicant or employee is between ages 40 and 70 and where such Contractor employs at least 20 persons.
4. Against any applicant for employment or employee on the basis of that person's status as a disabled or Vietnam-era veteran.

The Contractor and his Subcontractors will take affirmative action to insure applicants for employment and employees are treated equally without regard to race, color, religion, national origin, sex, disability, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion and transfer; recruitment or recruitment advertising; and selection for training, including apprenticeship. The Contractor and his Subcontractors will give written notice of their commitments under this clause to any labor union with which they have bargaining or other agreements.

- B. The Contractor and his subcontractors shall develop, implement, maintain and submit in writing to the Owner an affirmative action program if at least fifty (50) persons in the aggregate are employed under this contract. If less than fifty (50) persons in the aggregate are to be employed under this contract, the Contractor shall submit, in lieu of the written affirmative action program, a properly executed Affidavit for Affirmative Action in the form included in the contract specifications. For the purpose of this section, an "affirmative action program" means positive action to influence all employment practices (including, but not limited to, recruiting, hiring, promoting and training) in providing equal employment opportunity regardless of race, color, sex, national origin, religion, age (where the person affected is between age 40 and 70), disabled and Vietnam-era veteran status, and disability. Such "affirmative action program" shall include:

1. A written policy statement committing the total organization to affirmative action and

assigning management responsibilities and procedures for evaluation and dissemination;

2. The identification of a person designated to handle affirmative action;
3. The establishment of non-discriminatory selection standards, objective measures to analyze recruitment, an upward mobility system, a wage and salary structure, and standards applicable to lay-off, recall, discharge, demotion and discipline;
4. The exclusion of discrimination from all collective bargaining agreements; and
5. Performance of an internal audit of the reporting system to monitor execution and to provide for future planning.

In the enforcement of this non-discrimination clause, the Owner may use any reasonable procedures available, including, but not limited to: requests, reports, site visits and inspection of relevant documents of contractors and subcontractors.

- C. In the event of the Contractor's or his subcontractor's noncompliance with any provisions of this Article of the Contract, the Owner may cancel this contract in whole or in part or require the Contractor to terminate his contract with the subcontractor.

#### **ARTICLE 1.5 - ANTI-KICKBACK**

No employee of the division, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract or in any part hereof. No officer, employee, designer, attorney, or administrator of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

#### **ARTICLE 1.6 - PATENTS AND ROYALTIES**

- A. The Contractor shall hold and save the Owner and its officers, agents, servants and employees harmless from liabilities of any nature or kind, including cost and expenses, for, or on account of, any patented or unpatented invention, process, article or appliance manufactured or used in the performance of this contract, including its use by the Owner, unless otherwise specifically stipulated in the contract documents.
- B. If the Contractor uses any design, device or materials covered by letters, patent or copyright,

the Contractor shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, without exception, that the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract and shall indemnify the Owner for any cost, expense or damage it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

#### **ARTICLE 1.7 - PREFERENCE FOR AMERICAN AND MISSOURI PRODUCTS AND SERVICES**

- A. By virtue of statutory authority a preference will be given to Missouri labor and to products of mines, forests and quarries of the state of Missouri when they are found in marketable quantities in the state, and all such materials shall be of the best quality and suitable character that can be obtained at reasonable market prices, all as provided for in Section 8.280, Missouri Revised Statutes and Cumulative Supplements.
- B. Furthermore, pursuant to Section 34.076 Missouri Revised Statutes and Cumulative Supplements, a preference shall be given to those persons doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less. In addition, in order for a non-domiciliary bidder to be successful, his bid must be that same percentage lower than a domiciliary Missouri bidder's bid, as would be required for a Missouri bidder to successfully bid in the non-domiciliary state.
- C. In accordance with the Missouri Domestic Products Procurement Act Section 34.350 RSMo and Cumulative Supplements any manufactured goods or commodities used or supplied in the performance of this contract or any subcontract thereto shall be manufactured, assembled or produced in the United States, unless the specified products are not manufactured, assembled or produced in the United States in sufficient quantities to meet the agency's requirements or cannot be manufactured, assembled or produced in the United States within the necessary time in sufficient quantities to meet the contract requirements, or if obtaining the specified products manufactured, assembled or produced in the

United States would increase the cost of this contract for purchase of the product by more than ten percent.

#### **ARTICLE 1.8 - COMMUNICATIONS**

- A. All notices, requests, instructions, approvals and claims must be in writing and shall be delivered to the Designer and copied to the Construction Representative for the project except as required by Article 1.12 Disputes and Disagreements, or as otherwise specified by the Owner in writing as stated in Section 012600. Any such notice shall be deemed to have been given as of the time of actual receipt.
- B. The Contractor shall attend on-site progress and coordination meetings, as scheduled by the Construction Representative, no less than once a month.
- C. The Contractor shall ensure that major subcontractors and suppliers shall attend monthly progress meetings as necessary to coordinate the work, and as specifically requested by the Construction Representative.

#### **ARTICLE 1.9 - SEPARATE CONTRACTS AND COOPERATION**

- A. The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.
- B. The Contractor shall consult the drawings for all other contractors in connection with this work. Any work conflicting with the above shall be brought to the attention of the Owner's Representative before the work is performed. If the Contractor fails to do this, and constructs any work which interferes with the work of another contractor, the Contractor shall remove any part so conflicting and rebuild same, as directed by the Owner's Representative at no additional cost to the Owner.
- C. Each contractor shall be required to coordinate his work with other contractors so as to afford others reasonable opportunity for execution of their work. No contractor shall delay any other contractor by neglecting to perform contract work at the proper time. If any contractor causes delay to another, they shall be liable directly to that contractor for such delay in addition to any liquidated damages which might be due the Owner.
- D. Should the Contractor or project associated subcontractors refuse to cooperate with the instructions and reasonable requests of other Contractors or other subcontractors in the overall

coordinating of the work, the Owner may take such appropriate action and issue directions, as required, to avoid unnecessary and unwarranted delays.

- E. Each Contractor shall be responsible for damage done to Owner's or other Contractor's property by him/her or workers in his employ through their fault or negligence.
- F. Should a Contractor sustain any damage through any act or omission of any other Contractor having a contract with the Owner, the Contractor so damaged shall have no claim or cause of action against the Owner for such damage, but shall have a claim or cause of action against the other Contractor to recover any and all damages sustained by reason of the acts or omissions of such Contractor. The phrase "acts or omissions" as used in this section shall be defined to include, but not be limited to, any unreasonable delay on the part of any such contractors.

#### **ARTICLE 1.10 - ASSIGNMENT OF CONTRACT**

- A. No assignment by Contractor of any amount or any part of this contract or of the funds to be received there under will be recognized unless such assignment has had the written approval of the Director and the surety has been given due notice of such assignment and has furnished written consent thereto. In addition to the usual recitals in assignment contracts, the following language must be set forth: "It is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor of this contract and to claims or liens for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms or corporations rendering such services or supplying such materials."

#### **ARTICLE 1.11 - INDEMNIFICATION**

- A. Contractor agrees to indemnify and save harmless Owner and its respective commissioners, officers, officials, agents, consultants and employees and Designer, their agents, servants and employees, from and against any and all liability for damage arising from injuries to persons or damage to property occasioned by any acts or omissions of Contractor, any subcontractors, agents, servants or employees, including any and all expense, legal or otherwise, which may be incurred by Owner or Designer, its agents, servants or employees, in defense of any claim, action or suit.
- B. The obligations of the Contractor under this paragraph shall not extend to the liability of the Designer, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, contract changes, design or specifications, or (2) giving of or the failure to

give directions or instructions by the Designer, his agents or employees as required by this contract documents provided such giving or failure to give is the primary cause of the injury or damage.

#### **ARTICLE 1.12 - DISPUTES AND DISAGREEMENTS**

It is hereby expressly agreed and understood that in case any controversy or difference of opinion arises during construction, best efforts will be given to resolution at the field level. Should those efforts be unsuccessful, the Contractor has the right to appeal in writing, the decision of the Director's Designee to the Director at Room 730 Truman Building, P.O. Box 809, Jefferson City, Missouri 65102. The decision of the Director shall be final and binding on all parties.

#### **ARTICLE 2 -- OWNER/DESIGNER RESPONSIBILITIES**

- A. The Owner shall give all orders and directions contemplated under this contract relative to the execution of the work. During progress of work the Owner will be represented at the project site by the Construction Representative and/or Designer, whose responsibilities are to see that this contract is properly fulfilled.
- B. The Owner shall at all times have access to the work whenever it is in preparation or progress. The Contractors shall provide proper facilities for such access and for inspection and supervision.
- C. All materials and workmanship used in the work shall be subject to the inspection of the Designer and Construction Representative, and any work which is deemed defective shall be removed, rebuilt or made good immediately upon notice. The cost of such correction shall be borne by the Contractor. Contractor shall not be entitled to an extension of the contract completion date in order to remedy defective work. All rejected materials shall be immediately removed from the site of the work.
- D. If the Contractor fails to proceed at once with the correction of rejected defective materials or workmanship, the Owner may, by separate contract or otherwise, have the defects remedied or rejected. Materials removed from the site and charge the cost of the same against any monies which may be due the Contractor, without prejudice to any other rights or remedies of the Owner.
- E. Failure or neglect on the part of Owner to observe faulty work, or work done which is not in accordance with the drawings and specifications shall not relieve the Contractor from responsibility

for correcting such work without additional compensation.

- F. The Owner shall have the right to direct the Contractor to uncover any completed work.
  - 1. If the Contractor fails to adequately notify the Construction Representative and/or Designer of an inspection as required by the Contract Documents, the Contractor shall, upon written request, uncover the work. The Contractor shall bear all costs associated with uncovering and again covering the work exposed.
  - 2. If the Contractor is directed to uncover work, which was not otherwise required by the Contract Documents to be inspected, and the work is found to be defective in any respect, no compensation shall be allowed for this work. If, however, such work is found to meet the requirements of this contract, the actual cost of labor and material necessarily involved in the examination and replacement plus 10% shall be allowed the Contractor.
- G. The Designer shall give all orders and directions contemplated under this contract relative to the scope of the work and shall give the initial interpretation of the contract documents.
- H. The Owner may file a written notice to the Contractor to dismiss immediately any subcontractors, project managers, superintendents, foremen, workers, watchmen or other employees whom the Owner may deem incompetent, careless or a hindrance to proper or timely execution of the work. The Contractor shall comply with such notice as promptly as practicable without detriment to the work or its progress.
- I. If in the Owner's judgment it becomes necessary at any time to accelerate work, when ordered by the Owner in writing, the Contractor shall redirect resources to such work items and execute such portions of the work as may be required to complete the work within the current approved contract schedule.

### **ARTICLE 3 -- CONTRACTOR RESPONSIBILITIES**

The Contractor shall register and utilize the Owner's eBuilder digital project management system for submission of documents described in the following sections. This includes but is not limited to submittals as required by designer, payment applications, Request for Information (RFI), construction change orders, Request for Proposals (RFP), Designer Supplemental Instructions (DSI), etc.

### **ARTICLE 3.1 -- ACCEPTABLE SUBSTITUTIONS**

- A. The Contractor may request use of any article, device, product, material, fixture, form or type of construction which in the judgment of the Owner and Designer is equal in all respects to that named. Standard products of manufacturers other than those specified will be accepted when, prior to the ordering or use thereof, it is proven to the satisfaction of the Owner and Designer that they are equal in design, strength, durability, usefulness and convenience for the purpose intended.
- B. Any changes required in the details and dimensions indicated on the drawings for the substitution of products other than those specified shall be properly made at the expense of the Contractor requesting the substitution or change.
- C. The Contractor shall submit a request for such substitutions in writing to the Owner and Designer within twenty (20) working days after the date of the "Notice to Proceed." Thereafter no consideration will be given to alternate forms of accomplishing the work. This Article does not preclude the Owner from exercising the provisions of Article 4 hereof.
- D. Any request for substitution by the Contractor shall be submitted in accordance with SECTION 002113 - INSTRUCTIONS TO BIDDERS.
- E. When a material has been approved, no change in brand or make will be permitted unless:
  - 1. Written verification is received from the manufacturer stating they cannot make delivery on the date previously agreed, or
  - 2. Material delivered fails to comply with contract requirements.

### **ARTICLE 3.2 -- SUBMITTALS**

- A. The Contractor's submittals must be submitted with such promptness as to allow for review and approval so as not to cause delay in the work. The Contractor shall coordinate preparation and processing of submittals with performance of construction activities.

Coordinate each submittal with fabrication, = purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

Submit four (4) copies to the Designer and additional copies as required for the subcontractors and material suppliers. Also provide copies to meet the requirements for maintenance manuals.

- B. All subcontractors' shop drawings and schedules shall be submitted by the Contractor and shall bear evidence that Contractor has received, reviewed, and approved them. Any shop drawings and

schedules submitted without this evidence will be returned to the Contractor for resubmission.

- C. The Contractor shall include with the shop drawing, a letter indicating any and all deviations from the drawings and/or specifications. Failure to notify the Designer of such deviations will be grounds for subsequent rejection of the related work or materials. If, in the opinion of the Designer, the deviations are not acceptable, the Contractor will be required to furnish the item as specified and indicated on the drawings.
- D. The Designer shall check shop drawings and schedules with reasonable promptness and approve them only if they conform to the design concept of the project and comply with the information given in the contract documents. The approval shall not relieve the Contractor from the responsibility to comply with the drawings and specifications, unless the Contractor has called the Designer's attention to the deviation, in writing, at the time of submission and the Designer has knowingly approved thereof. An approval of any such modification will be given only under the following conditions:
  - 1. It is in the best interest of the Owner
  - 2. It does not increase the contract sum and/or completion time
  - 3. It does not deviate from the design intent
  - 4. It is without prejudice to any and all rights under the surety bond.
- E. No extension of time will be granted because of the Contractor's failure to submit shop drawings and schedules in ample time to allow for review, possible resubmission, and approval. Fabrication of work shall not commence until the Contractor has received approval. The Contractor shall furnish prints of approved shop drawings and schedules to all subcontractors whose work is in any way related to the work under this contract. Only prints bearing this approval will be allowed on the site of construction
- F. The Contractor shall maintain a complete file on-site of approved shop drawings available for use by the Construction Representative.

#### **ARTICLE 3.3 – AS-BUILT DRAWINGS**

- A. The Contractor shall update a complete set of the construction drawings, shop drawings and schedules of all work monthly by marking changes, and at the completion of their work (prior to submission of request for final payment) note all changes and turn the set over to the Construction Representative. The updates shall show all addenda, all field changes that were made to adapt to field conditions, changes resulting from contract

changes or supplemental instructions, and all locations of structures, buried installations of piping, conduit, and utility services. All buried and concealed items both inside and outside shall be accurately located as to depth and referenced to permanent features such as interior or exterior wall faces and dimensions shall be given in a neat and legible manner in a contrasting colored pencil or ink. If approved by the Designer, an electronic file format may be provided.

#### **ARTICLE 3.4 – GUARANTY AND WARRANTIES**

##### **A. General Guaranty**

- 1. Neither the final certificate of payment nor any provision in the contract documents nor partial use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with contract requirements.
- 2. The Contractor or surety shall remedy any defects in the work and pay for any damage to property resulting there from which shall appear within a period of one (1) year from the date of substantial completion unless a longer period is otherwise specified or a differing guaranty period has been established in the substantial completion certificate. The Owner will give notice of observed defects with reasonable promptness.
- 3. In case of default on the part of the Contractor in fulfilling this part of this contract, the Owner may correct the work or repair the damage and the cost and expense incurred in such event shall be paid by or recoverable from the Contractor or surety.
- 4. The work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's guaranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment

##### **B. Extended Warranty**

Manufacturer's certificates of warranty shall be obtained for all major equipment. Warranty shall be obtained for at least one year. Where a longer



period is offered at no additional cost or called for in the specific equipment specifications, the longer period shall govern.

#### **ARTICLE 3.5 -- OPERATION AND MAINTENANCE MANUALS**

A. Immediately after equipment submittals are approved and no later than ten (10) working days prior to the substantial completion inspection, the Contractor shall provide to the Designer three (3) copies of operating instructions and service manuals, containing the following:

1. Start-up and Shut-down Procedures: Provide a step-by-step write up of all major equipment. When manufacturer's printed start-up, trouble shooting and shut-down procedures are available; they may be incorporated into the operating manual for reference.
2. Operating Instructions: Written operating instructions shall be included for the efficient and safe operation of all equipment.
3. Equipment List: List of all major equipment as installed shall be prepared to include model number, capacities, flow rate, name plate data, shop drawings and air and water balance reports.
4. Service Instructions: Provide the following information for all pieces of equipment.
  - a. Recommended spare parts including catalog number and name of local supplier or factory representative.
  - b. Belt sizes, types, and lengths.
  - c. Wiring diagrams.
5. Manufacturer's Certificate of Warranty as described in Article 3.4.
6. Prior to the final payment, furnish to the Designer three (4) copies of parts catalogs for each piece of equipment furnished by him/her on the project with the components identified by number for replacement ordering.

B. Submission of operating instructions shall be done in the following manner.

1. Manuals shall be in quadruplicate, and all materials shall be bound into volumes of standard 8½" x 11" hard binders. Large drawings too bulky to be folded into 8½" x 11" shall be separately bound or folded and in envelopes, cross referenced and indexed with the manuals.
2. The manuals shall identify project name, project number, and include the name and

address of the Contractor, subcontractors and manufacturers who were involved with the activity described in that particular manual.

3. Internally subdivide the binder contents with permanent page dividers, logically organized with tab titles clearly printed under reinforced laminated plastic tabs.
4. Contents: Prepare a Table of Contents for each volume, with each product or system description identified.

#### **ARTICLE 3.6 -- OTHER CONTRACTOR RESPONSIBILITIES**

- A. The Contractor shall keep on site, during progress of the work, a competent superintendent satisfactory to the Construction Representative. The superintendent shall represent the Contractor and all agreements made by the superintendent shall be binding. The superintendent shall carefully study and compare all drawings, specifications and other instructions and shall promptly notify the Construction Representative and Designer, in writing, any error, inconsistency or omission which may be discovered. The superintendent shall coordinate all work on the project. Any change of the superintendent shall be approved by the Construction Representative.
- B. Contractor shall, at all times, enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him/her.
- C. The Contractor shall supply sufficient labor, material, plant and equipment and pay when due any laborer, subcontractor or supplier for supplies furnished and otherwise prosecute the work with diligence to prevent work stoppage and insure completion thereof within the time specified.
- D. The Contractor and each of his subcontractors shall submit to the Construction Representative, through the Designer such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this contract.
- E. The Contractor, subcontractors, and material suppliers shall upon written request, give the Owner access to all time cards, material invoices, payrolls, estimates, profit and loss statements, and all other direct or indirect costs related to this work.
- F. The Contractor shall be responsible for laying out all contract work such as layout of architectural, structural, mechanical and electrical work, which shall be coordinated with layouts of subcontractors

for general construction work. The Contractor is also responsible for unloading, uncrating and handling of all materials and equipment to be erected or placed by him/her, whether furnished by Contractor or others. No extra charges or compensation will be allowed as a result of failure to verify dimensions before ordering materials or fabricating items.

- G. The Contractor must notify the Construction Representative at least one working day before placing concrete or burying underground utilities, pipelines, etc.
- H. Contractors shall prearrange time with the Construction Representative for the interruption of any facility operation. Unless otherwise specified in these documents, all connections, alterations or relocations as well as all other portions of the work will be performed during normal working hours.
- I. The Contractor shall coordinate all work so there will not be prolonged interruptions of existing equipment operation. Any existing plumbing, heating, ventilating, air conditioning or electrical disconnections necessary for the project, which affect portions of this construction or building or any other building must be scheduled with the Construction Representative to minimize or avoid any disruption of facility operations. In no case, unless previously approved in writing by the Construction Representative, shall utilities be left disconnected at the end of a work day or over a weekend. Any interruption of utilities either intentionally or accidentally shall not relieve the Contractor responsible for the interruption from the responsibility to repair and restore the utility to normal service. Repairs and restoration shall be made before the workers responsible for the repair and restoration leave the job.
- J. Contractors shall limit operations and storage of materials to the area within the project, except as necessary to connect to existing utilities, and shall not encroach on neighboring property. The Contractor shall be responsible for repair of their damage to property on or off the project site occurring during construction of project. All such repairs shall be made to the satisfaction of the property owner.
- K. Unless otherwise permitted, all materials shall be new and both workmanship and materials shall be of the best quality.
- L. Unless otherwise provided and stipulated within these specifications, the Contractor shall furnish, construct, and/or install and pay for materials, devices, mechanisms, equipment, all necessary personnel, utilities including, but not limited to water, heat, light and electric power, transportation

services, applicable taxes of every nature, and all other facilities necessary for the proper execution and completion of the work.

- M. Contractor shall carefully examine the plans and drawings and shall be responsible for the proper fitting of his material, equipment and apparatus into the building.
- N. The Contractor or subcontractors shall not overload, or permit others to overload, any part of any structure during the performance of this contract.
- O. All temporary shoring, bracing, etc., required for the removal of existing work and/or for the installation of new work shall be included in this contract. The Contractor shall make good, at no cost to the Owner, any damage caused by improper support or failure of shoring in any respect. Each Contractor shall be responsible for shoring required to protect his work or adjacent property and improvements of Owner and shall be responsible for shoring or for giving written notice to adjacent property owners. Shoring shall be removed only after completion of permanent supports.
- P. The Contractor shall provide at the proper time such material as is required for support of the work. If openings are required, whether shown on drawings or not, the Contractor shall see that they are properly constructed.
- Q. During the performance of work the Contractor shall be responsible for providing and maintaining warning signs, lights, signal devices, barricades, guard rails, fences and other devices appropriately located on site which will give proper and understandable warning to all persons of danger of entry onto land, structure or equipment.
- R. The Contractor shall be responsible for protection, including weather protection, and proper maintenance of all equipment and materials.
- S. The Contractor shall be responsible for care of the finished work and shall protect same from damage or defacement until substantial completion by the Owner. If the work is damaged by any cause, the Contractor shall immediately begin to make repairs in accordance with the drawings and specifications. Contractor shall be liable for all damage or loss unless attributable to the acts or omissions of the Owner or Designer. Any claim for reimbursement shall be submitted in accordance with Article 4. After substantial completion the Contractor will only be responsible for damage resulting from acts or omissions of the Contractor or subcontractors through final warranty.
- T. In the event the Contractor encounters an unforeseen hazardous material, the Contractor

shall immediately stop work in the area affected and report the condition to the Owner and Designer in writing. The Contractor shall not be required, pursuant to Article 4, to perform, any work relating to hazardous materials.

- U. In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 4.
- V. Before commencing work, Contractors shall confer with the Construction Representative and facility representative and review any facility rules and regulations which may affect the conduct of the work.
- W. Project signs will only be erected on major projects and only as described in the specifications. If no sign is specified, none shall be erected.

#### **ARTICLE 3.7 -- SUBCONTRACTS**

- A. Subcontractor assignments as identified in the bid form shall not be changed without written approval of the Owner. The Owner will not approve changes of a listed subcontractor unless the Contractor documents, to the satisfaction of the Owner that the subcontractor cannot or will not perform the work as specified.
- B. The Contractor is fully responsible to the Owner for the acts and omissions of all subcontractors and of persons either directly or indirectly employed by them.
- C. Every subcontractor shall be bound by the applicable terms and provisions of these contract documents, but no contractual relationship shall exist between any subcontractor and the Owner unless the right of the Contractor to proceed with the work is suspended or this contract is terminated as herein provided, and the Owner in writing elects to assume the subcontract.
- D. The Contractor shall upon receipt of "Notice to Proceed" and prior to submission of the first payment request, notify the Designer and Construction Representative in writing of the names of any subcontractors to be used in addition to those identified in the bid form and all major material suppliers proposed for all parts of the work.

#### **ARTICLE 4 -- CHANGES IN THE WORK**

##### **4.1 CHANGES IN THE WORK**

- A. The Construction Representative, without giving notice to the surety and without invalidating this contract, may order extra work or make changes by

altering, adding to or deducting from the work, this contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract. A claim for extension of time caused by any change must be adjusted at the time of ordering such change. No future request for time will be considered.

- B. Each Contract Change shall include all costs required to perform the work including all labor, material, equipment, overheads and profit, delay, disruptions, or other miscellaneous expenses. No subsequent requests for additional compensation including claims for delay, disruption, or reduced efficiency as a result of each change will be considered. Values from the Schedule of Values will not be binding as a basis for additions to or deductions from the contract price.
- C. The amount of any adjustment in this contract price for authorized changes shall be agreed upon before such changes become effective and shall be determined, through submission of a request for proposal, as follows:
  - 1. By an acceptable fixed price proposal from the Contractor. Breakdowns shall include all takeoff sheets of each Contractor and subcontractor. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.
  - 2. By a cost-plus-fixed-fee (time and material) basis with maximum price, total cost not to exceed said maximum. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.
  - 3. By unit prices contained in Contractor's original bid form and incorporated in the construction contract.
- D. Overhead and Profit on Contract Changes shall be applied as follows:

- 1. The overhead and profit charge by the Contractor and all subcontractors shall be considered to include, but is not limited to: incidental job burdens, small truck (under 1 ton) expense, mileage, small hand tools,

- warranty costs, company benefits and general office overhead. Project supervision including field supervision and job site office expense shall be considered a part of overhead and profit unless a compensable time extension is granted.
2. The percentages for overhead and profit charged on Contract Changes shall be negotiated, and may vary according to the nature, extent, and complexity of the work involved. However, the overhead and profit for the Contractor or subcontractor actually performing the work shall not exceed 14%. When one or more tiers of subcontractors are used, in no event shall any Contractor or subcontractor receive as overhead and profit more than 3% of the cost of the work performed by any of his subcontractors. In no case shall the total overhead and profit paid by the Owner on any Contract Changes exceed twenty percent (20%) of the cost of materials, labor and equipment (exclusive of Contractor or any Subcontractor overhead and profit) necessary to put the contract change work in place.
  3. The Contractor will be allowed to add the cost of bonding and insurance to their cost of work. This bonding and insurance cost shall not exceed 2% and shall be allowed on the total cost of the added work, including overhead and profit.
  4. On proposals covering both increases and decreases in the amount of this contract, the application of overhead and profit shall be on the net change in the cost of the work.
  5. The percentage for overhead and profit to be credited to the Owner on Contract Changes that are solely decreases in the quantity of work or materials shall be negotiated, and may vary according to the nature, extent and complexity of the work involved, but in no case shall be less than ten percent (10%). If the percentage for overhead and profit charged for work added by Contract Changes for this contract has been negotiated to less than 10%, the negotiated rate shall then apply to credits as well.
- E. No claim for an addition to this contract sum shall be valid unless authorized as aforesaid in writing by the Owner. In the event that none of the foregoing methods are agreed upon, the Owner may order the Contractor to perform work on a time and material basis. The cost of such work shall be determined by the Contractor's actual labor and material cost to perform the work plus overhead and profit as outlined herein. The

Designer and Construction Representative shall approve the Contractor's daily time and material invoices for the work involved.

- F. If the Contractor claims that any instructions involve extra cost under this contract, the Contractor shall give the Owner's Representative written notice thereof within a reasonable time after the receipt of such instructions, and in any event before proceeding to execute the work. No such claim shall be valid unless so made and authorized by the Owner, in writing.
- G. In an emergency affecting the safety of life or of the structure or of adjoining property, the Contractor, without special instruction or authorization from the Construction Representative, is hereby permitted to act at their discretion to prevent such threatened loss or injury. The Contractor shall submit a claim for compensation for such emergency work in writing to the Owner's Representative.

#### **ARTICLE 4.2 – CHANGES IN COMPLETION TIME**

- A. Extension of the number of work days stipulated in the Contract for completion of the work with compensation may be made when:
  1. The contractor documents that proposed Changes in the work, as provided in Article 4.1, extends construction activities critical to contract completion date, OR
  2. The Owner suspends all work for convenience of the Owner as provided in Article 7.3, OR
  3. An Owner caused delay extends construction activities critical to contract completion (except as provided elsewhere in these General Conditions). The Contractor is to review the work activities yet to begin and evaluate the possibility of rescheduling the work to minimize the overall project delay.
- B. Extension of the number of work days stipulated in the Contract for completion of the work without compensation may be made when:
  1. Weather-related delays occur, subject to provisions for the inclusion of a specified number of "bad weather" days when provided for in Section 012100-Allowances, OR
  2. Labor strikes or acts of God occur, OR
  3. The work of the Contractor is delayed on account of conditions which were beyond the control of the Contractor, subcontractors or suppliers, and were not the result of their fault or negligence.
- C. No time extension or compensation will be provided for delays caused by or within the control

of the Contractor, subcontractors or suppliers and for concurrent delays caused by the Owner.

- D. The Contractor shall notify the Owner promptly of any occurrence or conditions which in the Contractor's opinion results in a need for an extension of time. The notice shall be in writing and shall include all necessary supporting materials with details of any resultant costs and be submitted in time to permit full investigation and evaluation of the Contractor's claim. The Owner shall promptly acknowledge the Contractor's notice and, after recommendation from the Owner's Representative and/or Designer, shall provide a decision to the Contractor. Failure on the part of the Contractor to provide such notice and to detail the costs shall constitute a waiver by the Contractor of any claim. Requests for extensions of time shall be for working days only.

## **ARTICLE 5 - CONSTRUCTION AND COMPLETION**

### **ARTICLE 5.1 – CONSTRUCTION COMMENCEMENT**

- A. Upon receipt of the "Intent to Award" letter, the Contractor must submit the following properly executed instruments to the Owner:

1. Contract;
2. Performance/payment bond as described in Article 6.1;
3. Certificates of Insurance, or the actual policies themselves, showing that the Contractor has obtained the insurance coverage required by Article 6.2.
4. Written Affirmative Action Plans as required in Article 1.4.

Above referenced items must be received by the Owner within ten (10) working days after the effective date of the contract. If not received, the Owner may treat the failure to timely submit them as a refusal by the Contractor to accept a contract for this work and may retain as liquidated damages the Contractor's bid bond, cashier's check or certified check as provided in the Instructions to Bidders. Upon receipt the Owner will issue a "Notice to Proceed" with the work to the Contractor.

- B. Within the time frame noted in Section 013200 - Schedules, following receipt of the "Notice to Proceed", the Contractor shall submit to the Owner a progress schedule and schedule of values, showing activities through the end of the contract period. Should the Contractor not receive written notification from the Owner of the disapproval of the schedule of values within fifteen (15) working

days, the Contractor may consider it approved for purpose of determining when the first monthly Application and Certification for Payment may be submitted.

- C. The Contractor may commence work upon receipt of the Division of Facilities Management, Design and Construction's "Notice to Proceed" letter. Contractor shall prosecute the work with faithfulness and energy, and shall complete the entire work on or before the completion time stated in the contract documents or pay to the Owner the damages resulting from the failure to timely complete the work as set out within Article 5.4.

## **ARTICLE 5.2 -- PROJECT CONSTRUCTION**

- A. Each Contractor shall submit for the Owner's approval, in reproducible form, a progress schedule showing the rate of progress and the order of the work proposed to carry on various phases of the project. The schedule shall be in conformance with the requirements outlined in Section 013200 – Schedules.
- B. Contractor shall employ and supply a sufficient force of workers, material, and equipment and shall pay when due, any worker, subcontractor or supplier and otherwise prosecute the work with such diligence so as to maintain the rate of progress indicated on the progress schedule, prevent work stoppage, and insure completion of the project within the time specified.

## **ARTICLE 5.3 -- PROJECT COMPLETION**

- A. Substantial Completion. A Project is substantially complete when construction is essentially complete and work items remaining to be completed can be done without interfering with the Owner's ability to use the Project for its intended purpose.

1. Once the Contractor has reached what they believe is Substantial Completion, the Contractor shall notify the Designer and the Construction Representative of the following:
  - a. That work is essentially complete with the exception of certain listed work items. The list shall be referred to as the "Contractor's Punch."
  - b. That all Operation and Maintenance Manuals have been assembled and submitted in accordance with Article 3.5A.
  - c. That the Work is ready for inspection by the Designer and Construction Representative. The Owner shall be entitled to a minimum of ten working

days notice before the inspection shall be performed.

2. If the work is acceptable, the Owner shall issue a Certificate of Substantial Completion, which shall set forth the responsibilities of the Owner and the Contractor for utilities, security, maintenance, damage to the work and risk of loss. The Certificate shall also identify those remaining items of work to be performed by the Contractor. All such work items shall be complete within 30 working days of the date of the Certificate, unless the Certificate specifies a different time. If the Contractor shall be required to perform tests that must be delayed due to climatic conditions, it is understood that such tests and affected equipment will be identified on the Certificate and shall be accomplished by the Contractor at the earliest possible date. Performance of the tests may not be required before Substantial Completion can be issued. The date of the issuance of the Certificate of Substantial Completion shall determine whether or not the work was completed within the contract time and whether or not Liquidated Damages are due.
  3. If the work is not acceptable, and the Owner does not issue a Certificate of Substantial Completion, the Owner shall be entitled to charge the Contractor with the Designer's and Owner's costs of re-inspection, including time and travel.
- B. Partial Occupancy. Contractor agrees that the Owner shall be permitted to occupy and use any completed or partially completed portions of the Project, when such occupancy and use is in the Owner's best interest. Owner shall notify Contractor of its desire and intention to take Partial Occupancy as soon as possible but at least ten (10) working days before the Owner intends to occupy. If the Contractor believes that the portion of the work the Owner intends to occupy is not ready for occupancy, the Contractor shall notify the Owner immediately. The Designer shall inspect the work in accordance with the procedures above. If the Contractor claims increased cost of the project or delay in completion as a result of the occupancy, he shall notify the Owner immediately but in all cases before occupancy occurs.
- C. Final Completion. The Project is finally complete when the Certificate of Substantial Completion has been issued and all work items identified therein as incomplete have been completed, and when all administrative items required by the contract have been completed. Final Completion entitles the Contractor to payment of the outstanding balance of the contract amount including all change orders

and retainage. Within five (5) working days of the date of the Certificate of Substantial Completion, the Contractor shall identify the cost to complete any outstanding items of work. The Designer shall review the Contractor's estimate and either approve it or provide an independent estimate for all such items. If the Contractor fails to complete the remaining items within the time specified in the Certificate, the Owner may terminate the contract and go to the surety for project completion in accordance with Article 7.2 or release the contract balance to the Contractor less 150% of the approved estimate to complete the outstanding items. Upon completion of the outstanding items, when a final cost has been established, any monies remaining shall be paid to the Contractor. Failure to complete items of work does not relieve the Contractor from the obligation to complete the administrative requirements of the contract, such as the provisions of Article 5.3 FAILURE TO COMPLETE ALL ITEMS OF WORK UNDER THE CONTRACT SHALL BE CONSIDERED A DEFAULT AND BE GROUNDS FOR CONTRACT TERMINATION AND DEBARMENT.

- D. Liquidated Damages. Contractor agrees that the Owner may deduct from the contract price and retain as liquidated damages, and not as penalty or forfeiture, the sum stipulated in this contract for each work day after the Contract Completion Day on which work is not Substantially Complete. Assessment of Liquidated Damages shall not relieve the Contractor or the surety of any responsibility or obligation under the Contract. In addition, the Owner may, without prejudice to any other rights, claims, or remedies the Owner may have including the right to Liquidated Damages, charge the Contractor for all additional expenses incurred by the Owner and/or Designer as the result of the extended contract period through Final Completion. Additional Expenses shall include but not be limited to the costs of additional inspections.
- E. Early Completion. The Contractor has the right to finish the work before the contract completion date; however, the Owner assumes no liability for any hindrances to the Contractor unless Owner caused delays result in a time extension to the contract completion date. The Contractor shall not be entitled to any claims for lost efficiencies or for delay if a Certificate of Substantial Completion is given on or before the Contract Completion Date.

#### **ARTICLE 5.4 -- PAYMENT TO CONTRACTOR**

- A. Payments on account of this contract will be made monthly in proportion to the work which has been completed. Request for payment must be submitted on the Owner's forms. No other pay request will

be processed. Supporting breakdowns must be in the same format as Owner's forms and must provide the same level of detail. The Designer will, within 5 working days from receipt of the contractor's request for payment either issue a Certificate for Payment to the Owner, for such amount as the Designer determines is properly due, or notify the Contractor in writing of reasons for withholding a Certificate. The Owner shall make payment within 30 calendar days after the "Application and Certification for Payment" has been received and certified by the Designer. The following items are to be attached to the contractor's pay request:

1. Updated construction schedule
  2. Certified payrolls consisting of name, occupation and craft, number of hours worked and actual wages paid for each individual employee, of the Contractor and all subcontractors working on the project
- B. The Owner shall retain 5 percent of the amount of each such payment application, except as allowed by Article 5.4, until final completion and acceptance of all work covered by this contract.
- C. Each payment made to Contractor shall be on account of the total amount payable to Contractor and all material and work covered by paid partial payment shall thereupon become the sole property of Owner. This provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made or restoration of any damaged work or as a waiver of the right of Owner to require fulfillment of all terms of this contract.
- D. Materials delivered to the work site and not incorporated in the work will be allowed in the Application and Certification for Payment on the basis of one hundred (100%) percent of value, subject to the 5% retainage providing that they are suitably stored on the site or in an approved warehouse in accordance with the following requirements:
1. Material has previously been approved through submittal and acceptance of shop drawings conforming to requirements of Article 3.2 of General Conditions.
  2. Delivery is made in accordance with the time frame on the approved schedule.
  3. Materials, equipment, etc., are properly stored and protected from damage and deterioration and remain so - if not, previously approved amounts will be deleted from subsequent pay applications.

4. The payment request is accompanied by a breakdown identifying the material equipment, etc. in sufficient detail to establish quantity and value.
- E. The Contractor shall be allowed to include in the Application and Certification for Payment, one hundred (100%) of the value, subject to retainage, of major equipment and material stored off the site if all of the following conditions are met:
1. The request for consideration of payment for materials stored off site is made at least 15 working days prior to submittal of the Application for Payment including such material. Only materials inspected will be considered for inclusion on Application for Payment requests.
  2. Materials stored in one location off site are valued in excess of \$25,000.
  3. That a Certificate of Insurance is provided indicating adequate protection from loss, theft conversion or damage for materials stored off site. This Certificate shall show the State of Missouri as an additional insured for this loss.
  4. The materials are stored in a facility approved and inspected, by the Construction Representative.
  5. Contractor shall be responsible for, Owner costs to inspect out of state facilities, and any delays in the completion of the work caused by damage to the material or for any other failure of the Contractor to have access to this material for the execution of the work.
- F. The Owner shall determine the amount, quality and acceptability of the work and materials which are to be paid for under this contract. In the event any questions shall arise between the parties, relative to this contract or specifications, determination or decision of the Owner or the Construction Representative and the Designer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this contract affected in any manner or to any extent by such question.
- G. Payments Withheld: The Owner may withhold or nullify in whole or part any certificate to such extent as may be necessary to protect the Owner from loss on account of:
1. Defective work not remedied. When a notice of noncompliance is issued on an item or items, corrective action shall be undertaken immediately. Until corrective action is completed, no monies will be paid and no additional time will be allowed for the item or

items. The cost of corrective action(s) shall be borne by the Contractor.

2. A reasonable doubt that this contract can be completed for the unpaid balance.
3. Failure of the Contractor to update as-built drawings monthly for review by the Construction Representative.
4. Failure of the Contractor to update the construction schedule.

When the Construction Representative is satisfied the Contractor has remedied above deficiencies, payment shall be released.

H. Final Payment: Upon receipt of written notice from the Contractor to the Designer and Project Representative that the work is ready for final inspection and acceptance, the Designer and Project Representative, with the Contractor, shall promptly make such inspection. If the work is acceptable and the contract fully performed, the Construction Representative shall complete a final acceptance report and the Contractor will be directed to submit a final Application and Certification for Payment. If the Owner approves the same, the entire balance shall be due and payable, with the exception of deductions as provided for under Article 5.4.

1. Where the specifications provide for the performance by the Contractor of (certain tests for the purpose of balancing and checking the air conditioning and heating equipment and the Contractor shall have furnished and installed all such equipment in accordance with the specifications, but said test cannot then be made because of climatic conditions, such test shall may be considered as required under the provisions of the specifications, Section 013300 and this contract may be substantial Full payment will not be made until the tests have been made and the equipment and system is finally accepted. If the tests are not completed when scheduled, the Owner may deduct 150% of the value of the tests from the final payment.
2. The final payment shall not become due until the Contractor delivers to the Construction Representative:
  - a) A complete file of releases, on the standard form included in the contract documents as "Final Receipt of Payment and Release Form", from subcontractors and material suppliers evidencing payment in full for services, equipment and materials, as the case may require, if the Owner approves, or a consent from

the Surety to final payment accepting liability for any unpaid amounts.

- b) An Affidavit of Compliance with Prevailing Wage Law, in the form as included in this contract specifications, properly executed by each subcontractor, and the Contractor
  - c) Certified copies of all payrolls
  - d) As-built drawings
3. If any claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a claim including all costs and a reasonable attorney's fee.
  4. Missouri statute requires prompt payment from the Owner to the Contractor within thirty calendar days and from the Contractor to his subcontractors within fifteen calendar days. Failure to make payments within the required time frame entitles the receiving party to charge interest at the rate of one and one half percent per month calculated from the expiration of the statutory time period until paid.
  5. The value of all unused unit price allowances and/or 150% of the value of the outstanding work items, and/or liquidated damages may be deducted from the final pay request without executing a Contract Change. Any unit price items which exceed the number of units in the contract may be added by Contract Change.

## ARTICLE 6 -- INSURANCE AND BONDS

### ARTICLE 6.1 -- BOND

- A. Contractor shall furnish a performance/payment bond in an amount equal to 100% of the contract price to guarantee faithful performance of the contract and 100% of the contract price to guarantee the payment of all persons performing labor on the project and furnishing materials in connection therewith under this contract as set forth in the standard form of performance and payment bond included in the contract documents. The surety on such bond shall be issued by a surety company authorized by the Missouri Department of Insurance to do business in the state of Missouri.
- B. All Performance/Payment Bonds furnished in response to this provision shall be provided by a bonding company with a rating of B+ or higher as established by A.M. Best Company, Inc. in their most recent publication.



## ARTICLE 6.2 – INSURANCE

A. The successful Contractor shall procure and maintain for the duration of the contract issued a policy or policies of insurance for the protection of both the Contractor and the Owner and their respective officers, officials, agents, consultants and employees. The Owner requires certification of insurance coverage from the Contractor prior to commencing work.

### B. Minimum Scope and Extent of Coverage

#### 1. General Liability

Commercial General Liability, ISO coverage form number or equivalent CG 00 01 ("occurrence" basis), or I-SO coverage form number CG 00 02, or ISO equivalent.

If ISO equivalent or manuscript general liability coverage forms are used, minimum coverage will be as follows: Premises/Operations; Independent Contractors; Products/Completed Operations; personal injury; Broad Form Property Damage including Completed Operations; Broad Form Contractual Liability Coverage to include Contractor's obligations under Article 1.11 Indemnification and any other Special Hazards required by the work of the contract.

#### 2. Automobile Liability

Business Automobile Liability Insurance, ISO Coverage form number or equivalent CA 00 01 covering automobile liability, code 1 "ANY AUTO".

#### 3. Workers' Compensation and Employer's Liability

Statutory Workers' Compensation Insurance for Missouri and standard Employer's Liability Insurance, or the authorization to self-insure for such liability from the Missouri Division of Workers' Compensation.

#### 4. Builder's Risk or Installation Floater Insurance

Insurance upon the work and all materials, equipment, supplies, temporary structures and similar items which may be incident to the performance of the work and located at or adjacent to the site, against loss or damage from fire and such other casualties as are included in extended coverage in broad "All Risk" form, including coverage for Flood and Earthquake, in an amount not less than the replacement cost of the work or this contract price, whichever is greater, with loss payable to Contractor and Owner as their respective interests may appear.

Contractor shall maintain sufficient insurance to cover the full value of the work and materials as the work progresses, and shall furnish Owner copies of all endorsements. If Builder's Risk Reporting- Form of Endorsement is used, Contractor shall make all reports as required therein so as to keep in force an amount of insurance which will equal the replacement cost of the work, materials, equipment, supplies, temporary structures, and other property covered thereby; and if, as a result of Contractor's failure to make any such report, the amount of insurance so recoverable shall be less than such replacement cost, Contractor's interest in the proceeds of such insurance, if any, shall be subordinated to Owner's interest to the end that Owner may receive full reimbursement for its loss.

### C. Minimum Limits of Insurance

#### 1. General Liability

Contractor

\$2,000,000	combined single limit per occurrence for bodily injury, personal injury, and property damage
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\$2,000,000	annual aggregate
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#### 2. Automobile Liability

\$2,000,000	combined single limit per occurrence for bodily injury and property damage
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#### 3. Workers' Compensation and Employers Liability

Workers' Compensation limits as required by applicable State Statutes (generally unlimited) and minimum of \$1,000,000 limit per accident for Employer's Liability.

General Liability and Automobile Liability insurance may be arranged under individual policies for the full limits required or by a combination of underlying policies with the balance provided by a form-following Excess or Umbrella Liability policy.

### D. Deductibles and Self-Insured Retentions

All deductibles, co-payment clauses, and self-insured retentions must be declared to and approved by the Owner. The Owner reserves the right to request the reduction or elimination of unacceptable deductibles or self-insured retentions, as they would apply to the Owner, and their respective officers, officials, agents, consultants and employees. Alternatively, the Owner may request Contractor to procure a bond guaranteeing

payment of losses and related investigations, claims administration, and defense expenses.

E. Other Insurance Provisions and Requirements

The respective insurance policies and coverage, as specified below, must contain, or be endorsed to contain the following conditions or provisions:

1. General Liability

The Owner, and its respective commissioners, officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 Additional Insured - Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance of self-insurance programs maintained by the designated additional -insured's shall be excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's general liability insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner, or for any of their officers, officials, agents, consultants or employees.

2. Automobile Insurance

The Owner, and their respective officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 - Additional Insured Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance or self-insurance

programs maintained by the designated additional insured's shall be in excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's automobile insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner or for any of its officers, officials, agents, consultants or employees.

3. Workers' Compensation/Employer's Liability

Contractor's workers' compensation insurance shall be endorsed with NCCI form WC 00 03 01 A - Alternative Employer Endorsement. The Alternative Employer Endorsement shall designate the Owner as "alternate employers."

4. All Coverages

Each insurance policy required by this section of the Contract shall contain a stipulation, endorsed if necessary, that the Owner will receive a minimum of a thirty (30) calendar day advance notice of any policy cancellation. Ten (10) calendar days advance notice is required for policy cancellation due to non-payment of premium.

F. Insurer Qualifications and Acceptability

Insurance required hereunder shall be issued by an A.M. Best, "B+" rated, Class IX insurance company approved to conduct insurance business in the state of Missouri.

G. Verification of Insurance Coverage

Prior to Owner issuing a Notice to Proceed, the Contractor shall furnish the Owner with Certificate(s) of Insurance and with any applicable original endorsements evidencing the required insurance coverage. The insurance certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements received by the Owner are subject to review and approval by the Owner. The Owner reserves the right to require certified copies of all required policies at any time. If the scope of this contract will exceed one (1) year - or, if any of Contractor's applicable insurance coverage expires prior to completion of the work or services required under this contract -

the Contractor will provide a renewal or replacement certificate before continuing work or services hereunder. If the Contractor fails to provide documentation of required insurance coverage, the Owner may issue a stop work order and no additional contract completion time and/or compensation shall be granted as a result thereof.

## **ARTICLE 7 – SUSPENSION OR TERMINATION OF CONTRACT**

### **ARTICLE 7.1 - FOR SITE CONDITIONS**

When conditions at the site of the proposed work are considered by the Owner to be unsatisfactory for prosecution of the work, the Contractor may be ordered in writing to suspend the work or any part thereof until reasonable conditions exist. When such suspension is not due to fault or negligence of the Contractor, time allowed for completion of such suspended work will be extended by a period of time equal to that lost due to delay occasioned by ordered suspension. This will be a no cost time extension.

### **ARTICLE 7.2 - FOR CAUSE**

#### **A. Termination or Suspension for Cause:**

1. If the Contractor shall file for bankruptcy, or should make a general assignment for the benefit of the creditors, or if a receiver should be appointed on account of insolvency, or if the contractor should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials, or if the contractor should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Owner, or otherwise be guilty of a substantial violation of any provision of this contract, then the Owner may serve notice on the Contractor and the surety setting forth the violations and demanding compliance with this contract. Unless within ten (10) consecutive calendar days after serving such notice, such violations shall cease and satisfactory arrangements for correction be made, the Owner may suspend the Contractor's right to proceed with the work or terminate this contract.
2. In the event the Owner suspends Contractor's right to proceed with the work or terminates the contract, the Owner may demand that the Contractor's surety take over and complete the work on this contract, after the surety submits a written proposal to the Owner and receives written approval and upon the surety's failure or refusal to do so within ten (10) consecutive

calendar days after demand therefore, the Owner may take over the work and prosecute the same to completion by bid or negotiated contract, or the Owner may elect to take possession of and utilize in completing the work such materials, supplies, appliances and plant as may be on the site of the work, and all subcontractors, if the Owner elects, shall be bound to perform their contracts.

- B. The Contractor and its surety shall be and remain liable to the Owner for any excess cost or damages occasioned to the Owner as a result of the actions above set forth.
- C. The Contractor in the event of such suspension or termination shall not be entitled to receive any further payments under this contract until the work is wholly finished. Then if the unpaid balance under this contract shall exceed all expenses of the Owner as certified by the Director, such excess shall be paid to the Contractor; but, if such expenses shall exceed the unpaid balance as certified by the Director, the Contractor and their surety shall be liable for and shall pay the difference and any damages to the Owner.
- D. In exercising Owner's right to secure completion of the work under any of the provisions hereof, the Director shall have the right to exercise Owner's sole discretion as to the manner, methods and reasonableness of costs of completing the work.
- E. The rights of the Owner to suspend or terminate as herein provided shall be cumulative and not exclusive and shall be in addition to any other remedy provided by law.
- F. The Contractor in the event of such suspension or termination may be declared ineligible for Owner contracts for a minimal period of twelve (12) months. Further, no contract will be awarded to any Contractor who lists in their bid form any subcontractor whose prior performance has contributed, as determined by the Owner, to a breach of a contract. In order to be considered for state-awarded contracts after this period, the Contractor/subcontractor will be required to forward acceptance reports to the Owner regarding successful completion of non-state projects during the intervening twelve (12) months from the date of default. No contracts will be awarded to a subcontractor/Contractor until the ability to perform responsibly in the private sector has been proven to the Owner.

### **ARTICLE 7.3 -- FOR CONVENIENCE**

- A. The Owner may terminate or suspend the Contract or any portion of the Work without cause at any time, and at the Owner's convenience. Notification of a termination or suspension shall be in writing

and shall be given to the Contractor and their surety. If the Contract is suspended, the notice will contain the anticipated duration of the suspension or the conditions under which work will be permitted to resume. If appropriate, the Contractor will be requested to demobilize and re-mobilize and will be reimbursed time and costs associated with the suspension.

B. Upon receipt of notification, the Contractor shall:

1. Cease operations when directed.
2. Take actions to protect the work and any stored materials.
3. Place no further subcontracts or orders for material, supplies, services or facilities except as may be necessary to complete the portion of the Contract that has not been terminated. No claim for payment of materials or supplies ordered after the termination date shall be considered.
4. Terminate all existing subcontracts, rentals, material, and equipment orders.

5. Settle all outstanding liabilities arising from termination with subcontractors and suppliers.

6. Transfer title and deliver to the Owner, work in progress, completed work, supplies and other material produced or acquire for the work terminated, and completed or partially completed plans, drawings information and other property that, if the Contract had been completed, would be required to be furnished to the Owner.

C. For termination without cause and at the Owner's convenience, in addition to payment for work completed prior to date of termination, the Contractor may be entitled to payment of other documented costs directly associated with the early termination of the contract. Payment for anticipated profit and unapplied overhead will not be allowed.

## **SECTION 007300 - SUPPLEMENTARY CONDITIONS**

### **1.0 GENERAL:**

- A. These Supplementary General Conditions clarify, add, delete, or otherwise modify standard terms and conditions of DIVISION 0, BIDDING AND CONTRACTING REQUIREMENTS.

### **2.0 CONTACTS:**

Designer: Lindsay Robertson  
IMEG Corp  
1600 Baltimore, Suite 300  
Kansas City, MO, 64108  
Telephone: 816-652-0100  
Email: [lindsay.robertson@imegcorp.com](mailto:lindsay.robertson@imegcorp.com)

Construction Representative: Ricky Howard  
Division of Facilities Management, Design and Construction  
615 E 13th St,  
Kansas City, MO  
Telephone: 816-329-0201  
Email: [Ricky.Howard@oa.mo.gov](mailto:Ricky.Howard@oa.mo.gov)

Project Manager: Glenn Smith  
Division of Facilities Management, Design and Construction  
301 West High Street, Room 730  
Jefferson City, Missouri 65101  
Telephone: 573-751-1367  
Email: [Glenn.Smith@oa.mo.gov](mailto:Glenn.Smith@oa.mo.gov)

Contract Specialist: Mandy Roberson  
Division of Facilities Management, Design and Construction  
301 West High Street, Room 730  
Jefferson City, Missouri 65101  
Telephone: 573-522-0074  
Email: [mandy.roberson@oa.mo.gov](mailto:mandy.roberson@oa.mo.gov)

### **3.0 NOTICE: ALL BID MATERIALS ARE DUE AT THE TIME OF BID SUBMITTAL. THERE IS NO SECOND SUBMITTAL FOR THIS PROJECT.**

### **4.0 FURNISHING CONSTRUCTION DOCUMENTS:**

- A. The Owner will furnish the Contractor with approximately 4 complete sets of drawings and specifications at no charge.
- B. The Owner will furnish the Contractor with approximately 4 sets of explanatory or change drawings at no charge.
- C. The Contractor may make copies of the documents as needed with no additional cost to the Owner.

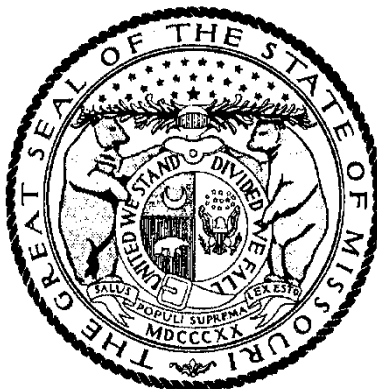
### **5.0 SAFETY REQUIREMENTS**

Contractor and subcontractors at any tier shall comply with RSMo 292.675 and Article 1.3, E, of Section 007213, General Conditions.

# Missouri

## Division of Labor Standards

### WAGE AND HOUR SECTION



MICHAEL L. PARSON, Governor

## Annual Wage Order No. 29

Section 048  
**JACKSON COUNTY**

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by

Todd Smith, Director  
Division of Labor Standards

Filed With Secretary of State: March 10, 2022

Last Date Objections May Be Filed: April 11, 2022

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Asbestos Worker	\$67.05
Boilermaker	\$37.33*
Bricklayer	\$59.20
Carpenter	\$60.21
Lather	
Linoleum Layer	
Millwright	
Pile Driver	
Cement Mason	\$54.35
Plasterer	
Communications Technician	\$58.66
Electrician (Inside Wireman)	\$66.21
Electrician Outside Lineman	\$64.01
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Elevator Constructor	\$37.33*
Glazier	\$56.84
Ironworker	\$66.35
Laborer	\$49.04
General Laborer	
First Semi-Skilled	
Second Semi-Skilled	
Mason	\$54.39
Marble Mason	
Marble Finisher	
Terrazzo Worker	
Terrazzo Finisher	
Tile Setter	
Tile Finisher	
Operating Engineer	\$60.71
Group I	
Group II	
Group III	
Group III-A	
Group IV	
Group V	
Painter	\$50.15
Plumber	\$74.12
Pipe Fitter	
Roofer	\$57.93
Sheet Metal Worker	\$71.70
Sprinkler Fitter	\$61.32
Truck Driver	\$47.50
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

\*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. The public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

\*\*The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title as defined in Section 290.210 RSMo.

Heavy Construction Rates for  
JACKSON County

Section 048

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Carpenter	\$60.95
Millwright	
Pile Driver	
Electrician (Outside Lineman)	\$84.43
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Laborer	\$49.28
General Laborer	
Skilled Laborer	
Operating Engineer	\$58.78
Group I	
Group II	
Group III	
Group IV	
Truck Driver	\$50.64
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

\*The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. The public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

\*\*The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title as defined in Section 290.210 RSMo.



# OVERTIME and HOLIDAYS

## OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, "**overtime work**" shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

## HOLIDAYS

January first;  
The last Monday in May;  
July fourth;  
The first Monday in September;  
November eleventh;  
The fourth Thursday in November; and  
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

## SECTION 011000 – SUMMARY OF WORK

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Project consists of the replacement of the facility's existing fire alarm, access control and video surveillance systems.
  - 1. Project Location: Center for Behavioral Medicine (1000 E 24<sup>th</sup> Street, Kansas City, MO 64108).
  - 2. Owner: State of Missouri, Office of Administration, Division of Facilities Management, Design and Construction, Harry S Truman State Office Building, Post Office Box 809, 301 West High Street, Jefferson City, Missouri 65102.
- B. Contract Documents, dated July 1, 2022 were prepared for the Project by IMEG, Corp., 1600 Baltimore, Suite 300, Kansas City, MO 64108. Contact P. Lindsay Robertson, 816-842-8437.
- C. The Work consists of replacing the facility's existing fire alarm, access control and video surveillance systems.
  - 1. The Work includes new fire alarm, access control and video surveillance systems.
  - 2. The Work includes providing new 120V power circuits from the building's life safety emergency branch to existing fire alarm power extender panels.
- D. The Work will be constructed under a single prime contract.

#### 1.3 WORK SEQUENCE

- A. The Work will be conducted in one (1) phase.
  - 1. Phase 1: Replacement of the existing fire alarm, access control and video surveillance systems, and extension of new 120V life safety power to existing fire alarm panels.

#### 1.4 CONTRACTOR USE OF PREMISES

- A. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises limited only by the Owner's right to perform work or to retain other contractors on portions of the Project.

- B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
  - 1. Owner Occupancy: Allow for Owner occupancy and use by the public.
  - 2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage cause by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

#### 1.5 OCCUPANCY REQUIREMENTS

- A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate owner usage. Perform the Work so as not to interfere with the Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 011000

## SECTION 012300 - ALTERNATES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Alternates.

#### 1.3 DEFINITIONS

- A. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents..

- 1. The cost for each alternate is the net addition to the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

- B. No additional time will be allowed for alternate work unless the number of work days is so stated on the bid form.

#### 1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate the Alternate Work into the Project.

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

- B. Notification: The award of the Contract will indicate whether alternates have been accepted or rejected.

- C. Execute accepted alternates under the same conditions as other Work of this Contract.

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

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: *Furnish and install new Video Surveillance System and remove existing system as shown on drawings and specified in Section 282300.*
- B. Alternate No. 2: *Furnish and install new Access Control System and remove existing system as shown on drawings and specified in Section 281300.*

END OF SECTION 012300

## SECTION 012600 – CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract Modifications.
- B. Related Sections include the following:
  - 1. Division 0, Section 007213, Article 3.1 "Acceptable Substitutions" for administrative procedures for handling Requests for Substitutions made after Contract award.
  - 2. Division 0, Section 007213, Article 4.0 "Changes in the Work" for Contract Change requirements.

#### 1.3 REQUESTS FOR INFORMATION

- A. In the event that the Contractor or Subcontractor, at any tier, determines that some portion of the Drawings, Specifications, or other Contract Documents requires clarification or interpretation, the Contractor shall submit a "Request for Information" (RFI) in writing to the Designer. A RFI may only be submitted by the Contractor and shall only be submitted on the RFI forms provided by the Owner. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed. In the RFI, the Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
- B. Responses to RFI shall be issued within ten (10) working days of receipt of the Request from the Contractor unless the Designer determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Designer, the Designer will, within five (5) working days of receipt of the request, notify the Contractor of the anticipated response time. If the Contractor submits a RFI on a time sensitive activity on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Designer to respond to the request provided that the Designer responds within the ten (10) working days set forth above.
- C. Responses from the Designer will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Document, the Contractor shall give written notice to the Designer requesting a Contract Change for the work. Failure to give such written notice within ten (10) working days, shall waive the Contractor's right to seek additional time or cost under Article 4, "Changes in the Work" of the General Conditions.

#### 1.4 MINOR CHANGES IN THE WORK

- A. Designer will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Amount or the Contract Time, on "Designer's Supplemental Instructions" (DSI).

#### 1.5 PROPOSAL REQUESTS

- A. The Designer or Owner Representative will issue a detailed description of proposed Changes in the Work that may require adjustment to the Contract Amount or the Contract Time. The proposed Change Description will be issued using the "Request for Proposal" (RFP) form. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Proposal Requests issued by the Designer or Owner Representative are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
  - 2. Within ten (10) working days after receipt of Proposal Request, submit a proposal for the cost adjustments to the Contract Amount and the Contract Time necessary to execute the Change. The Contractor shall submit his proposal on the appropriate Contract Change Detailed Breakdown form. Subcontractors may use the appropriate Contract Change Detailed Breakdown form or submit their proposal on their letterhead provided the same level of detail is included. All proposals shall include:
    - a. A detailed breakdown of costs per Article 4.1 of the General Conditions.
    - b. If requesting additional time per Article 4.2 of the General Conditions, include an updated Contractor's Construction Schedule that indicates the effect of the Change including, but not limited to, changes in activity duration, start and finish times, and activity relationship.

#### 1.6 CONTRACT CHANGE PROCEDURES

- A. On Owner's approval of a Proposal Request, the Designer or Owner Representative will issue a Contract Change for signatures of Owner and Contractor on the "Contract Change" form.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

## SECTION 013100 – COORDINATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Projects including, but not limited to, the following:
  - 1. Coordination Drawings.
  - 2. Administrative and supervisory personnel.
  - 3. Project meetings.
- B. Each Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific Contractor.
- C. Related Sections include the following:
  - 1. Division 1, Section 013200 "Schedules" for preparing and submitting Contractor's Construction Schedule.
  - 2. Articles 1.8.B and 1.8.C of Section 007213 "General Conditions" for coordinating meetings onsite.
  - 3. Article 5.4.H of Section 007213 "General Conditions" for coordinating Closeout of the Contract.

#### 1.3 COORDINATION

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections, which depend on each other for proper installation, connection, and operation.
- B. Coordination: Each Contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each Contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other Contractors to ensure maximum accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.



4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components including mechanical and electrical.
- C. Prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  1. Prepare similar memoranda for Owner and separate Contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  1. Preparation of Contractor's Construction Schedule.
  2. Preparation of the Schedule of Values.
  3. Delivery and processing of submittals.
  4. Progress meetings.
  5. Startup and adjustment of systems.
  6. Project Closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
  1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

#### 1.4 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.
- B. Key Personnel Names: Within fifteen (15) workdays of starting construction operations, submit a list of key personnel assignments including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
  1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 PROJECT MEETINGS

- A. The Owner's Construction Representative will schedule a Pre-Construction Meeting prior to beginning of construction. The date, time, and exact place of this meeting will be determined after Contract Award and notification of all interested parties. The Contractor shall arrange to have the Job Superintendent and all prime Subcontractors present at the meeting. During the Pre-Construction Meeting, the construction procedures and information necessary for submitting payment requests will be discussed and materials distributed along with any other pertinent information.
  - 1. Minutes: Designer will record and distribute meeting minutes.
- B. Progress Meetings: The Owner's Construction Representative will conduct Monthly Progress Meetings as stated in Articles 1.8.B and 1.8.C of Section 007213 "General Conditions".
  - 1. Minutes: Designer will record and distribute to Contractor the meeting minutes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

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## SECTION 013115 - PROJECT MANAGEMENT COMMUNICATIONS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.
- B. Division 1, Section 013300 - Submittals
- C. Division 1, Section 012600 – Contract Modification Procedures

#### 1.2 SUMMARY

- A. Project Management Communications: The Contractor shall use the Internet web-based project management communications tool, E-Builder® ASP software, and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.
  - 1. Project management communications is available through E-Builder® as provided by "e-Builder®" in the form and manner required by the Owner.
  - 2. The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.
- B. Support: E-Builder® will provide on-going support through on-line help files.
- C. Copyrights and Ownership: Nothing in this specification or the subsequent communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the project specified herein.
- D. Purpose: The intent of using E-Builder® is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files
- E. Authorized Users: Access to the web site will be by individuals who are authorized users.
  - 1. Individuals shall complete the E-Builder New Company/User Request Form located at the following web site: <https://oa.mo.gov/facilities/vendor-links/contractor-forms>. Completed forms shall be emailed to the following email address: [OA.FMDCE-BuilderSupport@oa.mo.gov](mailto:OA.FMDCE-BuilderSupport@oa.mo.gov).
  - 2. Authorized users will be contacted directly and assigned a temporary user password.
  - 3. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

- F. Administrative Users: Administrative users have access and control of user licenses and all posted items. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!** Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).
- G. Communications: The use of fax, email and courier communication for this project is discouraged in favor of using E-Builder® to send messages. Communication functions are as follows:
1. Document Integrity and Revisions:
    - a. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
    - b. The system shall make it easy to identify revised or superseded documents and their predecessors.
    - c. Server or Client-side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.
  2. Document Security:
    - a. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties communication except for Administrative Users. **DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!**
  3. Document Integration:
    - a. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.
  4. Reporting:
    - a. The system shall be capable of generating reports for work in progress, and logs for each document type. Summary reports generated by the system shall be available for team members.
  5. Notifications and Distribution:
    - a. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.
  6. Required Document Types:
    - a. RFI, Request for Information.
    - b. Submittals, including record numbering by drawing and specification section.
    - c. Transmittals, including record of documents and materials delivered in hard copy.
    - d. Meeting Minutes.
    - e. Application for Payments (Draft or Pencil).
    - f. Review Comments.
    - g. Field Reports.
    - h. Construction Photographs.
    - i. Drawings.

- j. Supplemental Sketches.
  - k. Schedules.
  - l. Specifications.
  - m. Request for Proposals
  - n. Designer's Supplemental Instructions
  - o. Punch Lists
- H. Record Keeping: Except for paper documents, which require original signatures and large format documents (greater than 8½ x 11 inches), all other 8½ x 11 inches documents shall be submitted by transmission in electronic form to the E-Builder® web site by licensed users.
- a. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier shall respond to documents received in electronic form on the web site and consider them as if received in paper document form.
  - b. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall reply or respond by transmissions in electronic form on the web site to documents actually received in paper document form.
  - c. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall copy any paper document into electronic form and make same available on the web site.
- I. Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier required to have a user license(s) shall be responsible for the following:
- 1. Providing suitable computer systems for each licensed user at the user's normal work location<sup>1</sup> with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.
  - 2. Each of the above referenced computer systems shall have the following minimum system<sup>2</sup> and software requirements:
    - a. Desktop configuration (Laptop configurations are similar and should be equal to or exceed desktop system.)
      - 1) Operating System: Windows XP or newer
      - 2) Internet Browser: Internet Explorer 6.01SP2+ (Recommend IE7.0+)
      - 3) Minimum Recommend Connection Speed: 256K or above
      - 4) Processor Speed: 1 Gigahertz and above
      - 5) RAM: 512 mb
      - 6) Operating system and software shall be properly licensed.
      - 7) Internet Explorer version 7 (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients may access the published content.

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<sup>1</sup> The normal work location is the place where the user is assigned for more than one-half of his time working on this project.

<sup>2</sup> The minimum system herein will not be sufficient for many tasks and may not be able to process all documents and files stored in the E-Builder® Documents area.

- 8) Adobe Acrobat Reader (current version is a free distribution for download).
- 9) Users should have the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 013115

## SECTION 013200 – SCHEDULE – BAR CHART

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes requirements for a Bar Chart Schedule for the project construction activities, schedule of submittals, and schedule for testing.

### PART 2 - PRODUCTS – (Not Applicable)

### PART 3 - EXECUTION

#### 3.1 SUBMITTAL PROCEDURES

- A. The Contractor shall submit to the Designer, within ten (10) working days following the Notice to Proceed, a Progress Schedule including Schedule of Values showing the rate of progress the Contractor agrees to maintain and the order in which he proposed to carry out the various phases of Work. No payments shall be made to the Contractor until the Progress Schedule has been approved by the Owner.
  - 1. The Schedule of Values must have the following line items included with the value of the item as indicated below:
    - a. O&M's (Owner's Manual)
      - 1) \$1,000,000.00 (One million) and under – 2% of the total contract amount
      - 2) Over \$1,000,000.00 (One million) – 1% of the total contract amount
    - b. Close Out Documents
      - 1) \$1,000,000.00 (One million) and under – 2% of the total contract amount
      - 2) Over \$1,000,000.00 (One million) – 1% of the total contract amount
    - c. General Conditions
      - 1) No more than 10%



- B. The Contractor shall submit an updated Schedule for presentation at each Monthly Progress Meeting. The Schedule shall be updated by the Contractor as necessary to reflect the current Schedule and its relationship to the original Schedule. The updated Schedule shall reflect any changes in the logic, sequence, durations, or completion date. Payments to the Contractor shall be suspended if the Progress Schedule is not adequately updated to reflect actual conditions.
- C. The Contractor shall submit Progress Schedules to Subcontractors to permit coordinating their Progress Schedules to the general construction Work. The Contractor shall coordinate preparation and processing of Schedules and reports with performance of other construction activities.

### 3.2 CONSTRUCTION PROGRESS SCHEDULE – BAR CHART SCHEDULE

- A. Bar-Chart Schedule: The Contractor shall prepare a comprehensive, fully developed, horizontal bar chart-type Contractor's Construction Schedule. The Contractor for general construction shall prepare the Construction Schedule for the entire Project. The Schedule shall show the percentage of work to be completed at any time, anticipated monthly payments by Owner, as well as significant dates (such as installation of system head-end equipment, field devices, testing, training, etc.) which shall serve as check points to determine compliance with the approved Schedule.
  - 1. The Contractor shall provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week.
    - a. If practical, use the same Schedule of Values breakdown for schedule time bars.
  - 2. The Contractor shall provide a base activity time bar showing duration for each construction activity. Each bar is to indicate start and completion dates for the activity. The Contractor is to place a contrasting bar below each original schedule activity time for indicating actual progress and planned remaining duration for the activity.
  - 3. The Contractor shall prepare the Schedule on a minimal number of separate sheets to readily show the data for the entire construction period.
  - 4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on schedule with other construction activities. Include minor elements involved in the overall sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.
  - 5. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other required schedules and reports.
  - 6. Indicate the Intent to Award and the Contract Substantial Completion dates on the schedule.

- B. Work Stages: Use crosshatched bars to indicate important stages of construction for each major portion of the Work. Such stages include, but are not necessarily limited to, the following:
  - 1. Subcontract awards
  - 2. Submittals
  - 3. Purchases
  - 4. Deliveries
  - 5. Installation
  - 6. Testing
  - 7. Adjusting
  - 8. Startup and placement into final use and operation
- C. Area Separations: Provide a separate time bar to identify each major area of construction for each major portion of the Work. For the purposes of this Article, a “major area” is a separate system.

### 3.3 SCHEDULE OF SUBMITTALS

- A. Upon acceptance of the Construction Progress Schedule, prepare and submit a complete schedule of submittals. Coordinate the submittal schedule with Section 013300 SUBMITTALS, the approved Construction Progress Schedule, list of subcontracts, Schedule of Values and the list of products.
- B. Prepare the schedule in chronological order. Provide the following information.
  - 1. Scheduled date for the first submittal
  - 2. Related Section number
  - 3. Submittal category
  - 4. Name of the Subcontractor
  - 5. Description of the part of the Work covered
  - 6. Scheduled date for resubmittal
  - 7. Scheduled date for the Designer’s final release or approval
- C. Distribution: Following the Designer’s response to the initial submittal schedule, print and distribute copies to the Designer, Owner, subcontractors, and other parties required to comply with submittal dates indicated.
  - 1. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned part of the Work and are no longer involved in construction activities.
- D. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

### 3.4 SCHEDULE OF INSPECTIONS AND TESTS

- A. Prepare a schedule of inspections, tests, and similar services required by the Contract Documents. Submit the schedule with (15) days of the date established for commencement of the Contract Work. The Contractor is to notify the testing agency at least (5) working days in advance of the required tests unless otherwise specified.
- B. Form: This schedule shall be in tabular form and shall include, but not be limited to, the following:
  - 1. Specification Section number
  - 2. Description of the test
  - 3. Identification of applicable standards
  - 4. Identification of test methods
  - 5. Number of tests required
  - 6. Time schedule or time span for tests
  - 7. Entity responsible for performing tests
  - 8. Unique characteristics of each service
- C. Distribution: Distribute the schedule to the Owner, Designer, and each party involved in performance of portions of the Work where inspections and tests are required.

END OF SECTION 013200

## SECTION 013300 – SUBMITTALS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions, Bid Form, and other Division 1 Specification Sections apply to this Section.
- B. Division 1, Section 013115 “Project Management Communications” for administrative requirements for communications.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work including the following:
  - 1. Shop Drawings
  - 2. Product Data
  - 3. Samples
  - 4. Quality Assurance Submittals
  - 5. Construction Photographs
  - 6. Operating and Maintenance Manuals
  - 7. Warranties
- B. Administrative Submittals: Refer to General and Supplementary Conditions other applicable Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
  - 1. Construction Progress Schedule including Schedule of Values
  - 2. Performance and Payment Bonds
  - 3. Insurance Certificates
  - 4. Applications for Payment
  - 5. Certified Payroll Reports
  - 6. Partial and Final Receipt of Payment and Release Forms
  - 7. Affidavit – Compliance with Prevailing Wage Law
  - 8. Record Drawings
  - 9. Notifications, Permits, etc.

- C. The Contractor is obliged and responsible to check all shop drawings and schedules to assure compliance with contract plans and specifications. The Contractor is responsible for the content of the shop drawings and coordination with other contract work. Shop drawings and schedules shall indicate, in detail, all parts of an Item or Work including erection and setting instructions and integration with the Work of other trades.
- D. The Contractor shall at all times make a copy, of all approved submittals, available on site to the Construction Representative.

### 1.3 SUBMITTAL PROCEDURES

- A. The Contractor shall comply with the General and Supplementary Conditions and other applicable sections of the Contract Documents. The Contractor shall submit, with such promptness as to cause no delay in his work or in that of any other contractors, all required submittals indicated in Part 3.1 of this section and elsewhere in the Contract Documents. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
    - a. The Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
- B. Each drawing and/or series of drawings submitted must be accompanied by a letter of transmittal giving a list of the titles and numbers of the drawings. Each series shall be numbered consecutively for ready reference and each drawing shall be marked with the following information:
  - 1. Date of Submission
  - 2. Name of Project
  - 3. Location
  - 4. Section Number of Specification
  - 5. State Project Number
  - 6. Name of Submitting Contractor
  - 7. Name of Subcontractor
  - 8. Indicate if Item is submitted as specified or as a substitution

### 1.4 SHOP DRAWINGS

- A. Comply with the General Conditions, Article 3.2.

- B. The Contractor shall submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- C. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings including the following information:
  - 1. Dimensions
  - 2. Identification of products and materials included by sheet and detail number
  - 3. Compliance with specified standards
  - 4. Notation of coordination requirements
  - 5. Notation of dimensions established by field measurement
  - 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8½"x11" but no larger than 36"x48".

#### 1.5 PRODUCT DATA

- A. The Contractor shall comply with the General Conditions, Article 3.2.
- B. The Contractor shall collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
  - 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information including the following information:
    - a. Manufacturer's printed recommendations
    - b. Compliance with Trade Association standards
    - c. Compliance with recognized Testing Agency standards
    - d. Application of Testing Agency labels and seals
    - e. Notation of dimensions verified by field measurement
    - f. Notation of coordination requirements
  - 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.

#### 1.6 QUALITY ASSURANCE DOCUMENTS

- A. The Contractor shall comply with the General Conditions, Article 3.2
- B. The Contractor shall submit quality control submittals including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.

- C. **Certifications:** Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the Manufacturer certifying compliance with specified requirements.
1. **Signature:** Certification shall be signed by an officer of the Manufacturer or other individual authorized to contractually bind the Company.
- D. **Inspection and Test Reports:** The Contractor shall submit the required inspection and test reports from independent testing agencies as specified in this Section and in other Sections of the Contract Documents.

## 1.7 OPERATING AND MAINTENANCE MANUALS AND WARRANTIES

- A. The Contractor shall submit all required manufacturer's operating instructions, maintenance/service manuals, and warranties in accordance with the General Conditions, Article 3.5, and Supplementary Conditions along with this and other Sections of the Contract Documents.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 REQUIRED SUBMITTALS

- A. Contractor shall submit the following information for materials and equipment to be provided under this contract.

SPEC SECTION	TITLE	CATEGORY
013100	Coordination Drawings, if needed	Shop Drawings
013100	Key Personnel Names	List of Subcontractors
013200	Schedules	Schedule of Values
013200	Schedules	Construction Schedule
013200	Schedules	Shop Drawings
013200	Schedules	Test Report
013513.19	Materials Safety Data Sheets, if applicable	Product Data
013513.19	Schedule of Proposed Shutdowns, if applicable	Construction Schedule
260519	Building Wires and Cables, Connectors, Splices and Terminations Rated 600V or Less	Product Data
260519	Building Wires and Cables Rated 600V or Less	Test Report
260526	Grounding Conductors and Connectors	Product Data
260529	Hangers and Supports	Product Data
260533	Raceways, Fittings and Boxes	Product Data
280500	Sleeve Seals, if applicable	Product Data

Center for Behavioral Medicine, Kansas City, MO  
Change in Scope Rebid: Upgrade Fire Alarm and Security Systems #M1903-01

SPEC SECTION	TITLE	CATEGORY
280513	Access Control and Video Surveillance Conductors and Cables, Pathways, and Equipment Racks	Product Data
280513	Fire Alarm Conductors and Cables	Product Data
280513	UTP and Optical Fiber Cable	Test Report
280513	Conductors and Cables	Operation / Maintenance Manual
281300	Access Control System	Product Data
281300	Diagrams for Cable Management System	Shop Drawings
281300	System Labeling Schedules	Shop Drawings
281300	Cable Administration Drawings	Shop Drawings
281300	Project Planning Documents	Shop Drawings
281300	Installers	Certification
281300	Access Control System	Test Report
281300	Access Control System	As-Built
281300	Access Control System	Operation / Maintenance Manual
281300	Access Control System	Warranty
282300	Video Surveillance System	Product Data
282300	Schematic of System Components and Physical Space Requirements	Shop Drawings
282300	System Network Topology Diagram	Shop Drawings
282300	Connecting Riser Diagrams for Interfacing Equipment	Shop Drawings
282300	Installers	Certification
282300	Video Surveillance System	Test Report
282300	Video Surveillance System	As-Built
282300	Video Surveillance System	Operation / Maintenance Manual
282300	Video Surveillance System	Warranty
283111	Fire Alarm System	Product Data
283111	Fire Alarm System	Shop Drawings
283111	Installers	Certification
283111	Fire Alarm System	Test Report
283111	Fire Alarm System	As-Built
283111	Fire Alarm System	Operation / Maintenance Manual
283111	Software and Firmware Operational Documentation	Operation / Maintenance Manual
283111	Fire Alarm System	Warranty

END OF SECTION 013300



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## SECTION 013513.19 – SITE SECURITY AND HEALTH REQUIREMENTS (DMH)

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes general Institution rules.
- B. This Section includes requirements for infection control in environments that Clients are housed in, dine in, or participate in program activities in or adjacent to the Scope of Work area:
  - 1. The Contractor shall have the applicable measures specified below in-place any time demolition or construction activities occur in occupied or non-occupied project work areas.
  - 2. The Contractor shall complete all specified cleaning procedures and receive clearance from the Construction Representative prior to removing any barriers and other precautionary measures - even for areas that the Clients do not occupy during construction.

#### 1.3 SUBMITTALS

- A. List of required submittals:
  - 1. Materials Safety Data Sheets for all hazardous materials to be brought onsite.
  - 2. Schedule of proposed shutdowns, if applicable.

### PART 2 - PRODUCTS (Not Applicable)

### PART 3 - EXECUTION

#### 3.1 GENERAL RULES OF THE INSTITUTION

- A. All workers and supervisors employed by the Contractor or any Subcontractors shall be made aware that the buildings and grounds are part of a Department of Mental Health facility and that:
  - 1. The Residents or Patients are to be treated with dignity.
  - 2. Construction activities shall not interfere with normal facility operation, except as otherwise arranged with and approved by the Facility Authorities.
  - 3. Access to the Facility, Residents, and Staff by Emergency Responders shall not be compromised at any time.

4. Fire exits, alarm systems, and sprinkler systems shall remain fully operational at all times unless written approval is received from the Construction Representative and the appropriate Facility Representative at least (24) hours in advance. The Contractor shall submit a written time schedule for any proposed shutdowns.
  5. Smoking is not permitted in State-operated buildings. Smoking on grounds shall be in accordance with local Facility regularities and only as approved by Facility Management.
  6. Intoxicating beverages or narcotics shall not be brought upon the premises nor shall Contractor's personnel be under the influence of these substances while on the premises.
  7. Explosives or firearms and other weapons shall not be allowed onsite.
  8. Keys shall not be left in unattended vehicles. Vehicles shall be locked when not in use.
  9. The Residents shall not be photographed. Maintaining confidentiality of the Residents shall be required.
- B. Because of the persistent risk that Residents or Patients may cause harm to themselves or others, extreme caution and special care must be taken in the interest of safety.
1. Materials, tools, and construction apparatus including ropes, ladders, and flammable liquids shall not be unattended during working hours and shall be securely stored during non-working hours. Secure storage includes lockable cabinets, rooms, trailers, and rigid fenced areas. The location and use of exterior storage areas shall be approved by the Construction Representative and Facility Management prior to their use.
  2. An inventory of tools, equipment, and materials intended to be left unsecured must be submitted to and approved by the Construction Representative in advance.
  3. Any missing tools, equipment, or material must be immediately reported to the Construction Representative and Facility Management. Unattended or unsecured tools, equipment, or material that poses a potential risk may be confiscated by Facility Staff and returned after completion of the appropriate required documents by the Contractor.
  4. Access to construction areas must be controlled at all times. Appropriate barriers must be erected to secure trenches, pits, wiring, etc.
  5. Material Safety Data Sheets, or their equivalent, shall be provided to the Construction Representative for all hazardous materials to be brought onsite at least a day before their delivery.
  6. Construction debris and trash must be securely stored in approved containers or removed from the site at least daily.

- C. If the safety of Residents or Staff is jeopardized because Safety Guidelines are not properly observed, the Facility Representative will notify the Construction Representative who may stop the Work until the situation is resolved. In such case, the Work will resume only after the unsafe conditions have been corrected and the Contractor is notified by the Construction Representative to resume the Work.

### 3.2 ACCESS TO THE SITE

- A. The Contractor shall coordinate with the Facility and Construction Representative to establish a schedule for working hours. Normal working hours for this Facility are 7:30AM to 4:00PM Monday through Friday. Working hour changes or overtime are to be requested and approved (48) hours in advance. The need for emergency overtime shall be reported to the Construction Representative as soon as it is evident that overtime is needed.
- B. The Contractor shall provide the name and phone number of the individual who is in charge onsite and who can be contacted in case of an emergency. This individual must maintain a current list of names and addresses of all project construction personnel and to furnish this list to the Construction Representative or Facility Representative upon request.
- C. All construction personnel shall be identified to the Facility Representative and, when the Facility Representative feels it is necessary, they will be issued identification cards.
- D. Construction personnel will be required to submit a 15-minute Binex screening twice per week prior to entering the facility. Construction personnel are required to wear a face covering while inside the facility.

### 3.3 HEALTH AND TRAFFIC CONTROLS

- A. Take all reasonable and necessary measures to reduce air and water pollution by any material or equipment used during construction. Keep volatile wastes in approved covered containers. Do not dispose of volatile wastes or oils in storm or sanitary drains.
- B. Keep project area in a neat, clean, orderly, and safe condition at all times. Immediately remove all waste materials. Do not allow trash or rubbish to accumulate. Provide approved onsite containers for collection of trash and rubbish and dispose of it at frequent intervals during progression of the Work.
- C. No burning will be permitted on the grounds.
- D. Conduct all construction-related activities and management of debris to ensure minimum interference with roadways, streets, walks, utilities, and adjacent facilities.
- E. Do not obstruct streets, driveways, walks, or use facilities without permission from the Facility Representative.
- F. No driver shall exceed the Facility speed limit of 5 mph.

### 3.4 SPECIFICATION OF REQUIRED INFECTION CONTROL PRECAUTIONS BY CLASS

Class II is for work that generates minimal to a high level of dust, requires demolition, or removal of any fixed building components or assemblies. Work of this type includes, but is not limited to, installation of telephone and computer cabling, access to chase spaces, cutting of walls or ceiling where dust migration can be controlled, sanding of walls for painting or wall covering, removal of floor coverings, ceiling tiles and casework, new wall construction, minor duct work, electrical or plumbing work above ceilings, and any activity that cannot be completed within a single work shift.

- A. Class II: Contractor shall perform the following precautionary measures during the projects:
  - 1. Provide active means to prevent airborne dust from dispersing into the atmosphere.
  - 2. Water mist work surfaces to control dust while cutting.
  - 3. Seal unused doors with duct tape.
  - 4. Block off and seal air vents.
  - 5. Place dust mat at entrance and exit of work area.
  - 6. Remove or isolate HVAC system in areas where work is being performed.
- B. Class II: Contractor shall perform the following measures upon completion of the project:
  - 1. Wipe work surfaces with disinfectant.
  - 2. Contain construction waste before transport in tightly covered containers.
  - 3. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.
  - 4. Remove isolation of HVAC system in areas where work is being performed.

### 3.5 SECURITY CLEARANCES AND RESTRICTIONS

- A. FMDC CONTRACTOR BACKGROUND AND ID BADGE PROCESS
  - 1. All employees of an OA/FMDC contractor (or subcontractor performing work under an OA/FMDC contract) are required to submit a fingerprint check through the Missouri State Highway Patrol (MSHP) and the FBI enabling OA/FMDC to obtain state and national criminal background checks on the employees, unless stated otherwise in the Contractor's contract.
  - 2. FMDC reserves the right to prohibit any employee of the Contractor from performing work in or on the premises of any facility owned, operated, or utilized by the State of Missouri for any reason.
  - 3. The Contractor shall ensure all of its employees submit fingerprints to the Missouri State Highway Patrol and pay for the cost of such background checks. The Contractor shall submit to FMDC via email to [FMDCSecurity@oa.mo.gov](mailto:FMDCSecurity@oa.mo.gov) a list of the names of the Contractor's employees who will be fingerprinted and a signed OA/FMDC Authorization for Release of Information Confidentiality Oath for each employee. All employees of the Contractor approved by FMDC to work at a State facility must obtain a contractor ID badge from FMDC prior to

beginning work on-site, unless the Director of FMDC, at the Director's discretion, waives the requirement for a contractor ID badge. The Contractor and its employees must comply with the process for background checks and contractor ID badges found on FMDC's website at: <https://oa.mo.gov/facilities/facilities-operations/security-information/fmdc-contractor-background-and-id-badge>.

4. Fingerprints and Authorization for Release of Information Confidentiality Oath form are valid for one (1) year and must be renewed annually. Changing or adding locations may result in additional required documentation. Certain employees may be required to be fingerprinted more frequently. OA/FMDC reserves the right to request additional background checks at any time for any reason.

END OF SECTION 013513.19

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## SECTION 017400 – CLEANING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for cleaning during the Project.
- B. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.
  - 1. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
  - 2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator for the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

### PART 3 - EXECUTION

#### 3.1 PROGRESS CLEANING

- A. General
  - 1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
  - 2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
  - 3. At least once each month, and more often if necessary, completely remove all scrap, debris, and waste material from the jobsite.
  - 4. Provide adequate storage for all items awaiting removal from the jobsite, observing all requirements for fire protection and protection of the ecology.



B. Site

1. Daily, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Weekly, inspect all arrangements of materials stored onsite. Re-stack, tidy, or otherwise service all material arrangements.
3. Maintain the site in a neat and orderly condition at all times.

3.2 FINAL CLEANING

A. General: Provide final cleaning operations when indicated. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.

1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities including landscape development areas, of rubbish, waste material, litter, and foreign substances.
2. Remove petrochemical spills, stains, and other foreign deposits.
3. Remove tools, construction equipment, machinery, and surplus material from the site.
4. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
5. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
6. Broom clean concrete floors in unoccupied spaces.
7. Vacuum clean carpet and similar soft surfaces removing debris and excess nap. Shampoo, if required.
8. Remove labels that are not permanent labels.
9. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
  - a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
10. Wipe surfaces of systems equipment.
11. Leave the Project clean and ready for occupancy.

C. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.

- D.     Compliances:  Comply with governing regulations and safety standards for cleaning operations.  Remove waste materials from the site and dispose of lawfully.
  - 1.       Where extra materials of value remain after Final Acceptance by the Owner, they become the Owner's property.

END OF SECTION 017400

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## **SECTION 017900 - DEMONSTRATION AND TRAINING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Demonstration and training video recordings.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
  - 1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Architect.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Date of video recording.
  - 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.

3. At completion of training, submit complete training manual(s) for Owner's use in PDF electronic file format on compact disc.

## **1.5 QUALITY ASSURANCE**

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Coordination". Review methods and procedures related to demonstration and training including, but not limited to, the following:
  1. Inspect and discuss locations and other facilities required for instruction.
  2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  3. Review required content of instruction.
  4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## **1.6 COORDINATION**

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

## **PART 2 - PRODUCTS**

### **2.1 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

- a. System, subsystem, and equipment descriptions.
  - b. Performance and design criteria if Contractor is delegated design responsibility.
  - c. Operating standards.
  - d. Regulatory requirements.
  - e. Equipment function.
  - f. Operating characteristics.
  - g. Limiting conditions.
  - h. Performance curves.
2. Documentation: Review the following items in detail:
  - a. Emergency manuals.
  - b. Operations manuals.
  - c. Maintenance manuals.
  - d. Project record documents.
  - e. Identification systems.
  - f. Warranties and bonds.
  - g. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 007213 "General Conditions".
- B. Set up instructional equipment at instruction location.

### **3.2 INSTRUCTION**

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  2. Owner will furnish an instructor to describe Owner's operational philosophy.
  3. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  1. Schedule training with Owner with at least seven days' advance notice.

- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

### **3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS**

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
  - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
  - 1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
  - 2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
  - 3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
  - 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
  - 1. Film training session(s) in segments not to exceed 15 minutes.
    - a. Produce segments to present a single significant piece of equipment per segment.
    - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
    - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.



1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

**END OF SECTION 017900**

## SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.

#### 1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.

#### 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.
- C. All conductors and cables shall be UL labeled.

#### 1.6 COORDINATION

- A. Coordinate layout and installation of conductors and cables with other trades.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Delivery conductors and cables according to NEMA WC 26.
- B. Protect stored conductors and cables from moisture and dirt. Do not store outside, exposed to elements. Elevate above grade. Do not exceed structural capacity of floor, when stored inside.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following, or an approved equal:
  - 1. Southwire Company.
  - 2. Cerro Wire.
  - 3. General Cable.
  - 4. Encore Wire and Cable.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW.
- D. Multiconductor Cable: Comply with NEMA WC 70 for mineral-insulated, metal-sheathed cable, Type MI with ground wire.

2.2 CONNECTORS AND SPLICES

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following, or an approved equal:
  - 1. AMP Incorporated/Tyco International.
  - 2. 3M; Electrical Products Division.
  - 3. Panduit Corporation.
  - 4. NSI Industries.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL AND SIZE APPLICATIONS

- A. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

- B. Conductors smaller than No. 12 AWG shall not be utilized anywhere, unless specifically noted on drawings.
- C. The minimum conductor size for branch circuits shall be #12 AWG copper. To compensate for voltage drop, where branch circuit lengths are between 100 and 150 feet, use #10 AWG copper. For branch circuit lengths exceeding 150 feet, use #8 AWG copper.
- D. Wire size ampacity shall equal or exceed its overload protective device. Where wire sizes shown on the drawings are greater than the apparent ampacity requirements, the size shown shall prevail to compensate for voltage drop. In no instance shall conductors be installed that are less than required by NEC.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-THWN, single conductors in raceway or Type XHHW, single conductors in raceway. Mineral-insulated, metal-sheathed cable, Type MI where specifically indicated on drawings.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- D. Feeders at all other locations: Type THHN-THWN, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- G. Branch Circuits at all other locations: Type THHN-THWN, single conductors in raceway.
- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- I. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- J. Class 2 Control Circuits: Type THHN-THWN, in raceway.
- K. Fire Alarm Circuits: Refer to Section 280513 "Conductors and Cables for Electronic Safety and Security".

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems".

### 3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
  - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

### 3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

### 3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test branch circuit conductors for shorts and grounds.
- C. Test Reports: Prepare a written report to record the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

## SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.
- B. This Section includes grounding of electrical systems and equipment and basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.
- C. Related Sections include the following:
  - 1. Division 26 Section "Low-Voltage Electrical Power Conductors and Cables" for requirements for grounding conductors.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

### PART 2 - PRODUCTS

#### 2.1 CONDUCTORS

- A. Insulated Conductors: Copper or tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

## 2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger, unless otherwise indicated.
- B. Conductor Terminations and Connections:
  - 1. Equipment Grounding Conductor Terminations: Bolted connectors.

### 3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all branch circuits.

### 3.3 INSTALLATION

- A. Ground electrical systems and equipment according to NEC requirements, except where Drawings or Specifications exceed NEC requirements.
- B. The complete metal conduit system shall be used for the equipment grounding system. Conduit systems and associated fittings and terminations shall be made mechanically tight to provide a continuous electrical path to ground and shall be safely grounded at all equipment by bonding all metallic conduit to the equipment enclosures with locknuts cutting thru paint of enclosures.
- C. In addition to using the conduit system for grounding, a complete auxiliary green wire equipment grounding system shall be installed, continuous from main ground, through distribution and branch circuit panelboards and paralleling all feeders and branch circuit wiring. The minimum size shall be #12 copper except #14 on control circuits. This shall apply to all circuits rated 100 volts or more above ground potential.
- D. Metal covers on pull boxes and junction boxes shall be effectively grounded.

### 3.4 CONNECTIONS

- A. Equipment Grounding-Wire Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

END OF SECTION 260526

## SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Hangers and supports for electrical equipment and systems.

#### 1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.6 QUALITY ASSURANCE

- A. Comply with NFPA 70.



## PART 2 - PRODUCTS

### 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  - 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following, or an approved equal:
    - a. Arlington Industries.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. ERICO International Corporation.
    - d. Thomas & Betts Corporation.
    - e. Unistrut; Tyco International, Ltd.
  - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  - 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  - 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  - 5. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch-diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
  - 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following, or an approved equal:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. Fabco Plastics Wholesale Limited.
    - d. Seasafe, Inc.
  - 2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
  - 3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
  - 4. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

### PART 3 - EXECUTION

#### 3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

#### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

END OF SECTION 260529

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## SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes raceways, fittings, and boxes for electrical wiring.

#### 1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. FMC: Flexible metal conduit.
- C. LFMC: Liquidtight flexible metal conduit.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

#### 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

### PART 2 - PRODUCTS

#### 2.1 METAL CONDUIT AND TUBING

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following, or an approved equal:
  - 1. Allied Tube & Conduit; a Tyco International Ltd. Co.
  - 2. Republic Conduit.

3. Western Tube and Conduit.
  4. Wheatland Tube Company.
  5. Sapa.
- B. EMT: ANSI C80.3.
- C. FMC: Zinc-coated steel.
- D. LFMC: Flexible steel conduit with PVC jacket.
- E. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Fittings for EMT: Steel or die-cast, set-screw or compression type.

## 2.2 METAL WIREWAYS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following, or an approved equal:
1. Cooper B-Line, Inc.
  2. Hoffman.
  3. Keystone/Rees Inc.
  4. Square D; Schneider Electric.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 3R, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Screw-cover type. Flanged-and-gasketed type where shown on drawings.
- E. Finish: Manufacturer's standard enamel finish.

## 2.3 BOXES

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following, or an approved equal:
1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
  2. EGS/Appleton Electric.
  3. Hoffman.
  4. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
  5. RACO; a Hubbell Company.
  6. Thomas & Betts Corporation.

- B. Pull and junction boxes shall be minimum 4" x 4".
- C. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- D. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, with gasketed cover.

### PART 3 - EXECUTION

#### 3.1 RACEWAY APPLICATION

- A. Comply with the following indoor applications, unless otherwise indicated:
  - 1. Exposed, Not Subject to Physical Damage: EMT.
  - 2. Concealed Above Hung Ceilings and Within Interior Sheet Rock Walls and Partitions: EMT.
  - 3. Boxes: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.
- B. Concealed: FMC ½" inch – only in specific locations, in existing areas, within existing walls to remain. Utilize only between box in wall to junction box above ceiling. Junction box shall be located within 12" above hung ceiling. FMC, within walls, not acceptable in other locations.
- C. Minimum Raceway Size: 1/2-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.

#### 3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping. Do not install horizontal raceway directly and parallel under cold water or chilled water pipes. In general, install raceways as high as possible, closer to underside of structure. Install horizontal raceways minimum 8 inches above ceilings.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Install temporary closures to prevent foreign matter entering the raceways.
- F. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- G. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

- H. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- I. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
  - 1. Run parallel or banked raceways together on common supports.
  - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- J. Join raceways with fittings designed and approved for that purpose and make joints tight.
  - 1. Use insulating bushings to protect conductors.
- K. Utilize compression fittings only with suitable tools.
- L. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with one (1) locknut, use two (2) locknuts: One (1) inside and one (1) outside the box.
- M. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- N. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- O. Expansion-Joint Fittings: Install UL approved expansion fittings in each run of aboveground conduit that is located at building expansion joint. Length of fittings shall not exceed 6 inches.
- P. All raceways terminating at junction boxes, located above ceiling shall be provided with color coded vinyl tape indicating the service. Color coding tape shall be applied next to the junction box. Tape color shall match junction box cover color.

### 3.3 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

END OF SECTION 260533

## SECTION 280500 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

1. Electronic safety and security equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Coordination drawings.
6. Project record drawings.
7. Electronic safety and security demolition.
8. Common electronic safety and security installation requirements.

#### 1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

#### 1.4 SUBMITTALS

- A. Product Data: For sleeve seals.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery raceways in clean condition. Store to prevent entrance of dirt, debris and moisture.
- B. Protect stored raceways, cables, and connectors from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.



## 1.6 COORDINATION

- A. Coordinate arrangement, mounting, and support of electronic safety and security equipment:
  - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  - 3. To allow right of way for piping and conduit installed at required slope.
  - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

## 1.7 SCHEDULING

- A. All electronic safety and security work shall be scheduled to meet project completion date. Install additional conduit, junction-boxes, pull-boxes, devices as required to support any phasing as required.

## PART 2 - PRODUCTS

### 2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
  - 1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

### 2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Products & Systems, Inc.

- b. Calpico, Inc.
  - c. Metraflex Co.
  - d. Pipeline Seal and Insulator, Inc.
  - e. Or approved equal.
- 2. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 3. Pressure Plates: Carbon steel. Include two for each sealing element.
  - 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

## 2.4 PROJECT RECORD DRAWINGS

- A. Drawings shall be furnished in electronic-media (CD-Rewritable type) and at-least one hard copy prints.
  - 1. Format: Same CAD program, version and operating system as the original contract documents.
  - 2. Incorporate changes and additional information previously marked on record prints. Delete, redraw and add details and notations where applicable.
- B. Identify and date each drawing and include the designation "PROJECT RECORD DRAWING" or "AS-BUILT DRAWING" in a prominent location, with contractor's name below it.

## PART 3 - EXECUTION

### 3.1 ELECTRONIC SAFETY AND SECURITY DEMOLITION

- A. Disconnect, demolish, and remove devices and components indicated to be removed. In general, remove all devices, raceways, cables, junction boxes, and equipment not utilized in new construction. For circuits disconnected, remove raceways and cables all way to the source.
- B. Protect existing equipment, devices and installation indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new devices of equal capacity, quality, and functionality.
- C. Accessible Work: Remove exposed equipment, devices, and installations, indicated to be demolished, in their entirety.
- D. Remove demolished material from Project site.

- E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.
- F. Remove equipment to be salvaged, disconnect from power, and deliver to Owner as directed.

### 3.2 COMMON REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electronic safety and security equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

### 3.3 SLEEVE INSTALLATION FOR ELECTRONIC SAFETY AND SECURITY PENETRATIONS

- A. Electronic safety and security penetrations occur when raceways, pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations within core-drilled holes as required.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
  - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials.
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

### 3.4 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.5 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electronic safety and security installations to restore original fire-resistance rating of assembly.

END OF SECTION 280500

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## SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

1. UTP cabling and connectivity.
2. 50/125-micrometer, multimode optical fiber cabling and connectivity.
3. Equipment racks and cable management.
4. Ladder runway.
5. Grounding and bonding.
6. J-hook cable supports.
7. RS-232 cabling.
8. RS-485 cabling.
9. Low-voltage control cabling.
10. Control-circuit conductors.
11. Fire alarm wire and cable.
12. Identification products.

#### 1.3 DEFINITIONS

- A. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.
- B. BICSI: Building Industry Consulting Service International.
- C. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel section.
- D. EMI: Electromagnetic interference.
- E. IDC: Insulation displacement connector.
- F. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).
- G. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- H. Open Cabling: Passing telecommunications cabling through open space (e.g., between the studs of a wall cavity).

- I. RCDD: Registered Communications Distribution Designer.
- J. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal side rails, and a bottom without ventilation openings.
- K. Trough or Ventilated Cable Tray: A fabricated structure consisting of integral or separate longitudinal rails and a bottom having openings sufficient for the passage of air and using 75 percent or less of the plan area of the surface to support cables.
- L. UTP: Unshielded twisted pair.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.
- C. Maintenance Data: For wire and cable to include in maintenance manuals.

#### 1.5 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 50 or less.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install UTP, optical fiber, and coaxial cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

### PART 2 - PRODUCTS

#### 2.1 PATHWAYS

- A. Support of Open Cabling: NRTL labeled for support of Category 5e/Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
  - 1. Support brackets with cable tie slots for fastening cable ties to brackets.

2. Lacing bars, spools, J-hooks, and D-rings.
3. Straps and other devices.

## 2.2 BACKBOARDS

- A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches.

## 2.3 UTP CABLE

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Belden CDT Inc.; Electronics Division.
  2. Berk-Tek; a Nexans company.
  3. CommScope.
  4. General Cable.
  5. Mohawk; a division of Belden CDT.
  6. Superior Essex Inc.
  7. Or approved equal.
- B. Description: 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket.
1. Comply with ICEA S-90-661 for mechanical properties.
  2. Comply with TIA/EIA-568-B.1 for performance specifications.
  3. Comply with TIA/EIA-568-B.2, Category 5e.
  4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
    - a. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
    - b. Communications, Riser Rated: Type CMR, complying with UL 1666.
    - c. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
    - d. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

## 2.4 UTP CABLE HARDWARE

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Belden.
  2. CommScope.
  3. Ortronics.
  4. Panduit.
  5. Simon Co.
  6. Or approved equal.
- B. UTP Cable Connecting Hardware: Patch Panels, Category 5e, IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.



- C. Connecting Blocks: 110-style for Category 5e. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

## 2.5 OPTICAL FIBER CABLE

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Belden.
  - 2. Berk-Tek; a Nexans company.
  - 3. CommScope.
  - 4. Corning Cable Systems.
  - 5. General Cable Technologies Corporation.
  - 6. Mohawk; a division of Belden CDT.
  - 7. Superior Essex Inc.
  - 8. Or approved equal.
- B. Description: Multimode Type OM3, 50/125-micrometer, 6-fiber, conductive spiral-wrapped armor, tight buffer, optical fiber cable.
  - 1. Comply with ICEA S-83-596 for mechanical properties.
  - 2. Comply with TIA/EIA-568-B.3 for performance specifications.
  - 3. Comply with TIA/EIA-492AAAA-B for detailed specifications.
  - 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
    - a. Plenum Rated, Conductive: Type OFCP, complying with NFPA 262.
    - b. Riser Rated, Conductive: Type OFCR, complying with UL 1666.
  - 5. Conductive cable shall be aluminum armored type.
- C. Jacket:
  - 1. Jacket Color: Aqua for 50/125-micrometer cable.
  - 2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
  - 3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches.

## 2.6 OPTICAL FIBER CABLE HARDWARE

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Belden.
  - 2. CommScope.
  - 3. Corning Cable Systems.
  - 4. Ortronics.
  - 5. Panduit.

6. Siemon Co.
7. Or approved equal.

B. Cable Connecting Hardware: Meet the Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.

1. LC-type duplex fusion-splice pig-tails, type OM3 optical fiber, terminate all installed strands of optical fiber.

## 2.7 PATCH CORDS

- A. Provide Category 5e patch cords, by same manufacturer as Category 5e patch panels and outlets provided. Provide in varying lengths to minimize cable slack/fill at patch panels and switches, and in quantity at both ends of permanent links installed, for complete and operational system.
- B. Provide 50-micron OM3 fiber optic patch cords, LC-LC duplex, in quantity as required to connect all fiber optic strands installed and used for this project. Provide in same brand as fiber optic enclosures / fusion splice pig-tails provided.

## 2.8 EQUIPMENT RACKS AND CABLE MANAGEMENT

- A. Wall-mount racks shall be 48"H x 24"D with 19" mounting, unless otherwise indicated.
1. 75-pound minimum equipment weight capacity.
  2. Dual-hinged, on left and right sides.
  3. Ortronics # OR-19-48-T25DB or approved equal.
  4. Provide on rack, 19"L copper ground bus bar, Chatsworth # 10610-019 or approved equal, bond to equipment ground of electrical branch circuit panel serving room the rack is located in, and to building steel, via 2-hole irreversible compression ground lugs and #6 AWG copper ground conductor. Install per ANSI-J-STD-607-A.
  5. Provide rack-mount UPS, reference Section 282300 Video Surveillance System.
  6. Anchor rack to wall structure using minimum four (4) anchors rated for total weight of rack plus 75 pounds.
- B. 4-post equipment rack shall be 84"H x 36"D, 19" mounting, 2200-pound equipment weight capacity, with adjustable rail depth. Chatsworth # 15252-703 or approved equal.
1. Anchor rack to floor using four (4) minimum 3/8" drop anchors.
  2. Provide bonding of included rack ground terminal block, to equipment ground of electrical branch circuit panel serving room the rack is located in, and to building steel, via 2-hole irreversible compression lugs and #6 AWG copper ground conductor. Install per ANSI-J-STD-607-A.
  3. Provide two (2) vertical cable management sections, dual sided, 6" width, Chatsworth # 14831-703 or approved equal.
  4. Provide rack-mount UPS, reference Section 282300 Video Surveillance System.

- C. Horizontal rack-mount cable management panels shall be front-only, finger-duct type with hinged cover, 1-Rack unit height, CommScope # HTK-19-SS-1U or approved equal. Provide a cable management panel above and below each new patch panel, fiber optic enclosure, and PoE switch provided as part of this project. Coordinate rack elevations of equipment mounting with Owner.

## 2.9 LADDER RUNWAY

- A. Provide ladder runway where indicated, 12" wide tubular steel construction, black finish, B-Line model SB17T12FB with B-Line hardware, or approved equivalent.
  - 1. Tubular steel rungs spaced at 9" intervals.
  - 2. UL Classified as a suitable equipment grounding conductor.
  - 3. Provide grounding/bonding jumpers between all adjacent sections of runway, #6 AWG green insulated copper conductors with irreversible compression lug connectors. Install lug connections per manufacturer guidelines to ensure metal-to-metal bonding connection.
  - 4. Provide support hardware to mount runway at 7'-6" AFF, anchor to wall structure via wall-mount triangle brackets SB213112KFB and/or wall-angle brackets SB211312FB or approved equals.
  - 5. Provide radius rung drop-out kit cable drop-out SB11DRK12FB above equipment racks at all vertical cable transitions.
  - 6. Provide bonding to rack-mount ground bar via #6 AWG green insulated copper ground conductor and irreversible 2-hole compression lugs. Install per ANSI-J-STD-607-A.

## 2.10 J-HOOK CABLE SUPPORTS

- A. J-Hook cable supports shall be utilized for supporting cables overhead and shall be smooth-radius type of metal or otherwise plenum rated construction, manufactured by B-Line, Erico Caddy, Panduit, or approved equal, rated for installation of Category 5e cables.
  - 1. Provide in sizes as required to include 30 percent spare cable fill capacity for future adds.
  - 2. Provide on maximum 60-inch spans, anchored to building structure.

## 2.11 RS-232 CABLE

- A. Standard Cable: NFPA 70, Type CM.
  - 1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
  - 2. Polypropylene insulation.
  - 3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
  - 4. PVC jacket.
  - 5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
  - 6. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated Cable: NFPA 70, Type CMP.
  - 1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.

2. Plastic insulation.
3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
4. Plastic jacket.
5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
6. Flame Resistance: Comply with NFPA 262.

## 2.12 RS-485 CABLE

### A. Standard Cable: NFPA 70, Type CM or CMG.

1. Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

### B. Plenum-Rated Cable: NFPA 70, Type CMP.

1. Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Fluorinated ethylene propylene jacket.
5. Flame Resistance: NFPA 262, Flame Test.

## 2.13 LOW-VOLTAGE CONTROL CABLE

### A. Paired Lock Cable: NFPA 70, Type CMG.

1. 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

### B. Plenum-Rated, Paired Lock Cable: NFPA 70, Type CMP.

1. 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors.
2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with NFPA 262.

### C. Paired Lock Cable: NFPA 70, Type CMG.

1. 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors.
2. PVC insulation.
3. Unshielded.

4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

D. Plenum-Rated, Paired Lock Cable: NFPA 70, Type CMP.

1. 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Plastic jacket.
5. Flame Resistance: NFPA 262, Flame Test.

2.14 CONTROL-CIRCUIT CONDUCTORS

- A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, in raceway complying with UL 83.
- B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, in raceway complying with UL 83.
- C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or TF, complying with UL 83.

2.15 FIRE ALARM WIRE AND CABLE

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Comtran Corp.
  2. Genesis Cable Products; Honeywell International, Inc.
  3. Rockbestos-Suprenant Cable Corporation.
  4. West Penn Wire/CDT; a division of Cable Design Technologies.
  5. Or approved equal.
- B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- C. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG or size as recommended by system manufacturer.
  1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a 2-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
  1. Low-Voltage Circuits: No. 16 AWG, minimum.
  2. Line-Voltage Circuits: No. 12 AWG, minimum.

3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NTRL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

## 2.16 IDENTIFICATION PRODUCTS

- A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Brady Corporation
  2. HellermannTyton.
  3. Kroy LLC.
  4. Panduit Corp.
  5. Or approved equal.
- B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

## 2.17 SOURCE QUALITY CONTROL

- A. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.
- B. Factory test UTP cables according to TIA/EIA-568-B.2.
- C. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.
- D. Factory sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.
- E. Cable will be considered defective if it does not pass tests and inspections.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PATHWAYS

- A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.
- B. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
- C. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems". for installation of conduits and wireways.
- D. Install manufactured conduit sweeps and long-radius elbows whenever possible.

E. Pathway Installation in Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard when entering room from overhead.
4. Extend conduits 3 inches above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices".
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
6. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
9. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable". Monitor cable pull tensions.

C. UTP Cable Installation:

1. Comply with TIA/EIA-568-B.2.
2. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

D. Optical Fiber Cable Installation:

1. Comply with TIA/EIA-568-B.3.
2. Cable shall be terminated on connecting hardware that is rack or cabinet mounted.
3. Terminate all installed strands of fiber.

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.3 FIRE ALARM WIRING INSTALLATION

A. Comply with NECA 1 and NFPA 72.

B. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceway and Boxes for Electrical Systems".

1. Install plenum cable in environmental air spaces, including plenum ceilings.



2. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring Method:

1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
2. Fire-Rated Cables: Use of 2-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is permitted.
3. Signaling Line Circuits: Power-limited fire alarm cables may be installed in the same cable or raceway as signaling line circuits.

D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and another for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

H. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

### 3.4 CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No. 14 AWG.
2. Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm and signal circuits, No. 12 AWG.

### 3.5 CONNECTIONS

- A. Comply with requirements in Division 28 Section "Access Control System" for connecting, terminating, and identifying wires and cables.
- B. Comply with requirements in Division 28 Section "Video Surveillance System" for connecting, terminating, and identifying wires and cables.
- C. Comply with requirements in Division 28 Section "Digital, Addressable Fire-Alarm System" for connecting, terminating, and identifying wires and cables.

### 3.6 FIRESTOPPING

- A. Comply with TIA/EIA-569-A, "Firestopping" Annex A.
- B. Comply with BICSI TDMM, "Firestopping Systems" Article.

### 3.7 GROUNDING

- A. For communications wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. For low-voltage wiring and cabling, comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems".

### 3.8 IDENTIFICATION

- A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A.

### 3.9 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Visually inspect UTP and optical fiber cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
  - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross connection.
  - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
4. Optical Fiber Cable Tests:
  - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
  - b. Link End-to-End Attenuation Tests:
    - 1) Multimode Link Measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
    - 2) Attenuation test results for links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.
- C. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide or transfer the data from the instrument to the computer, save as text files, print, and submit.
- D. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

END OF SECTION 280513

## SECTION 281300 - ACCESS CONTROL SYSTEM - ALTERNATE BID #2

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes a security access system consisting of a Central Station, operating system and application software, and field-installed Controllers connected by a high-speed electronic data transmission network. The Access Control System (ACS) shall have the following:
  - 1. Access Control:
    - a. Regulating access through doors.
    - b. Anti-passback.
    - c. Surge and tamper protection.
    - d. Credential Smart cards and readers.
    - e. Controllers.
    - f. Door position switches.
    - g. Electromagnetic locks.
    - h. Power supplies.
    - i. Monitoring of field-installed devices.
    - j. Reporting.
    - k. Integration with Owner's existing Badge Pass badging database.
    - l. Integration with new Video Surveillance System, with interface to Network Video Recorder to pull live video or recorded video to the ACS. The ACS shall not store or manipulate the video; the ACS shall only request the video stream in order to maintain any watermarking, and/or chain of custody for legal uses. This integration shall only be done if Alternate Bid #1 is accepted.
    - m. Graphic map functionality, with icons Owner can use to monitor and control access-controlled doors, and to view surveillance video feeds.
- B. See Division 28 Section "Video Surveillance System" for interface devices and communications protocol to integrate motion detection and video camera selection and positioning into security access system.

### 1.3 SYSTEM DESCRIPTION

- A. System shall consist of a PC-based Central Station, and field-installed Controllers, connected by a high-speed electronic data transmission network.
  - 1. System Software: Based on 32-bit, Microsoft Windows central-station operating system, server operating system, and application software. Software shall have the following capabilities:
    - a. Graphical user interface to show pull-down menus and a menu tree format that complies with interface guidelines of Microsoft Windows operating system.
    - b. System license shall be for the entire system and shall include capability for future additions that are within the indicated system size limits specified in this Section.
    - c. System shall have open architecture that allows importing and exporting of data and interfacing with other systems that are compatible with Microsoft Windows operating system.
    - d. Password-protected operator login and access.
- B. Network(s) connecting PCs and Controllers shall consist of one or more of the following:
  - 1. Contractor-provided Ethernet network, include switches, fiber optic transceivers, patch cords, and any additional equipment as required for a fully functional network and system.

### 1.4 PERFORMANCE REQUIREMENTS

- A. Security access system shall use a single database for access-control and credential-creation functions.
- B. Distributed Processing: System shall be a fully distributed processing system so that information, including time, date, valid codes, access levels, and similar data, is downloaded to Controllers so that each Controller makes access-control decisions for that Location. Do not use intermediate Controllers for access control. If communications to Central Station are lost, all Controllers shall automatically buffer event transactions until communications are restored, at which time buffered events shall be uploaded to the Central Station.
- C. Each card reader location shall be assigned and connected to a unique controller board port, so that reporting by individual reader, where credential was presented/read to unlock door, is achieved by the system.
- D. Number of Locations: Support at least 256 separate Locations using a single PC with combinations of direct-connect or TCP/IP LAN connections to each Location.
  - 1. Each Location shall have its own database and history in the Central Station. Locations may be combined to share a common database.

E. Data Capacity:

1. 120 different card-reader formats.
2. 999 comments.
3. 16 graphic file types for importing maps.

F. Location Capacity:

1. 256 reader-controlled doors.
2. 50,000 total access credentials.
3. 2048 supervised alarm inputs.
4. 2048 programmable outputs.
5. 32,000 custom action messages per Location to instruct operator on action required when alarm is received.

G. System Network Requirements:

1. Interconnect system components and provide automatic communication of status changes, commands, field-initiated interrupts, and other communications required for proper system operation.
2. Communication shall not require operator initiation or response and shall return to normal after partial or total network interruption such as power loss or transient upset.
3. System shall automatically annunciate communication failures to the operator and identify the communication link that has experienced a partial or total failure.
4. Communications Controller may be used as an interface between the Central Station display systems and the field device network. Communications Controller shall provide functions required to attain the specified network communications performance.

H. Central Station shall provide operator interface, interaction, display, control, and dynamic and real-time monitoring. Central Station shall control system networks to interconnect all system components, including field-installed Controllers.

I. Field equipment shall include Controllers, sensors, and controls. Controllers shall serve as an interface between the Central Station and sensors and controls. Data exchange between the Central Station and the Controllers shall include down-line transmission of commands, software, and databases to Controllers. The up-line data exchange from the Controller to the Central Station shall include status data such as intrusion alarms, status reports, and entry-control records. Controllers are classified as alarm-annunciation or entry-control type.

J. System Response to Alarms: Field device network shall provide a system end-to-end response time of one (1) second or less for every device connected to the system.

K. False Alarm Reduction: The design of Central Station and Controllers shall contain features to reduce false alarms. Equipment and software shall comply with SIA CP-01.

L. Error Detection: A cyclic code error detection method shall be used between Controllers and the Central Station, which shall detect single- and double-bit errors, burst errors of eight bits or less, and at least 99 percent of all other multi-bit and burst error conditions. Interactive or product error detection codes alone will not be acceptable.

- M. Data Line Supervision: System shall initiate an alarm in response to opening, closing, shorting, or grounding of data transmission lines.

## 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include operating characteristics, furnished specialties, and accessories. Reference each product to a location on Drawings. Test and evaluation data presented in Product Data shall comply with SIA BIO-01.
- B. Shop Drawings:
  - 1. Diagrams for cable management system.
  - 2. System labeling schedules, including electronic copy of labeling schedules that are part of the cable and asset identification system of the software specified in Parts 2 and 3.
  - 3. Cable Administration Drawings: As specified in Part 3 "Identification" Article.
- C. Project planning documents as specified in Part 3.
- D. Field quality-control test reports.
  - 1. Operation and maintenance data.
- E. Contractor Qualification data: per requirements of Article 1.6 Quality Assurance.
- F. As-Built Drawings: Provide original shop drawings modified to reflect changes made to comply with installation/configuration requirements and actual field conditions.
- G. Warranty: per requirements of Article 1.6 Quality Assurance.

## 1.6 QUALITY ASSURANCE

- A. Contractor shall have current Certified Installer company status by access control system manufacturer. Contractor's lead/supervisor technician who will staff this project shall have current Installer Certification by same manufacturer. Include documentation of company's and technicians' Certification status with Submittals.
- B. Warranty: provide access control system manufacturer's warranty covering system components and performance.
  - 1. ACS Software and Field Hardware Warranty. The ACS Software shall be warranted for a period of 90 Days from the date of shipment from the manufacturer to be free of defects and will function in substantial accordance to the published specification.
    - a. ACS Field Hardware shall be warranted for a period of three (3) years from the date of shipment from the manufacturer, will be free from defects and will function in general accordance with the product specifications.

- b. ACS Third Party Device warranties are transferred from the manufacturer to the contractor, which may then transfer third party warranties to the owner. Specific third-party warranty details, terms and conditions, remedies and procedures, are either expressly stated on, or packaged with, or accompany such products. The warranty period may vary from product to product. These products include but are not limited to devices that are directly interconnected to the SMS field hardware or computers and are purchased directly from the SMS manufacturer. Examples may include but not be limited to; Credential Printers, Reader Heads, Biometric Devices, Computers etc.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NFPA 70, "National Electrical Code."
- E. Comply with SIA DC-01, SIA DC-03, and SIA DC-07.
- F. Comply with UL 294, UL 1076.
- G. Comply with FCC – Part 15, Part 68
- H. Comply with IEEE, RS 170 variable standard.
- I. Where more than one code or regulation is applicable, the more stringent shall apply.
- J. Cable installation, identification, and termination shall be performed in addition to the applicable codes above.

#### 1.7 PROJECT CONDITIONS

- A. Environmental Conditions: System shall be capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
  - 1. Control Station: Rated for continuous operation in ambient conditions of 60 to 85 deg F and a relative humidity of 20 to 80 percent, noncondensing.
  - 2. Interior, Controlled Environment: System components, except central-station control unit, installed in temperature-controlled interior environments shall be rated for continuous operation in ambient conditions of 36 to 122 deg F dry bulb and 20 to 90 percent relative humidity, noncondensing. NEMA 250, Type 1 enclosure.
  - 3. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambient conditions of 0 to 122 deg F dry bulb and 20 to 90 percent relative humidity, noncondensing. NEMA 250, Type 3R enclosures.



1.8 OWNER-FURNISHED ITEMS

- A. Owner shall provide additional power circuits, receptacles, and hard-wired connections as required. Coordinate locations with Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SECURITY ACCESS SYSTEM

- A. Manufacturers:
  - 1. RS2 Technologies
  - 2. Avigilon
  - 3. Amag Technology
  - 4. Genetec
  - 5. Identiv Hirsch
  - 6. Lenel
  - 7. Siemens
  - 8. Or approved equal.

2.3 APPLICATION SOFTWARE

- A. Annual software maintenance fees shall not be acceptable. Access Control software shall be supported by the manufacturer to the authorized reseller at no annual fee. The current major version of the released version and the previous released version of the software and all sub-versions of the current and previous major version shall be supported.
- B. There shall be no Reader license fees; software having reader license fees based on the number of readers supported by the software package shall be unacceptable.
- C. The ACS shall be written using recognized standard software coding techniques, and to Microsoft's published standards for User Interface Design, Secure Coding Practices and Database Implementation Guidelines.

- D. The ACS shall support N-Tier architecture where the expansion of the system architecture will allow for end-user deployment based upon their system architectural needs. The ACS shall allow but not require the separation of the database, application server, web server, and client interface. The ACS shall require that all connections to the database are performed through a trusted link from the client or internet browser interface.
- E. The ACS shall support Centralized distribution (publishing) of applications using Windows Terminal Server, Citrix, or utilizing IIS for the web client using a standard internet browser such as Internet Explorer, Mozilla Firefox, Google Chrome, Apple Safari, and/or by means of a mobile computing platform using a Tablet PC, PDA device, or Smart Phone.
- F. System Software: Based on Microsoft Windows central-station operating system and application software. Software shall have the following features:
  - 1. Graphical user interface to show pull-down menus and a menu tree format.
  - 2. Capability for future additions within the indicated system size limits.
  - 3. Open architecture that allows importing and exporting of data and interfacing with other systems that are compatible with operating system.
  - 4. Password-protected operator login and access.
- G. The Access Control System shall use one of the following Operating Systems, Windows 10 Professional, Windows Server 2016. Other Operating Systems such as but not limited to - Windows Home editions, Linux, Unix, Sun, or Apple shall not be acceptable.
  - 1. The ACS shall use Microsoft SQL Server 2017 Express, Standard or Enterprise Editions as the database engine. SQL Server 2017 Express shall be included with Access It! Universal.NET CD-ROM, SQL Server 2016 Express, Standard, or Enterprise Editions, SQL Server 2014 Express, Standard or Enterprise Editions, SQL Server 2012 R2, Express, Standard, Enterprise Editions are supported. Other Substitutions shall not be acceptable.
- H. Application Software: Interface between the alarm annunciation and entry-control Controllers, to monitor sensors, operate displays, report alarms, generate reports, and help train system operators. Software shall have the following functions:
  - 1. Resides at the Central Station and Controllers as required to perform specified functions.
  - 2. Operate and manage peripheral devices.
  - 3. Manage files for disk I/O, including creating, deleting, and copying files; and automatically maintain a directory of all files, including size and location of each sequential and random-ordered record.
  - 4. Import custom icons into graphics views to represent alarms and I/O devices.
  - 5. Globally link I/O so that any I/O can link to any other I/O within the same Location, without requiring interaction with the host PC. This operation shall be at the Controller.
  - 6. Globally code I/O links so that any access-granted event can link to any I/O with the same Location without requiring interaction with the host PC. This operation shall be at the Controller.
  - 7. Messages from PC to Controllers and Controllers to Controllers shall be on a polled network that utilizes check summing and acknowledgment of each message. Communication shall be automatically verified, buffered, and retransmitted if message is not acknowledged.

8. Selectable poll frequency and message time-out settings shall handle bandwidth and latency issues for TCP/IP, RF, and other PC-to-Controller communications methods by changing the polling frequency and the amount of time the system waits for a response.
9. Automatic and encrypted backups for database and history backups shall be automatically stored at the central control PC and encrypted with a nine-character alphanumeric password, which must be used to restore or read data contained in backup.
10. Operator audit trail for recording and reporting all changes made to database and system software.

I. Controller Software:

1. Controllers shall operate as an autonomous intelligent processing unit. Controllers shall make decisions about access control, alarm monitoring, linking functions, and door locking schedules for its operation, independent of other system components. Controllers shall be part of a fully distributed processing control network. The portion of the database associated with a Controller and consisting of parameters, constraints, and the latest value or status of points connected to that Controller, shall be maintained in the Controller.
2. Functions: The following functions shall be fully implemented and operational within each Controller:
  - a. Monitoring inputs.
  - b. Controlling outputs.
  - c. Automatically reporting alarms to the Central Station.
  - d. Reporting of sensor and output status to Central Station on request.
  - e. Maintaining real time, automatically updated by the Central Station at least once a day.
  - f. Communicating with the Central Station.
  - g. Executing Controller resident programs.
  - h. Diagnosing.
  - i. Downloading and uploading data to and from the Central Station.
3. Controller Operations at a Location:
  - a. Location: Up to 64 Controllers connected to RS-485 communications loop. Globally operating I/O linking and anti-passback functions between Controllers within the same Location without central-station intervention. Linking and anti-passback shall remain fully functional within the same Location even when the Central Station is off line.
  - b. In the event of communications failure between the Central Station and a Location, there shall be no degradation in operations at the Controllers at that Location. The Controllers at each Location shall be connected to a memory buffer with a capacity to store up to 10,000 events; there shall be no loss of transactions in system history files until the buffer overflows.
  - c. Buffered events shall be handled in a first-in-first-out mode of operation.

4. Individual Controller Operation:

- a. Controllers shall transmit alarms, status changes, and other data to the Central Station when communications circuits are operable. If communications are not available, Controllers shall function in a stand-alone mode and operational data, including the status and alarm data normally transmitted to the Central Station, shall be stored for later transmission to the Central Station. Storage capacity for the latest 1024 events shall be provided at each Controller.
- b. Card-reader ports of a Controller shall be custom configurable for at least 120 different card-reader or keypad formats. Multiple reader or keypad formats may be used simultaneously at different Controllers or within the same Controller.
- c. Controllers shall provide a response to card-readers or keypad entries in less than 0.25 seconds, regardless of system size.
- d. Controllers that are reset, or powered up from a non-powered state, shall automatically request a parameter download and reboot to its proper working state. This shall happen without any operator intervention.
- e. Initial Startup: When Controllers are brought on-line, database parameters shall be automatically downloaded to them. After initial download is completed, only database changes shall be downloaded to each Controller.
- f. Failure Mode: On failure for any reason, Controllers shall perform an orderly shutdown and force Controller outputs to a predetermined failure mode state, consistent with the failure modes shown and the associated control device.
- g. Startup After Power Failure: After power is restored, startup software shall initiate self-test diagnostic routines, after which Controllers shall resume normal operation.
- h. Startup After Controller Failure: On failure, if the database and application software are no longer resident, Controllers shall not restart, but shall remain in the failure mode until repaired. If database and application programs are resident, Controllers shall immediately resume operation. If not, software shall be restored automatically from the Central Station.

5. Communications Monitoring:

- a. System shall monitor and report status of RS-485 communications loop of each Location.
  - b. Communication status window shall display which Controllers are currently communicating, a total count of missed polls since midnight, and which Controller last missed a poll.
  - c. Communication status window shall show the type of CPU, the type of I/O board, and the amount of RAM memory for each Controller.
6. Operating systems shall include a real-time clock function that maintains seconds, minutes, hours, day, date, and month. The real-time clock shall be automatically synchronized with the Central Station at least once per day to plus or minus 10 seconds. The time synchronization shall be automatic, without operator action and without requiring system shutdown.

J. PC-to-Controller Communications:

1. Central-station communications shall use the following:
  - a. TCP/IP LAN network interface cards.
2. Serial Port Configuration: Each serial port used for communications shall be individually configurable for "direct communications," "modem communications incoming and outgoing," or "modem communications incoming only"; or as an ASCII output port.
3. Multiport Communications Board: Use if more than two serial ports are needed.
  - a. Expandable and modular design. Use a 4-, 8-, or 16-serial port configuration that is expandable to 32 or 64 serial ports.
  - b. Connect the first board to an internal PCI bus adapter card.
4. Direct serial, TCP/IP, and dial-up communications shall be alike in the monitoring or control of system, except for the connection that must first be made to a dial-up Location.
5. TCP/IP network interface card shall have an option to set the poll frequency and message response time-out settings.
6. PC-to-Controller and Controller-to-Controller communications (direct, dial-up, or TCP/IP) shall use a polled-communication protocol that checks sum and acknowledges each message. All communications shall be verified and buffered and retransmitted if not acknowledged.

K. Direct Serial or TCP/IP PC-to-Controller Communications:

1. Communication software on the PC shall supervise the PC-to-Controller communications link.
2. Loss of communications to any Controller shall result in an alarm at all PCs running the communications software.
3. When communications are restored, all buffered events shall automatically upload to the PC, and any database changes shall be automatically sent to the Controller.

L. Controller-to-Controller Communications:

1. Controller-to-Controller Communications: RS-485, 4-wire, point-to-point, regenerative (repeater) communications network methodology.
2. RS-485 communications signal shall be regenerated at each Controller.

M. Database Downloads:

1. All data transmissions from PCs to a Location, and between Controllers at a Location, shall include a complete database checksum to check the integrity of the transmission. If the data checksum does not match, a full data download shall be automatically retransmitted.
2. If a Controller is reset for any reason, it shall automatically request and receive a database download from the PC. The download shall restore data stored at the Controller to their normal working state and shall take place with no operator intervention.

N. Operator Interface:

1. Inputs in system shall have two icon representations, one for the normal state and one for the abnormal state.
2. When viewing and controlling inputs, displayed icons shall automatically change to the proper icon to display the current system state in real time. Icons shall also display the input's state, whether armed or bypassed, and if the input is in the armed or bypassed state due to a time zone or a manual command.
3. Outputs in system shall have two icon representations, one for the secure (locked) state and one for the open (unlocked) state.
4. Icons displaying status of the I/O points shall be constantly updated to show their current real-time condition without prompting by the operator.
5. The operator shall be able to scroll the list of I/Os and press the appropriate toolbar button, or right click, to command the system to perform the desired function.
6. Graphic maps or drawings containing inputs, outputs, and override groups shall include the following:
  - a. Database to import and store full-color maps or drawings and allow for input, output, and override group icons to be placed on maps.
  - b. Maps to provide real-time display animation and allow for control of points assigned to them.
  - c. System to allow inputs, outputs, and override groups to be placed on different maps.
  - d. Software to allow changing the order or priority in which maps will be displayed.
7. Override Groups Containing I/Os:
  - a. System shall incorporate override groups that provide the operator with the status and control over user-defined "sets" of I/Os with a single icon.
  - b. Icon shall change automatically to show the live summary status of points in that group.
  - c. Override group icon shall provide a method to manually control or set to time zone points in the group.
  - d. Override group icon shall allow the expanding of the group to show icons representing the live status for each point in the group, individual control over each point, and the ability to compress the individual icons back into one summary icon.
8. Schedule Overrides of I/Os and Override Groups:
  - a. To accommodate temporary schedule changes that do not fall within the holiday parameters, the operator shall have the ability to override schedules individually for each input, output, or override group.
  - b. Each schedule shall be composed of a minimum of two dates with separate times for each date.
  - c. The first time and date shall be assigned the override state that the point shall advance to, when the time and date become current.
  - d. The second time and date shall be assigned the state that the point shall return to, when the time and date become current.
9. Copy command in database shall allow for like data to be copied and then edited for specific requirements, to reduce redundant data entry.

O. Operator Access Control:

1. Control operator access to system controls through three password-protected operator levels. System operators and managers with appropriate password clearances shall be able to change operator levels for operators.
2. Three successive attempts by an operator to execute functions beyond their defined level during a 24-hour period shall initiate a software tamper alarm.
3. A minimum of 32-bit passwords shall be available with the system software. System shall display the operator's name or initials in the console's first field. System shall print the operator's name or initials, action, date, and time on the system printer at login and logoff.
4. The password shall not be displayed or printed.
5. Each password shall be definable and assignable for the following:
  - a. Commands usable.
  - b. Access to system software.
  - c. Access to application software.
  - d. Individual zones that are to be accessed.
  - e. Access to database.

P. Operator Commands:

1. Command Input: Plain-language words and acronyms shall allow operators to use the system without extensive training or data-processing backgrounds. System prompts shall be a word, a phrase, or an acronym.
2. Command inputs shall be acknowledged, and processing shall start in not less than one second.
3. Tasks that are executed by operator's commands shall include the following:
  - a. Acknowledge Alarms: Used to acknowledge that the operator has observed the alarm message.
  - b. Place Zone in Access: Used to remotely disable intrusion alarm circuits emanating from a specific zone. System shall be structured so that console operator cannot disable tamper circuits.
  - c. Place Zone in Secure: Used to remotely activate intrusion alarm circuits emanating from a specific zone.
  - d. System Test: Allows the operator to initiate a system-wide operational test.
  - e. Zone Test: Allows the operator to initiate an operational test for a specific zone.
  - f. Print reports.
  - g. Change Operator: Used for changing operators.
  - h. Run system tests.
  - i. Generate and format reports.
  - j. Request help with the system operation.
    - 1) Include in main menus.
    - 2) Provide unique, descriptive, context-sensitive help for selections and functions with the press of one function key.
    - 3) Provide navigation to specific topic from within the first help window.
    - 4) Help shall be accessible outside the applications program.

- k. Entry-Control Commands:
    - 1) Lock (secure) or unlock (open) each controlled entry and exit up to four times a day through time-zone programming.
    - 2) Arm or disarm each monitored input up to four times a day through time-zone programming.
    - 3) Enable or disable readers or keypads up to twice a day through time-zone programming.
    - 4) Enable or disable cards or codes up to four times per day per entry point through access-level programming.
  - 4. Command Input Errors: Show operator input assistance when a command cannot be executed because of operator input errors. Assistance screen shall use plain-language words and phrases to explain why the command cannot be executed. Error responses that require an operator to look up a code in a manual or other document are not acceptable. Conditions causing operator assistance messages include the following:
    - a. Command entered is incorrect or incomplete.
    - b. Operator is restricted from using that command.
    - c. Command addresses a point that is disabled or out of service.
    - d. Command addresses a point that does not exist.
    - e. Command is outside the system's capacity.
- Q. Alarms:
- 1. System Setup:
    - a. Assign manual and automatic responses to incoming point status change or alarms.
    - b. Automatically respond to input with a link to other inputs, outputs, operator-response plans, unique sound with use of WAV files, and maps or images that graphically represent the point location.
    - c. 60-character message field for each alarm.
    - d. Operator-response-action messages shall allow message length of at least 65,000 characters, with database storage capacity of up to 32,000 messages. Setup shall assign messages to access point.
    - e. Secondary messages shall be assignable by the operator for printing to provide further information and shall be editable by the operator.
    - f. Allow 25 secondary messages with a field of 4 lines of 60 characters each.
    - g. Store the most recent 1000 alarms for recall by the operator using the report generator.
  - 2. Software Tamper:
    - a. Annunciate a tamper alarm when unauthorized changes to system database files are attempted. Three consecutive unsuccessful attempts to log onto system shall generate a software tamper alarm.
    - b. Annunciate a software tamper alarm when an operator or other individual makes three consecutive unsuccessful attempts to invoke functions beyond their authorization level.



- c. Maintain a transcript file of the last 5000 commands entered at the each Central Station to serve as an audit trail. System shall not allow write access to system transcript files by any person, regardless of their authorization level.
    - d. Allow only acknowledgment of software tamper alarms.
  3. Read access to system transcript files shall be reserved for operators with the highest password authorization level available in system.
  4. Animated Response Graphics: Highlight alarms with flashing icons on graphic maps; display and constantly update the current status of alarm inputs and outputs in real time through animated icons.
  5. Alarm Handling: Each input may be configured so that an alarm cannot be cleared unless it has returned to normal, with options of requiring the operator to enter a comment about disposition of alarm. Allow operator to silence alarm sound when alarm is acknowledged.
- R. Alarm Monitoring: Monitor sensors, Controllers, and DTS circuits and notify operators of an alarm condition. Display higher-priority alarms first and, within alarm priorities, display the oldest unacknowledged alarm first. Operator acknowledgment of one alarm shall not be considered acknowledgment of other alarms nor shall it inhibit reporting of subsequent alarms.
  1. Displayed alarm data shall include type of alarm, location of alarm, and secondary alarm messages.
  2. Printed alarm data shall include type of alarm, location of alarm, date and time (to nearest second) of occurrence, and operator responses.
  3. Maps shall automatically display the alarm condition for each input assigned to that map, if that option is selected for that input location.
  4. Alarms initiate a status of "pending" and require the following two handling steps by operators:
    - a. First Operator Step: "Acknowledged." This action shall silence sounds associated with the alarm. The alarm remains in the system "Acknowledged" but "Un-Resolved."
    - b. Second Operator Step: Operators enter the resolution or operator comment, giving the disposition of the alarm event. The alarm shall then clear.
  5. Each alarm point shall be programmable to disallow the resolution of alarms until the alarm point has returned to its normal state.
  6. Alarms shall transmit to Central Station in real time, except for allowing connection time for dial-up locations.
  7. Alarms shall be displayed and managed from a minimum of four different windows.
    - a. Input Status Window: Overlay status icon with a large red blinking icon. Selecting the icon will acknowledge the alarm.
    - b. History Log Transaction Window: Display name, time, and date in red text. Selecting red text will acknowledge the alarm.
    - c. Alarm Log Transaction Window: Display name, time, and date in red. Selecting red text will acknowledge the alarm.
    - d. Graphic Map Display: Display a steady colored icon representing each alarm input location. Change icon to flashing red when the alarm occurs. Change icon from flashing red to steady red when the alarm is acknowledged.

8. Once an alarm is acknowledged, the operator shall be prompted to enter comments about the nature of the alarm and actions taken. Operator's comments may be manually entered or selected from a programmed predefined list, or a combination of both.
  9. For locations where there are regular alarm occurrences, provide programmed comments. Selecting that comment shall clear the alarm.
  10. The time and name of the operator who acknowledged and resolved the alarm shall be recorded in the database.
  11. Identical alarms from same alarm point shall be acknowledged at same time the operator acknowledges the first alarm. Identical alarms shall be resolved when the first alarm is resolved.
  12. Alarm functions shall have priority over downloading, retrieving, and updating database from Controllers.
  13. When a reader-controlled output (relay) is opened, the corresponding alarm point shall be automatically bypassed.
- S. Monitor Display: Display text and graphic maps that include zone status integrated into the display. Colors are used for the various components and current data. Colors shall be uniform throughout the system.
1. Color Code:
    - a. FLASHING RED: Alerts operator that a zone has gone into an alarm or that primary power has failed.
    - b. STEADY RED: Alerts operator that a zone is in alarm and alarm has been acknowledged.
    - c. YELLOW: Advises operator that a zone is in access.
    - d. GREEN: Indicates that a zone is secure and that power is on.
  2. Graphics:
    - a. Support 32,000 graphic display maps and allow import of maps from a minimum of 16 standard formats from another drawing or graphics program, including but not limited to PDF, Visio, and AutoCAD.
    - b. Allow I/O to be placed on graphic maps by the drag-and-drop method.
    - c. Operators shall be able to view the inputs, outputs, and the point's name by moving the mouse cursor over the point on graphic map.
    - d. Inputs or outputs may be placed on multiple graphic maps. The operator shall be able to toggle to view graphic map associated with inputs or outputs.
    - e. Each graphic map shall have a display-order sequence number associated with it to provide a predetermined order when toggled to different views.
    - f. Camera icons shall have the ability to be placed on graphic maps that, when selected by an operator, will open a video window, display the camera associated with that icon, and provide pan-tilt-zoom control of pan-tilt-zoom cameras.
    - g. Input, output, or camera placed on a map shall allow the ability to arm or bypass an input, open or secure an output, or control the pan-tilt-zoom function of the selected camera.
    - h. Support map hierarchies and maps within maps. There shall be no limit to the number of maps that can be nested hierarchically with each other. Multiple maps may be displayed simultaneously.

- T. System test software enables operators to initiate a test of the entire system or of a particular portion of the system.
  - 1. Test Report: The results of each test shall be stored for future display or printout. The report shall document the operational status of system components.
- U. Report Generator Software: Include commands to generate reports for displaying, printing, and storing on disk and tape. Reports shall be stored by type, date, and time. Report printing shall be the lowest priority activity. Report generation mode shall be operator selectable but set up initially as periodic, automatic, or on request. Include time and date printed and the name of operator generating the report. Report formats may be configured by operators.
  - 1. Automatic Printing: Setup shall specify, modify, or inhibit the report to be generated; the time the initial report is to be generated; the time interval between reports; the end of period; and the default printer.
  - 2. Printing on Requests: An operator may request a printout of any report.
  - 3. Alarm Reports: Reporting shall be automatic as initially set up. Include alarms recorded by system over the selected time and information about the type of alarm (such as door alarm, tamper alarm, etc.), the type of sensor, the location, the time, and the action taken.
  - 4. Access and Secure Reports: Document zones placed in access, the time placed in access, and the time placed in secure mode.
  - 5. Custom Reports: Reports tailored to exact requirements of who, what, when, and where. As an option, custom report formats may be stored for future printing.
  - 6. Automatic History Reports: Named, saved, and scheduled for automatic generation.
  - 7. Cardholder Reports: Include data, or selected parts of the data, as well as the ability to be sorted by name, card number, imprinted number, or by any of the user-defined fields.
  - 8. Cardholder by Reader Reports: Based on who has access to a specific reader or group of readers by selecting the readers from a list.
  - 9. Cardholder by Access-Level Reports: Display everyone that has been assigned to the specified access level.
  - 10. Panel Labels Reports: Printout of control-panel field documentation including the actual location of equipment, programming parameters, and wiring identification. Maintain system installation data within system database so that they are available on-site at all times.
  - 11. History Reports: Custom reports that allows the operator to select any date, time, event type, device, output, input, operator, Location, name, or cardholder to be included or excluded from the report.
    - a. Initially store history on the hard disk of the host PC.
    - b. Print history to any system printer.
    - c. The report shall be definable by a range of dates and times with the ability to have a daily start and stop time over a given date range.
    - d. Each report shall depict the date, time, event type, event description, device, or I/O name, cardholder group assignment, and cardholder name or code number.
    - e. Each line of a printed report shall be numbered to ensure that the integrity of the report has not been compromised.
    - f. Total number of lines of the report shall be given at the end of the report. If the report is run for a single event such as "Alarms," the total shall reflect how many alarms occurred during that period.

12. Reports shall have the following four options:
  - a. View on screen.
  - b. Print to system printer. Include automatic print spooling and "Print To" options if more than one printer is connected to system.
  - c. "Save to File" with full path statement.
  - d. System shall have the ability to produce a report indicating status of system inputs and outputs or of inputs and outputs that are abnormal, out of time zone, manually overridden, not reporting, or in alarm.
13. Custom Code List Subroutine: Allow the access codes of system to be sorted and printed according to the following criteria:
  - a. Active, inactive, or future activate or deactivate.
  - b. Code number, name, or imprinted card number.
  - c. Group, Location, access levels.
  - d. Start and stop code range.
  - e. Codes that have not been used since a selectable number of days.
  - f. In, out, or either status.
  - g. Codes with trace designation.
14. The reports of system database shall allow options so that every data field may be printed.
15. The reports of system database shall be constructed so that the actual position of the printed data shall closely match the position of the data on the data-entry windows.

V. Anti-Passback:

1. System shall have global and local anti-passback features, selectable by Location. System shall support hard and soft anti-passback.
2. Hard Anti-Passback: Once a credential holder is granted access through a reader with one type of designation (IN or OUT), the credential holder may not pass through that type of reader designation until the credential holder passes through a reader of opposite designation.
3. Soft Anti-Passback: Should a violation of the proper IN or OUT sequence occur, access shall be granted, but a unique alarm shall be transmitted to the control station, reporting the credential holder and the door involved in the violation. A separate report may be run on this event.
4. Timed Anti-Passback: A Controller capability that prevents an access code from being used twice at the same device (door) within a user-defined amount of time.
5. Provide four separate zones per Location that can operate without requiring interaction with the host PC (done at Controller). Each reader shall be assignable to one or all four anti-passback zones. In addition, each anti-passback reader can be further designated as "Hard," "Soft," or "Timed" in each of the four anti-passback zones. The four anti-passback zones shall operate independently.
6. The anti-passback schemes shall be definable for each individual door.
7. The Master Access Level shall override anti-passback.
8. System shall have the ability to forgive (or reset) an individual credential holder or the entire credential holder population anti-passback status to a neutral status.

W. Visitor Assignment:

1. Provide for and allow an operator to be restricted to only working with visitors. The visitor badging subsystem shall assign credentials and enroll visitors. Allow only access levels that have been designated as approved for visitors.
2. Provide an automated log of visitor name, time and doors accessed, and whom visitor contacted.
3. Allow a visitor designation to be assigned to a credential holder.
4. Security access system shall be able to restrict the access levels that may be assigned to credentials that are issued to visitors.
5. Allow operator to recall visitors' credential holder file, once a visitor is enrolled in the system.
6. The operator may designate any reader as one that deactivates the credential after use at that reader. The history log shall show the return of the credential.
7. System shall have the ability to use the visitor designation in searches and reports. Reports shall be able to print all or any visitor activity.

X. Training Software: Enables operators to practice system operation including alarm acknowledgment, alarm assessment, response force deployment, and response force communications. System shall continue normal operation during training exercises and shall terminate exercises when an alarm signal is received at the console.

Y. Entry-Control Enrollment Software: Database management functions that allow operators to add, delete, and modify access data as needed.

1. The enrollment station shall not have alarm response or acknowledgment functions.
2. Provide multiple, password-protected access levels. Database management and modification functions shall require a higher operator access level than personnel enrollment functions.
3. The program shall provide means to disable the enrollment station when it is unattended to prevent unauthorized use.
4. The program shall provide a method to enter personnel identifying information into the entry-control database files through enrollment stations. Allow entry of personnel identifying information into the system database using menu selections and data fields. The data field names shall be customized during setup to suit user and site needs.
5. Cardholder Data: Provide 99 user-defined fields. System shall have the ability to run searches and reports using any combination of these fields. Each user-defined field shall be configurable, using any combination of the following features:
  - a. MASK: Determines a specific format that data must comply with.
  - b. REQUIRED: Operator is required to enter data into field before saving.
  - c. UNIQUE: Data entered must be unique.
  - d. DEACTIVATE DATE: Data entered will be evaluated as an additional deactivate date for all cards assigned to this cardholder.
  - e. NAME ID: Data entered will be considered a unique ID for the cardholder.
6. Personnel Search Engine: A report generator with capabilities such as search by last name, first name, group, or any predetermined user-defined data field; by codes not used in definable number of days; by skills; or by seven other methods.
7. Multiple Deactivate Dates for Cards: User-defined fields to be configured as additional stop dates to deactivate any cards assigned to the cardholder.

8. Batch card printing.
9. Default card data can be programmed to speed data entry for sites where most card data are similar.
10. Enhanced ACSII File Import Utility: Allows the importing of cardholder data and images.
11. Card Expire Function: Allows readers to be configured to deactivate cards when a card is used at selected devices.

## 2.4 SYSTEM DATABASE

- A. Database and database management software shall define and modify each point in database using operator commands. Definition shall include parameters and constraints associated with each system device.
- B. Database Operations:
  1. System data management shall be in a hierarchical menu tree format, with navigation through expandable menu branches and manipulated with use of menus and icons in a main menu and system toolbar.
  2. Navigational Aids:
    - a. Toolbar icons for add, delete, copy, print, capture image, activate, deactivate, and muster report.
    - b. Point and click feature to facilitate data manipulation.
    - c. Next and previous command buttons visible when editing database fields to facilitate navigation from one record to the next.
    - d. Copy command and copy tool in the toolbar to copy data from one record to create a new similar record.
  3. All data entry shall be automatically checked for duplicate and illegal data and shall verify that data are in a valid format.
  4. Provide a memo or note field for each item that is stored in database, allowing the storing of information about any defining characteristics of the item. Memo field is used for noting the purpose the item was entered for, reasons for changes that were made, and the like.
- C. File Management:
  1. Provide database backup and restoration system, allowing selection of storage media, including USB portable drives, Zip and Jaz drives, and designated network resources.
  2. Provide manual and automatic mode of backup operations. The number of automatic sequential backups before the oldest backup becomes overwritten; FIFO mode shall be operator selectable.
  3. Backup program shall provide manual operation from any PC on the LAN and shall operate while system remains operational.
- D. Operator Passwords:
  1. Software shall support up to 1024 individual system operators, each with a unique password.

2. Operator Password: Coordinate number of alphanumeric characters required, with Owner prior to system configuration.
  3. Allow passwords to be case sensitive.
  4. Passwords shall not be displayed when entered.
  5. Provide each password with a unique and customizable password profile, and allow several operators to share a password profile. Include the following features in the password profile:
    - a. Allow for at least 1024 operator password profiles.
    - b. Predetermine the highest-level password profile for access to all functions and areas of program.
    - c. Allow or disallow operator access to any program operation, including the functions of View, Add, Edit, and Delete.
    - d. Restrict which doors an operator can assign access to.
  6. Operators shall use a username and password to log on to system.
    - a. This username and password is used to access database areas and programs as determined by the associated profile.
  7. Make provision to allow the operator to log off without fully exiting program. User may be logged off, but program will remain running while displaying the login window for the next operator.
- E. Access Card/Code Operation and Management: Access authorization shall be by card, by a manually entered code (PIN), or by a combination of both (card plus PIN).
1. Access authorization shall verify the facility code first, the card or card-and-PIN validation second, and the access level (time of day, day of week, date), anti-passback status, and number of uses last.
  2. Use data-entry windows to view, edit, and issue access levels. Access authorization entry management system shall maintain and coordinate all access levels to prevent duplication or the incorrect creation of levels.
  3. Allow assignment of multiple cards/codes to a cardholder.
  4. Allow assignment of up to four access levels for each Location to a cardholder. Each access level may contain any combination of doors.
  5. Each door may be assigned four time zones.
  6. Access codes may be up to 11 digits in length.
  7. Software shall allow the grouping of locations so cardholder data can be shared by all locations in the group.
  8. Visitor Access: Issue a visitor badge, without assigning that person a card or code, for data tracking or photo ID purposes.
  9. Cardholder Tracing: Allow for selection of cardholder for tracing. Make a special audible and visual annunciation at control station when a selected card or code is used at a designated code reader. Annunciation shall include an automatic display of the cardholder image.
  10. Allow each cardholder to be given either an unlimited number of uses or a number from 1 to 9998 that regulates the number of times the card can be used before it is automatically deactivated.
  11. Provide for cards and codes to be activated and deactivated manually or automatically by date. Provide for multiple deactivate dates to be preprogrammed.

F. Security Access Integration:

1. Contractor shall integrate Owner's existing Badge Pass badging database into the Access Control System database.
2. Automatic or manual image recall and manual access based on photo verification shall also be a means of access verification and entry.
3. System shall allow sorting of cardholders together by group or other characteristic for a fast and efficient method of reporting on, and enabling or disabling, cards or codes.

G. Operator Comments:

1. With the press of one appropriate button on toolbar, the user shall be permitted to make operator comments into history at anytime.
2. Automatic prompting of operator comment shall occur before the resolution of each alarm.
3. Operator comments shall be recorded by time, date, and operator number.
4. Comments shall be sorted and viewed through reports and history.
5. The operator may enter comments in two ways; either or both may be used:
  - a. Manually entered through keyboard data entry (typed), up to 65,000 characters per each alarm.
  - b. Predefined and stored in database for retrieval on request.
6. System shall have a minimum of 999 predefined operator comments with up to 30 characters per comment.

H. Group:

1. Group names may be used to sort cardholders into groups that allow the operator to determine the tenant, vendor, contractor, department, division, or any other designation of a group to which the person belongs.
2. System software shall have the capacity to assign 1 of 32,000 group names to an access authorization.
3. Make provision in software to deactivate and reactivate all access authorizations assigned to a particular group.
4. Allow sorting of history reports and code list printouts by group name.

I. Time Zones:

1. Each zone consists of a start and stop time for 7 days of the week and three holiday schedules. A time zone is assigned to inputs, outputs, or access levels to determine when an input shall automatically arm or disarm, when an output automatically opens or secures, or when access authorization assigned to an access level will be denied or granted.
2. Up to four time zones may be assigned to inputs and outputs to allow up to four arm or disarm periods per day or four lock or unlock periods per day; up to three holiday override schedules may be assigned to a time zone.
3. Data-entry window shall display a dynamically linked bar graph showing active and inactive times for each day and holiday, as start and stop times are entered or edited.
4. System shall have the capacity for 2048 time zones for each Location.



J. Holidays:

1. Three different holiday schedules may be assigned to a time zone. Holiday schedule consists of date in format MM/DD/YYYY and a description. When the holiday date matches the current date of the time zone, the holiday schedule replaces the time zone schedule for that 24-hour period.
2. System shall have the capacity for 128 holidays.
3. Three separate holiday schedules may be applied to a time zone.
4. Holidays have an option to be designated as occurring on the designated date each year. These holidays remain in system and will not be purged.
5. Holidays not designated to occur each year shall be automatically purged from database after the date expires.

K. Access Levels:

1. System shall allow for the creation up to 128 access levels.
2. One level shall be predefined as the Master Access Level. The Master Access Level shall work at all doors at all times and override any anti-passback.
3. System shall allow for access to be restricted to any area by reader and by time. Access levels shall determine when and where an Identifier is authorized.
4. System shall be able to create multiple door and time zone combinations under same access level so that an Identifier may be valid during different time periods at different readers even if the readers are on the same Controller.

L. User-Defined Fields:

1. System shall provide a minimum of 99 user-defined fields, each with up to 50 characters, for specific information about each credential holder.
2. System shall accommodate a title for each field; field length shall be 20 characters.
3. A "Required" option may be applied to each user-defined field that, when selected, forces the operator to enter data in the user-defined field before the credential can be saved.
4. A "Unique" option may be applied to each user-defined field that, when selected, will not allow duplicate data from different credential holders to be entered.
5. Data format option may be assigned to each user-defined field that will require the data to be entered with certain character types in specific spots in the field entry window.
6. A user-defined field, if selected, will define the field as a deactivate date. The selection shall automatically cause the data to be formatted with the windows MM/DD/YYYY date format. The credential of the holder will be deactivated on that date.
7. A search function shall allow any one user-defined field or combination of user-defined fields to be searched to find the appropriate cardholder. The search function shall include search for a character string.
8. System shall have the ability to print cardholders based on and organized by the user-defined fields.

## 2.5 SURGE AND TAMPER PROTECTION

- A. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor-entry connection to components.
  - 1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Division 26 Section "Transient Voltage Suppression."
  - 2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Division 26 Section "Transient Voltage Suppression" as recommended by manufacturer for type of line being protected.
- B. Tamper Protection: Tamper switches on enclosures, control units, pull boxes, junction boxes, cabinets, and other system components shall initiate a tamper-alarm signal when unit is opened or partially disassembled. Control-station control-unit alarm display shall identify tamper alarms and indicate locations.

## 2.6 CONTROLLERS

- A. Controllers: Intelligent peripheral control unit, complying with UL 294, that stores time, date, valid codes, access levels, and similar data downloaded from the Central Station for controlling its operation.
- B. Controllers shall connect to Central-Station Computer via Owner-furnished Ethernet network. Contractor shall furnish cabling and terminations for these connections, per Section 27 "Communications Cabling."
- C. Subject to compliance with requirements in this Article, manufacturers may use multipurpose Controllers.
- D. Battery Backup: Sealed, lead acid; sized to provide run time during a power outage of 90 minutes, complying with UL 924.
- E. Alarm Annunciation Controller:
  - 1. The Controller shall automatically restore communication within 10 seconds after an interruption with the field device network.
    - a. Inputs: Monitor dry contacts for changes of state that reflect alarm conditions. Provides at least eight alarm inputs, which are suitable for wiring as normally open or normally closed contacts for alarm conditions.
    - b. Alarm-Line Supervision:
      - 1) Supervise the alarm lines by monitoring each circuit for changes or disturbances in the signal using dc change measurements. System shall initiate an alarm in response to an abnormal current, which is a dc change of five percent or more for longer than 500 ms.

- 2) Transmit alarm-line-supervision alarm to the Central Station during the next interrogation cycle after the abnormal current condition.
    - c. Outputs: Managed by Central Station software.
  2. Auxiliary Equipment Power: A GFI service outlet inside the Controller enclosure.
- F. Entry-Control Controller:
  1. Function: Provide local entry-control functions including one- and two-way communications with access-control devices such as card readers, keypads, biometric personal identity verification devices, door strikes, magnetic latches, gate and door operators, and exit pushbuttons.
    - a. Operate as a stand-alone portal Controller using the downloaded database during periods of communication loss between the Controller and the field-device network.
    - b. Accept information generated by the entry-control devices; automatically process this information to determine valid identification of the individual present at the portal:
      - 1) On authentication of the credentials or information presented, check privileges of the identified individual, allowing only those actions granted as privileges.
      - 2) Privileges shall include, but not be limited to, time of day control, day of week control, group control, and visitor escort control.
    - c. Maintain a date-, time-, and Location-stamped record of each transaction. A transaction is defined as any successful or unsuccessful attempt to gain access through a controlled portal by the presentation of credentials or other identifying information.
  2. Inputs:
    - a. Data from entry-control devices; use this input to change modes between access and secure.
    - b. Database downloads and updates from the Central Station that include enrollment and privilege information.
  3. Outputs:
    - a. Indicate success or failure of attempts to use entry-control devices and make comparisons of presented information with stored identification information.
    - b. Grant or deny entry by sending control signals to portal-control devices.
    - c. Maintain a date-, time-, and Location-stamped record of each transaction and transmit transaction records to the Central Station.
    - d. Door Prop Alarm: If a portal is held open for longer than a number of seconds to be coordinated with the Owner, alarm sounds.
  4. With power supplies sufficient to power at voltage and frequency required for field devices and portal-control devices.

5. Data Line Problems: For periods of loss of communications with Central Station, or when data transmission is degraded and generating continuous checksum errors, the Controller shall continue to control entry by accepting identifying information, making authentication decisions, checking privileges, and controlling portal-control devices.
  - a. Store up to 1000 transactions during periods of communication loss between the Controller and access-control devices for subsequent upload to the Central Station on restoration of communication.
6. Controller Power: NFPA 70, Class II power supply transformer, with 12- or 24-V ac secondary, backup battery and charger.
  - a. Backup Battery: Premium, valve-regulated, recombinant-sealed, lead-calcium battery; spill proof; with a full 1-year warranty and a pro rata 19-year warranty. With single-stage, constant-voltage-current, limited battery charger, comply with battery manufacturer's written instructions for battery terminal voltage and charging current recommendations for maximum battery life.
  - b. Backup Battery: Valve-regulated, recombinant-sealed, lead-acid battery; spill proof. With single-stage, constant-voltage-current, limited battery charger, comply with battery manufacturer's written instructions for battery terminal voltage and charging current recommendations for maximum battery life.
  - c. Backup Power Supply Capacity: 90 minutes of battery supply. Submit battery and charger calculations.
  - d. Power Monitoring: Provide manual dynamic battery load test, initiated and monitored at the control center; with automatic disconnection of the Controller when battery voltage drops below Controller limits. Report by using local Controller-mounted LEDs and by communicating status to Central Station. Indicate normal power on and battery charger on trickle charge. Indicate and report the following:
    - 1) Trouble Alarm: Normal power off load assumed by battery.
    - 2) Trouble Alarm: Low battery.
    - 3) Alarm: Power off.

## 2.7 CARD READERS AND CARDS

- A. Readers shall be manufactured by HID, Smart card type, iCLASS SE series.
  1. Single-gang mount readers shall be HID model # R40 (920N).
  2. Mullion-mount readers shall be HID # R10 (900N).
  3. Keypad readers shall be HID model # RK40.
- B. Power: Card reader shall be powered from its associated Controller, including its standby power source.
- C. Display: LED or other type of visual indicator display shall provide visual status indications and user prompts. Indicate power on/off, whether user passage requests have been accepted or rejected, and whether the door is locked or unlocked.

- D. Enclosure: Suitable for surface, semiflush, or pedestal mounting. Mounting types shall additionally be suitable for installation in the following locations:
  - 1. Indoors, controlled environment.
  - 2. Indoors, uncontrolled environment.
  - 3. Outdoors, with built-in heaters or other cold-weather equipment to extend the operating temperature range as needed for operation at the site.
- E. Provide (200) HID Multi-Technology iCLASS SE / HID Prox Card credential cards, 2k Byte (16k Bits) + HID Prox, with plain white gloss finish.

## 2.8 DOOR HARDWARE INTERFACE

- A. Exit Device with Alarm: Operation of the exit device shall generate an alarm and annunciate a local alarm. Exit devices are existing unless otherwise noted.
- B. Exit Alarm: Operation of a monitored door shall generate an alarm.
- C. Electric Door Latches: Use end-of-line resistors to provide power line supervision. Signal switches shall transmit data to Controller to indicate when the lock is not engaged and the latch mechanism is unlocked, and shall report a forced entry. Power and signal shall be from the Controller.
- D. Electromagnetic Locks: End-of-line resistors shall provide power line supervision. Lock status sensing signal shall positively indicate door is secure. Power and signal shall be from the Controller.

## 2.9 ELECTROMAGNETIC LOCKS

- A. Electromagnetic Locks shall be Von Duprin M62 Series or approved equal, with 1200 pound holding force. Furnish and install with all hardware and connections as required.

## 2.10 DOOR POSITION SWITCHES

- A. Door position switches shall be concealed type, by Securitron Magnalock or approved equal, coordinate switch model in accordance with door finish and type.
  - 1. Operating temperature range: -40 to +150 degrees F
  - 2. Switching current AC/DC (max): 0.4A

## 2.11 POWER SUPPLIES

- A. Power Supplies for Controllers (Door Reader Interfaces), Card Readers, Maglocks, Electric Latches, and Door Position Switches shall be 115VAC 60Hz input to 2.5 amp continuous supply output at 12VDC or 24VDC distributed via 16 fuse protected Class 2 Rated power limited outputs. UL listed for Access Control Systems (UL294), NFPA 72 Compliant. Altronix # AL300ULXPD16 or approved equal.

- B. Provide in quantities as required to supplement existing access control system power supplies, for quantity of access control locations / devices per drawings.
- C. Provide each power supply with 12VDC/12AH batteries, Altronix # BT1212 or approved equal, in quantity required for 90-minute backup time.
- D. Provide connection to fire alarm system for Fail-Safe at all electronic door locks in the event of a fire alarm.

## 2.12 FLOOR SELECT ELEVATOR CONTROL

- A. Elevator access control shall be integral to security access, at locations noted on drawings.
  - 1. System shall be capable of providing full elevator security and control through dedicated Controllers without relying on the control-station host PC for elevator control decisions.
  - 2. Access-control system shall enable and disable car calls on each floor and floor select buttons in each elevator car, restricting passengers' access to the floors where they have been given access.
  - 3. System setup shall, through programming, automatically secure and unsecure each floor select button of a car individually by time and day. Each floor select button within a car shall be separately controlled so that some floors may be secure while others remain unsecure.
  - 4. When a floor select button is secure, it shall require the passenger to use his/her access code and have access to that floor before the floor select button will operate. The passenger's credential shall determine which car call and floor select buttons are to be enabled, restricting access to floors unless authorized by system's access code database. Floor select button shall be enabled only in the car where the credential holder is the passenger.
- B. Security access system shall record which call button is pressed, along with credential and time information.
  - 1. System Controller shall record elevator access data.
  - 2. The Controller shall reset all additional call buttons that may have been enabled by the user's credential.
  - 3. The floor select elevator control shall allow for manual override either individually by floor or by cab as a group from a workstation PC.

## 2.13 TRANSFORMERS

- A. NFPA 70, Class II control transformers, NRTL listed. Transformers for security access-control system shall not be shared with any other system.

## 2.14 ACCESS CONTROL COMPOSITE CABLE

- A. Provide cabling from appropriate Controller in Data and Electrical Rooms to access-controlled door locations where existing cabling is not able to be re-used. Cable to be Belden or approved equal composite type, NFPA 70 / NEC Type CMP, model 658AFS or 638AFS, depending cable length and conductor sizing per equipment manufacturer's guidelines.
1. Belden # 658AFS shall consist of the following cables, with no overall jacket:
    - a. Reader Cable: 3-Pair 22 AWG stranded (7x30) bare copper conductors, shielded, Orange jacket.
    - b. Door Contact Cable: 2-Conductor 22 AWG stranded (7x30) bare copper conductors, shielded, White jacket.
    - c. Rex/Spare Cable: 4-Conductor 22 AWG stranded (7x30) bare copper conductors, shielded, Blue jacket.
    - d. Lock Power Cable: 4-Conductor 18 AWG stranded (7x26) bare copper conductors, shielded, Gray jacket.
  2. Belden # 638AFS shall consist of the following cables, with no overall jacket:
    - a. Reader Cable: 3-Pair 18 AWG stranded (7x26) bare copper conductors, shielded, Orange jacket.
    - b. Door Contact Cable: 2-Conductor 18 AWG stranded (7x26) bare copper conductors, shielded, White jacket.
    - c. Rex/Spare Cable: 4-Conductor 18 AWG stranded (7x26) bare copper conductors, shielded, Blue jacket.
    - d. Lock Power Cable: 4-Conductor 16 AWG stranded (19x30) bare copper conductors, shielded, Gray jacket.

## 2.15 DOOR POSITION SWITCH CABLE

- A. At door locations receiving a door position switch, but no access control, provide Plenum-Type, Paired Input Cable: 1-pair, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, aluminum foil-polyester tape shield (foil side out), with No. 22 AWG drain wire, 100 percent shield coverage, and plastic jacket. As manufactured by Belden, General Cable, Tappan, or approved equal.
1. NFPA 70, Type CMP.
  2. Flame Resistance: NFPA 262 Flame Test.

## 2.16 ROUGH-IN

- A. For access control devices and equipment at locations where existing rough-in (in-wall conduits, back-boxes and junction boxes) is not available, provide new rough-in for concealing cables and device mounting boxes within walls.
1. Conduits shall be EMT, minimum 0.75" trade size, larger as required, maximum 40% cable fill.
  2. Back-boxes and junction boxes shall be minimum 4"x4", 2.125" deep, sheet metal, NEMA OS 1. Provide single-gang mount rings for devices as required.

3. Cut walls as required to conceal rough-in, patch, and re-paint with owner-furnished paint.
4. Provide pull-boxes after every 100-feet of continuous conduit, and after every 180-degrees of direction transition within any conduit run.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Comply with recommendations in SIA CP-01.
- B. Comply with EIA/TIA-606, "Administration Standard for the Telecommunications Infrastructure of Commercial Buildings."
- C. Obtain detailed Project planning forms from manufacturer of access-control system; develop custom forms to suit Project. Closely coordinate with Owner to determine programming plan for System. Publish as Project planning documents for review and approval.
  1. Record setup data for control station.
  2. For each Location, record setup of Controller features and access requirements.
  3. Propose start and stop times for time zones and holidays and match up access levels for doors.
  4. Set up groups, facility codes, linking, and list inputs and outputs for each Controller.
  5. Assign action message names and compose messages.
  6. Set up alarms. Establish interlocks between alarms and video surveillance features.
  7. Prepare and install alarm graphic maps.
  8. Develop user-defined fields.
  9. Develop screen layout formats.
  10. Propose setup for key control.
  11. Complete system diagnostics and operation verification.
  12. Prepare a specific plan for system testing, startup, and demonstration.
  13. Develop acceptance test concept and, on approval, develop specifics of the test.
- D. In meetings with Architect and Owner, present Project planning documents and review, adjust, and prepare final setup documents. Use final documents to set up system software.

#### 3.2 CABLING

- A. Comply with NECA 1, "Good Workmanship in Electrical Contracting."
- B. Install cables and wiring according to requirements in Division 28 Section "Conductors and Cables for Electronic Safety and Security."
- C. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters. Conceal raceway and wiring except in unfinished spaces.



- D. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Use NRTL-listed plenum cable in environmental air spaces, including plenum ceilings. Conceal raceway and cables except in unfinished spaces.
- E. Install LAN cables using techniques, practices, and methods that are consistent with Category 5e rating of components and that ensure Category 5e performance of completed and linked signal paths, end to end.
- F. Install cables without damaging conductors, shield, or jacket.
- G. Boxes and enclosures containing security system components or cabling, and which are easily accessible to employees or to the public, shall be provided with a lock. Boxes above ceiling level in occupied areas of the building shall not be considered to be accessible. Junction boxes and small device enclosures below ceiling level and easily accessible to employees or the public shall be covered with a suitable cover plate and secured with tamperproof screws.
- H. Install end-of-line resistors at the field device location and not at the Controller or panel location.

### 3.3 CABLE APPLICATION

- A. Comply with EIA/TIA-569-B, "Commercial Building Standard for Telecommunications Pathways and Spaces."
- B. Cable application requirements are minimum requirements and shall be exceeded if recommended or required by manufacturer of system hardware.
- C. RS-485 Cabling: Install at a maximum distance of 4000 feet.
- D. Install minimum No. 18 AWG ac power wire from transformer to Controller, with a maximum distance of 25 feet.

### 3.4 GROUNDING

- A. Comply with Division 26 Section "Grounding and Bonding for Electrical Systems" and Division 28 "Conductors and Cables for Electronic Safety and Security."
- B. Comply with IEEE 1100, "Power and Grounding Sensitive Electronic Equipment."
- C. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
- D. Bond shields and drain conductors to ground at only one point in each circuit.

E. Signal Ground:

1. Terminal: Locate in each equipment room and wiring closet per Section 280513 Conductors and Cables for Electronic Safety and Security; isolate from power system and equipment grounding.
2. Backbone Cable: Extend from signal ground bus to signal ground terminal in each equipment room and wiring closet.

3.5 INSTALLATION

- A. Push Buttons: Where multiple push buttons are housed within a single switch enclosure, they shall be stacked vertically with each push-button switch labeled with 1/4-inch- high text and symbols as required. Push-button switches shall be connected to the Controller associated with the portal to which they are applied, and shall operate the appropriate electric strike, electric latch, or other facility release device.
- B. Install and configure devices and equipment according to manufacturers' guidelines.

3.6 IDENTIFICATION

- A. In addition to requirements in this Article, comply with TIA/EIA-606.
- B. Develop Cable Administration Drawings for system identification, testing, and management. Use unique, alphanumeric designation for each cable, and label cable and jacks, connectors, and terminals to which it connects with same designation. Use logical and systematic designations for facility's architectural arrangement.
- C. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
  1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
  2. Each wire connected to building-mounted devices is not required to be numbered at the device if the color of the wire is consistent with the associated wire connected and numbered within the panel or cabinet.
- D. At completion, cable test report labels shall reflect as-built conditions.

3.7 SYSTEM SOFTWARE

- A. Develop, install, and test software and databases for the complete and proper operation of systems involved. Assign software license to Owner.

### 3.8 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
  - 1. Test each circuit and component of each system. Tests shall include, but are not limited to, measurements of power supply output under maximum load, signal loop resistance, and leakage to ground where applicable. System components with battery backup shall be operated on battery power for a period of not less than 10 percent of the calculated battery operating time. Provide special equipment and software if testing requires special or dedicated equipment.
  - 2. Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.

### 3.9 STARTUP SERVICE

- A. Engage a factory-authorized service representative to supervise and assist with startup service. Complete installation and startup checks according to approved procedures that were developed in "Preparation" Article and with manufacturer's written instructions.
  - 1. Enroll and prepare badges and access cards for Owner's operators, management, and security personnel.

### 3.10 PROTECTION

- A. Maintain strict security during the installation of equipment and software. Room housing the control station that has been powered up shall be locked and secured, during periods when a qualified operator in the employ of Contractor is not present.

### 3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's Administrative, Nursing Staff, and Maintenance personnel on two separate days, for up to eight hours each day, to operate, adjust and maintain security access control system. Video record training sessions and turn recording over to Owner.

Include training for the following:

- 1. Computer system administration personnel to manage and repair the databases and to update and maintain software.
- 2. Operators who prepare and input credentials to staff the control station and to enroll personnel.

3. Hardware maintenance personnel.
  4. Administrative management.
- B. Engage a factory-authorized service representative to provide up to sixteen hours of onsite follow-up training within 30-60 days after Owner has moved into project space, to operate, adjust and maintain security access control system, to include all aspects of Item 3.11.A above. Video record training sessions and turn recording over to Owner.
- C. Coordinate training sessions with Owner, with at least seven days' advance notice.

END OF SECTION 281300

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## SECTION 282300 – VIDEO SURVEILLANCE SYSTEM - ALTERNATE BID #1

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes: Description, architectural and functional requirements, data security requirements, operational capabilities, and computer equipment requirements for an on-premises Video Management Software (VMS) supporting an unrestricted number of users, devices, servers, and sites; as well as Network Video Recorder (NRV), Ethernet switches, cameras, and related equipment/accessories for a complete, functional Video Surveillance System.
- B. Compliance: System equipment and installation shall comply with all provisions and requirements of this specification as well as all applicable national, state and local codes and standards.
- C. Related Requirements:
  - 1. Section 280000 Electronic Safety and Security (Division 28).
    - a. Section 280500 – Common Work Results for Electronic Safety and Security.
    - b. Section 280513 – Conductors and Cables for Electronic Safety and Security.
    - c. Section 281300 – Access Control System.

#### 1.2 REFERENCES

- A. Trademarks Used in This Document:
  - 1. Apple: Safari®
  - 2. Digital Living Network Alliance: DLNA®
  - 3. Google: Google Chrome™
  - 4. Immervision: ImmerVision Enables®
  - 5. Intel: Intel®, Core™, Xeon®
  - 6. Microsoft: Microsoft®, Outlook®, Windows®, Active Directory®, Hyper-V®, SQL Server®, Microsoft Internet Explorer®
  - 7. Milestone: XProtect®, Scalable Video Quality Recording™
  - 8. nVIDIA: NVIDIA®
  - 9. Mozilla: Mozilla®, Firefox®
  - 10. VMWare: VMWare®
- B. Abbreviations and Acronyms:
  - 1. ACC: Advanced Audio Coding.
  - 2. AES: Advanced Encryption Standard.
  - 3. API: Application Programming Interface.
  - 4. DES: Data Encryption Standard.

5. DLNA: Digital Living Network Alliance.
6. EULA: End User License Agreement.
7. FPS: Frames per Second.
8. Full HD: High Definition video resolution of 1920 x 1080 pixels.
9. GB: Gigabyte.
10. GOP: Group of Pictures.
11. H.264/H.265: Video compression formats.
12. HD: High Definition video resolution of 1280 x 720 pixels.
13. HTML: Hyper Text Markup Language.
14. HTTPS: Hyper Text Transfer Protocol Secure.
15. I/O: Input/Output.
16. IP: Internet Protocol.
17. JPEG: Joint Photographic Experts Group (image format).
18. LAN: Local Area Network.
19. LPR: License Plate Recognition.
20. MIP SDK: Milestone Integration Platform Software Development Kit.
21. MPEG: Moving Picture Experts Group (video format).
22. NAS: Network Attached Storage.
23. NAT: Network Address Translation.
24. ONVIF: Open Network Video Interface Forum.
25. PTZ: Pan-Tilt-Zoom.
26. RTSP: Real Time Streaming Protocol.
27. SDK: Software Development Kit.
28. SVQR: Scalable Video Quality Recording.
29. UPnP: Universal Plug and Play.
30. UPS: Uninterruptible Power Supply.
31. VMS: Video Management Software.
32. WAN: Wide Area Network.

C. Definitions:

1. AAC Audio Codec: Advanced Audio Coding is a proprietary audio coding standard for lossy digital audio compression.
2. Active Media Storage: High-performance media storage used for active video, audio and metadata recording.
3. Application Programming Interface (API): Set of clearly defined methods of communication between various software components.
4. Archived Media Storage: Secondary media storage used for storing video, audio and metadata beyond an initial retention period.
5. Authentication: Process that establishes the origin of information or determines an entity's identity.
6. Authorization: Process that associates permission to access a resource or asset with a person and the person's identifier(s) for the purpose of granting or denying access.
7. Bit Rate: Number of bits per time unit sent over a network.
8. Contractor: Firm selected by Owner and any of Contractor's subcontractors, vendors, suppliers or fabricators, to perform work specified in these contract documents and supporting documentation. Contractor shall supply all equipment, labor, material and services necessary to complete the project construction in accordance with Contract Documents.

9. Central Processing Unit (CPU): General purpose electronic circuitry within a computer that carries out the instructions of a computer program, typically contained in a single integrated circuit chip.
10. Digital Living Network Alliance: Standards-making group for consumer electronics manufacturers establishing interoperability among consumer devices for picture and video display.
11. Dwg-files: Proprietary binary file format used for storing two- and three- dimensional design data and metadata.
12. Dxf-files: CAD data file format developed by Autodesk for enabling data interoperability between AutoCAD and other programs.
13. G.711 Audio Codec: ITU-T standard audio codec that provides toll-quality audio.
14. G.726 Audio Codec: ITU-T ADPCM speech codec standard covering the transmission of voice.
15. Graphics Processing Unit (GPU): Specialized electronic circuit designed to rapidly decode video, manipulate images and accelerate the creation of video images in a video frame buffer intended for output to a display device, much more efficiently than can be done by general purpose computer CPUs. GPUs are used in mobile phones, personal computers, workstations and game consoles.
16. Group of Pictures (GOP): In video coding, a group of pictures, or GOP structure, specifies the order in which intra- and inter-frames are arranged. The GOP is a collection of successive pictures within a coded video stream. Each coded video stream consists of successive GOPs, from which the visible frames are generated. Encountering a new GOP in a compressed video stream means that the decoder doesn't need any previous frames to decode the next ones and allows fast seeking through the video.
17. Hardware Acceleration: Use of computer hardware (such as a GPU) to perform some functions more efficiently than is possible in software running on a more general-purpose CPU.
18. Kerberos: Ticket-based network authentication protocol designed to provide strong authentication for client/server or server/server applications.
19. Multi-site: Reference to a VMS that spans multiple physical site locations.
20. Open Network Video Interface Forum (ONVIF): Global and open industry forum for the creation of standards for how IP-networked products within video surveillance and other physical security areas can communicate with each other.
21. Pre-buffering: Temporary storage of video and audio for pre-recording.
22. Pre-recording: Automatically recording video and audio starting a specified number of seconds just before the event or time condition that initiated the recording.
23. Post-recording: Automatically continuing the recording of video and audio for a specified number of seconds after the end of the event or time condition that initiated the recording.
24. PTZ Patrolling or PTZ Tour: Automatically moving a camera through a specified series of preset PTZ positions, dwelling on those positions for a specified amount of time, and transitioning between the preset positions at a specified speed.
25. Reseller: Contractor authorized by manufacturer to furnish, install and maintain manufacturer's VMS, who may be the primary contractor or a subcontractor for the provision of this project's VMS.
26. Universal Plug and Play (UPnP): Set of networking protocols that permits networked devices, such as personal computers, printers, Internet gateways, Wi-Fi access points, IP video cameras and mobile devices to seamlessly discover each other's presence on the network and establish functional network services for data sharing and communications.



D. Brand Names Used in This Document:

1. XProtect® LPR
2. XProtect® Professional+
3. XProtect® Retail
4. XProtect® Transact

1.3 SUBMITTALS

A. Product Data: Provide manufacturer's data sheets and installation manuals on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

B. Shop Drawings: Provide the following drawings.

1. Schematic of system components with physical space requirements.
2. System network topology diagram.
3. Connecting riser diagrams for all interfacing equipment.
  - a. List of all equipment with part numbers.
  - b. Locations for all components to be installed under this scope of work.

1.4 CLOSEOUT SUBMITTALS

A. As-Built Drawings: Provide original shop drawings modified to reflect changes made to comply with installation/configuration requirements and actual field conditions.

B. Maintenance Contracts: Submit a maintenance service agreement, including cost and services for a two-year period for Owner's review.

C. Warranty Documentation: Submit manufacturer's standard VMS warranty.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, material and services specified for this project for commercial, military, or industrial use.
2. Contractors / Installers:
  - a. Licensure: Contractor or security sub-contractors shall be licensed to perform security installations in the state/region where the work is to be performed if so required.

- b. Experience: Contractor or security sub-contractor shall have a minimum of three years of experience installing and servicing systems of similar scope and complexity.
- c. References: Contractor shall provide three current Milestone project references from clients with systems of similar scope and complexity which became operational in the past three years.
  - 1) At least three references shall be utilizing the same system components, in a similar configuration as the proposed system.
  - 2) References shall include a current point of contact, company or agency name, business address, telephone number, and if the contact agrees, include a basic system description and date of project completion. The owner reserves the option to visit the reference sites, with the site owner's permission and representative, to verify the quality of installation and the reference's level of satisfaction with the system.
- d. Technician Certification: Utilize only manufacturer-trained technicians to install, program, and service VMS equipment.
  - 1) Ensure technicians have a minimum of five continuous years of technical experience in electronic security systems including IP networking and VMS solutions.
- e. Dealer Certification: Provide evidence that installing service company is an authorized dealer in good standing for the product's manufacturer, and that it meets the manufacturer's technical certification requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver software installation packages via download directly from manufacturer's web site.
- B. Software installation packages must be digitally signed by the manufacturer.

#### 1.7 WARRANTY AND SUPPORT

- A. Manufacturer Warranty and Support:
  - 1. Software Warranty:
    - a. Manufacturer's software warranty must be described in the manufacturer's EULA for the product.
  - 2. Software Support:
    - a. Provide free access to any software service updates or hot fixes released due to a material defect or error in the product.
    - b. Provide new device driver packs, multiple times per year, to extend support for additional devices without the need for a new version of the product.
    - c. Provide free access to self-paced interactive e-training.

3. Software Updates and Upgrades:

- a. Make software upgrades available for a period of one year from activation of the software license. Coverage options shall include:
  - 1) Free access to any new product versions for the purchased Milestone VMS software product.
  - 2) 100% credit on owners current Milestone VMS software products when upgrading to a more advanced Milestone VMS product.
  - 3) Case Management online tool for submitting and tracking technical cases.
  - 4) Direct Access to technical support via e-mail and phone.
  - 5) Prioritized handling of support phone call response times based upon criticality of issue, for questions submitted by email or that cannot be answered in initial phone call.
  - 6) Additional years of software upgrades available for purchase separately.

B. Contractor Warranty:

1. Fully warrant parts, materials and labor for a minimum of one year from date of the final acceptance of the VMS, including wiring, software, hardware and third-party products, including:
  - a. Provision of all new software service releases during the warranty period.
  - b. Provision of all new device driver packs.

C. Maintenance and Service:

1. General Requirements:
  - a. Provide all services required and equipment necessary to maintain VMS in an operational state as specified for one year from formal written acceptance of system.
  - b. Provide all necessary material required for performing scheduled adjustments or other non-scheduled work.
  - c. Minimize impacts on facility operations when performing scheduled adjustments or other non-scheduled work.
2. Description of Work: Deployment of VMS includes installation and setup of new server hardware and software, plus any new and existing equipment specified in Article 2.1. OWNER-FURNISHED PRODUCTS.
3. Personnel: Service personnel shall be certified in the maintenance and repair of the selected type of equipment and integrations and qualified to accomplish all work promptly and satisfactorily.
4. Schedule of Work: Work shall be performed during regular workweek working hours, as determined by the deployment facility's locale, excluding federal/public holidays.
5. Emergency Service:
  - a. Provide Owner with an emergency service center telephone number. Emergency service center shall be staffed 24 hours a day, 365 days a year and be located within 60 miles/kilometers of the deployment facility.
  - b. Be a stocking contractor of the manufacturer's equipment.

- c. Owner shall initiate service calls whenever system is not functioning properly.
  - d. Service Response:
    - 1) Owner has sole authority for determining catastrophic and non-catastrophic system failures.
    - 2) Catastrophic system failure is defined as any system failure that Owner determines will place a facility at increased risk.
    - 3) For catastrophic system failures, provide same-day four-hour service response with continued status updates at least every four hours.
    - 4) For non-catastrophic failures, provide service response within eight hours with continued status updates at least twice a week.
6. Verification of Operation: As part of scheduled adjustments and repairs, verify operation of system as demonstrated by performance verification testing.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS - VMS

#### A. Americas:

- 1. Milestone Systems, Inc., 5300 Meadows Rd, # 400, Lake Oswego, OR 97035 U.S.A.
  - a. Telephone: (503) 350-1100.
  - b. Website: [www.milestonesys.com](http://www.milestonesys.com).

#### B. Milestone Product Name: XProtect Professional+.

#### C. Substitution Vendors allowed, provided they meet all requirements within this Specification section: Avigilon, Genetec, Identiv Velocity Vision, OnSSI, or approved equal.

### 2.2 VIDEO MANAGEMENT SOFTWARE

#### A. Description: Video surveillance management software (referred to as “system” or “VMS”) supporting an unrestricted number of users, devices, servers and sites, with options for central surveillance operations and mobile devices.

#### B. System Architecture: The VMS shall consist of:

- 1. Servers: One or more VMS servers.
  - a. Physical or virtualized Windows servers.
  - b. Virtualized Windows servers, using:
    - 1) Microsoft Hyper-V.
    - 2) VMWare.
  - c. UPS provided to physical servers, network infrastructure and devices such as cameras.

2. Server Software Components: One or more Milestone XProtect software components, or software components made by others as noted, per VMS server.
  - a. Management Server: Central service component of the VMS responsible for handling system configuration, distributing the configuration to other system components, such as Recording Server services, and for facilitating user authentication.
  - b. Recording Server: Service responsible for communications, recording and event handling for all devices (cameras, video and audio encoders, I/O modules, metadata sources, etc.), including:
    - 1) Retrieving video, audio, metadata and I/O event streams from devices.
    - 2) Recording video, audio and metadata.
    - 3) Providing access to live and recorded video, audio and metadata.
    - 4) Transmit live audio from operator's microphone to one or more camera speakers or supported IP speakers.
    - 5) Providing access to device status.
    - 6) Triggering system and video events on device failures, events, etc.
    - 7) Writes video streams, audio streams and their metadata to a high-performance media database.
    - 8) Performing motion detection and generate smart search metadata.
  - c. Event Server: Service that handles various tasks related to events, alarms, maps and third-party integrations via the Milestone Integration Platform Software Development Kit (MIP SDK).
  - d. Log Server: Service that writes all system, audit and rule-triggered log messages to database.
  - e. Service Channel: Service responsible for communicating the following:
    - 1) Service and configuration messages to XProtect Smart Client.
  - f. Milestone Mobile Server: Service responsible for hosting the XProtect Web Client and for providing access to the VMS for XProtect Web Client and Milestone Mobile client users.
  - g. Milestone ONVIF Bridge: Optional server, including Milestone ONVIF Bridge service, Milestone RTSP Bridge service, and the Milestone ONVIF Bridge Manager, plus 64-bit plug-in for Management Client. This is to enable private-to-public video integration.
  - h. DLNA Server: Service to enable display of live video on any DLNA compliant TV or displays without the need for additional equipment.
  - i. Microsoft SQL Server: Microsoft database server service for the Management Server, Event Server and Log Server services.
  - j. Microsoft Active Directory: Active Directory is not required for single-site systems but is recommended for cyber security purposes.
3. PC or Laptop Workstations: One or more PCs or laptops for Milestone XProtect client software applications intended to run on Windows-based PCs and laptops.
  - a. Management Client: The administration interface for all parts of the VMS, designed to be run remotely from, for example, an administrator's computer.

- b. XProtect Smart Client: Designed for day-to-day use by dedicated operators, to be run remotely on the operator's computer. XProtect Smart Client provides dedicated task-oriented tabs for Live Video, Video Playback, Sequence Explorer, plus dockable tabs for Alarm Monitor. XProtect Smart Client supports definable keyboard and joystick button shortcuts for frequently-used actions, including window or camera selection.
      - c. XProtect Web Client: Browser-based application for the occasional or remote user that needs easy access to live video monitoring and audio listening with PTZ control including use of presets, and video and audio playback and export, with defined exports available for later usage or download.
  - 4. Tablets or Smartphones: One or more tablets or smartphones using XProtect Web Client (see above) or Milestone Mobile client.
    - a. Milestone Mobile Client: Native mobile app for smartphone or tablet users, for easy access to live and playback of cameras, and to activate system events and outputs. Additionally, for use as a remote recording device by using the mobile device's built-in camera, whereby video from the device's camera is streamed back to the VMS and recorded like a standard camera.
  - 5. Networks:
    - a. Multiple Network Segments: The VMS must support network segmentation into separate device, server and internet-connected networks.
    - b. Device Network: Local network whose capacity and configuration are suitable for the level of video, audio and metadata data transmission established by the system design and its intended usage.
    - c. Server Network: Local network whose capacity and configuration are suitable for the level of video data transmission, systems integration, and user operations established by the system design and its intended usage.
    - d. Internet-Connected Network: Internet-connected network providing connection to remote VMS sites and private-to-public connection via Milestone ONVIF Bridge. This network is also used for remote user access via the Milestone Mobile Server.
    - e. Network Traversal:
      - 1) Enable software clients to access Recording Server services from outside a NAT firewall, by the use of public addresses and port forwarding.
      - 2) Provide Remote Connect Services that enable secure remote connections to devices across different types of private and public networks.
- C. Multi-System Architectures: Provide the following architecture option for multi-site deployments:
  - 1. Distributed Recording Server Services: Intended for sites with stable network connections between the central site and any number of remote sites.
    - a. Management Server at central site is providing user authentication and authorization for all distributed Recording Server services.
    - b. Each site has at least one Recording Server.

## 2.3 SYSTEM DESIGN CRITERIA

- A. Scalability: Provide component-based system architecture to support scaling of VMS from small systems (up to 100 devices) to very large systems (several thousand devices) for single-site or multi-site deployment, whereby:
  - 1. For Small Systems: All software components can be installed on the same server if the server is able to handle the combined load.
  - 2. For Large Systems: Software components can be installed on separate dedicated servers to scale and distribute the load.
- B. Availability and High Performance: Provide the following capabilities to ensure high VMS availability and performance.
  - 1. Storage solution shall be configured with RAID10 for Live database and RAID5 or RAID6 for archive database.
- C. Operating Systems: Provide server and client software applications that are native 64-bit Microsoft Windows applications.
- D. Network Addressing: Support both IPv4 and IPv6 addressing.
- E. Video Standards: Provide simultaneous live streaming and recording of video from IP cameras and IP video encoders without any software limitations on the number of cameras per Recording Server, with support for the following codecs and options:
  - 1. Codecs:
    - a. H.264 and H.265
    - b. MPEG-4 and MPEG-4 ASP
    - c. MJPEG
    - d. MxPEG.
  - 2. Options:
    - a. Toggling between recording key frames only or full video stream for MPEG-4, H.264 and H.265 video.
    - b. Adjustable GOP length for MPEG-4, H.264 and H.265 video.
    - c. Toggle between recording full framerate from the camera and any lower FPS for MJPEG video.
- F. Video De-Interlacing: Provide live video views with an adaptive de-interlacing option, to improve the quality of interlaced video, based on the actual video content received, for example, to smooth area of an image where object lines would otherwise appear as jagged lines.

- G. Audio Standards: Provide simultaneous digital two-way audio streaming and recording of audio from IP speaker and IP microphone devices without any software limitations on the number of devices per Recording Server, with support for the following codecs and options:
  - 1. Codecs:
    - a. AAC
    - b. G711
    - c. G726
  - 2. Options:
    - a. Playback of audio files on rule.
- H. DLNA Support: Provide the ability to easily display live video from the installed cameras directly onto any modern consumer-grade TV supporting DLNA functionality.
- I. Hardware Acceleration XProtect Smart Client: Provide the following hardware acceleration capabilities to offload Smart Client video processing from the computer CPU to dedicated hardware video processing capabilities:
  - 1. NVIDIA GPU: Automatically detect and use all available NVIDIA GPUs, for hardware accelerated decoding, color correction, and scaling.
  - 2. Intel Quick Sync: Automatically detect and use Intel Quick Sync Video GPU integrated into select Intel processors for hardware accelerated decoding, color correction, and scaling.
  - 3. Provide the ability to use both NVIDIA and Intel GPUs at the same time and automatically load balance the requests for optimal performance.
  - 4. Provide the ability to show which GPU is used to decode which stream.
- J. Hardware Acceleration Recording Server: Provide the following hardware acceleration capabilities to offload Recording Server video processing from the computer CPU to dedicated hardware video processing capabilities:
  - 1. Intel Quick Sync: Automatically detect and use Intel Quick Sync Video GPU integrated into select Intel processors for hardware accelerated decoding to enable server-side motion detection.
- K. Hardware Acceleration Mobile Server: Provide the following hardware acceleration capabilities to offload Mobile Server video processing from the computer CPU to dedicated hardware video processing capabilities:
  - 1. NVIDIA GPU: Automatically detect and use all available NVIDIA GPUs, for hardware accelerated decoding to enable adaptive transcoding.
  - 2. Intel Quick Sync: Automatically detect and use Intel Quick Sync Video GPU integrated into select Intel processors for hardware accelerated decoding to enable adaptive transcoding.
  - 3. Provide the ability to use both NVIDIA and Intel GPUs at the same time and automatically load balance the requests for optimal performance.



- L. ONVIF Bridge Functionality: Provide access to live and recorded video, and the ability to control pan-tilt-zoom cameras in compliance with the relevant ONVIF Profile G and Profiles S standards.
- M. Camera-Independent Motion Detection: Provide real-time, camera-independent motion detection with:
  - 1. Configurable Sensitivity: Configurable and automatic motion-detection sensitivity per camera
  - 2. Searchable Metadata: Searchable motion detection metadata created during motion detection.
  - 3. Exclusion Zones: Multiple motion exclusion zones definable per camera to keep irrelevant motion from triggering recording.
- N. PTZ Control Priorities:
  - 1. Provide 3 PTZ priority levels for control of rights between different operators and automatic scanning and patrolling schemes.
  - 2. PTZ Scans and Patrols shall pause for higher-priority manual or event-based camera control, and resume after manual session timeout and completion of event camera control period.
- O. Configurable Pre-Buffering: Provide pre-buffering with variable buffer length, with the ability to place buffer on disk or in memory.
- P. Device Video Quality Optimization: Provide video quality optimized per available bandwidth, device screen resolution, and camera view window sizes in these clients:
  - 1. XProtect Smart Client Optimization:
    - a. Switch between all configured live video streams from the cameras to optimize bandwidth consumption and workstation performance.
    - b. Optimize viewing performance for remote viewing according to the available bandwidth and view layouts, maximizing video stream quality per display capabilities of defined views.
  - 2. XProtect Web Client and Milestone Mobile Client Optimization: Optimize transcoding by capping video stream resolution and frame rate for transmission to XProtect Web Client and Milestone Mobile client.
- Q. Multiple Language Support: Provide support for multiple languages in these XProtect clients:
  - 1. Management Client User Interface: American English, Chinese (Simplified), Chinese (Traditional), Danish, French, German, Italian, Japanese, Korean, Portuguese (Brazilian), Russian, Spanish, Swedish and Turkish.
  - 2. Management Client Built-In Help: American English, Chinese (Simplified), French, German, Japanese, Korean and Portuguese (Brazil).

3. XProtect Smart Client, XProtect Web Client and Milestone Mobile Client User Interface: American English, Arabic, Bulgarian, Chinese (Simplified), Chinese (Traditional), Croatian, Czech, Danish, Dutch, Farsi, Finnish, French, German, Hebrew, Hindi, Hungarian, Icelandic, Italian, Japanese, Korean, Norwegian (Bokmål), Polish, Portuguese (Brazilian), Russian, Serbian, Slovak, Spanish, Swedish, Thai and Turkish.
  4. XProtect Smart Client Built-In Help: American English, Arabic, Chinese (Simplified), Chinese (Traditional), Czech, Danish, Dutch, French, German, Italian, Japanese, Korean, Polish, Portuguese (Brazilian), Russian, Spanish, Swedish and Turkish.
  5. XProtect Web Client and Milestone Mobile Client Built-In Help: American English, Danish and Japanese.
- R. True Multi-Window Support: Provide true multi-window support in XProtect Smart Client whereby secondary windows have full functionality and can be operated in independent mode or synchronized mode where they follow the control of the main window.
- S. System Capacities: Provide the following maximum capacities, constrained only by the physical performance capabilities of installed server hardware and network infrastructure:
1. Unrestricted devices.
  2. Unrestricted client software users.
  3. Unrestricted mobile devices.
  4. Unrestricted client PCs or laptops.
  5. Unrestricted servers.
  6. Unrestricted sites.
  7. Unrestricted system rules.
  8. Unrestricted time profiles.
  9. Three software client profiles.
  10. Unrestricted media storage.
  11. Recording rates of at least 30 FPS per camera, limited only by hardware capabilities.

## 2.4 SYSTEM SECURITY

- A. Control and Information Security: Provide the following data protection measures and user rights management capabilities in support of system confidentiality, integrity and availability:
1. Data in Transit:
    - a. HTTPS connections from devices to Recording Server that support HTTPS connections.
    - b. HTTPS connections from Recording Server to VMS clients, SDK clients and services that support HTTPS connections.
  2. Off-Premises Live and Recorded Video in Transit: HTTPS connections from:
    - a. Mobile Server to browser-based XProtect Web Client and Milestone Mobile client app.
    - b. ONVIF Bridge to remote public systems.

3. Data Integrity of Exported Video:
    - a. Export video in XProtect format that can only be viewed in the XProtect Smart Client — Player.
    - b. Per-export password protection for playback.
    - c. 56-bit DES; 128, 192 and 256-bit AES encryption.
    - d. Digital sign exported media with SHA-2 algorithm to establish a means of detecting modification of exported video.
    - e. XProtect Smart Client — Player's Verify Signatures function to validate authenticity of exported video recording.
    - f. Option to prevent re-export of exported video.
  4. Digital Certificates Options: Use of system default-generated or customer-provided digital certificates for connections to the Mobile Server.
  5. Data Access Control: Provide:
    - a. User profiles restricting device access and video viewing, playback and export, including by day and time-of-day.
    - b. Timestamped audit log of who logged in, viewed live or recorded video, or exported video.
- B. User Authentication:
1. Log-in Options: Log-in authentication via:
    - a. Microsoft Active Directory.
    - b. Local Windows user accounts.
    - c. Basic user system account (username and password credentials).
    - d. Dual authentication, a.k.a. two-person rule, requiring two verified persons to gain access.
  2. Auto-Log-In: Use of last used credentials for authentication, with Auto-log-in and auto-restore of camera views.
  3. Kerberos Authentication: Provide strong authentication via Kerberos support.
- C. User Rights Management: Provide common and central detailed management of user rights across all user and programmatic (SDK) interfaces, using roles, users, and user groups:
1. User Rights: Define roles, add and delete users, manage permissions for roles, user groups and users, generate user rights management reports.
  2. Roles: Defining roles establishes permissions (also called "rights") that determine which system features may be accessed by users and groups. Provide the following security settings for roles:
    - a. Role Info:
      - 1) General: Smart Client profiles, dual authorization rights.
      - 2) Applications: Login to XProtect Smart Client, XProtect Web Client and Milestone Mobile client.
      - 3) Anonymous PTZ Sessions: Enabling anonymous user information for PTZ sessions.

- b. Users and Groups: Users and groups can be assigned to multiple roles.
- c. Overall System Permissions: Globally allow or deny permissions for servers, devices, and functions (such as manage, read, edit and delete).
- d. Specific System Permissions: Allow permissions for specific individual devices and functions:
  - 1) Cameras: Visibility, live view (within time profile), playback (within time profile), search sequences, smart search, export, manual recording, bookmark functions, AUX commands.
  - 2) Microphones and Speakers: Visibility, listen to live audio (within time profile), playback audio (within time profile), search sequences, export, manual recording, bookmark functions.
  - 3) Inputs and Outputs: Visibility, activation.
  - 4) PTZ Control: Manual control, activate PTZ presets, PTZ priority, manage PTZ presets and patrolling.
  - 5) Speech: Speak to speakers, speak priority.
  - 6) Remote Recordings: Retrieve remote recordings.
  - 7) External Events: Visibility, edit, delete, trigger.
  - 8) View Groups: Visibility, edit, delete, operate.
  - 9) Servers: Professional server access and authentication details.
  - 10) Matrix: Visibility.
  - 11) Alarms: Manage, view, disable alarms, receive notifications.
  - 12) MIP: Milestone Integration Platform plug-in permissions.
- D. Client Authentication: Provide Management Server authentication and authorization of connecting clients (XProtect Smart Client, Management Client and MIP SDK clients) and use a session-limited access token for controlling access to the Recording Server.
- E. System Hardening: System hardening guide that:
  - 1. Describes data security, network security and physical security measures and best practices for securing the installed VMS against cyber-attacks. This includes security considerations for the hardware and software of servers, clients, and network device components of a video surveillance system.
  - 2. Incorporates standards-based and best-practice-based security and privacy controls and maps them to each hardening recommendation.

## 2.5 LOGGING

- A. Provide logging of errors, warnings, system information, user activity, and logs about rules to a centralized database with time, date, and other related information. Logs provide multi-system support and configurable logging limits.
  - 1. System Logs: Log all system related errors, warnings, and system information, to be used for troubleshooting.
  - 2. Audit Logs: Log user activity in client applications including, but not limited to, user system access, configuration changes and operator actions.
  - 3. Rule-Triggered Logs: Log rules in which the system administrator has specified the "Make new log entry" action.
  - 4. Log Exporting: Logs can be exported as comma-separated-values (.csv) files.

5. Log Filtering: Logs can be filtered based on time frame, source name, source type, user, user location, rule name, etc.
6. Log-Related Options: Settings can be changed about:
  - a. Log retention time.
  - b. Which levels (error, warning, and system information) are logged.
  - c. Log security.

## 2.6 SYSTEM FUNCTIONALITY

### A. Configuration Management:

1. Real-Time Configuration Change Application: Immediately apply authorized changes of system configuration data for all sites, including, but not limited to licenses, devices, rules, schedules, users, maps, alarms, recording, client views, including while recording is in operation.
2. Configuration Data Caching for Continued Operation: Cached Recording Server configuration data shall ensure continuous operation of Recording Server during periods where the Management Server is inaccessible.
3. Backup and Restore: Built-in backup and restore support for manual system backup of all configuration data, including but not limited to:
  - a. All system configuration data.
  - b. Full device configuration data.
  - c. Maps.
  - d. Alarm settings and definitions.
  - e. Software client views.
  - f. User-defined rules and events. Defined video bookmarks.
4. Configuration Reporting: Provide complete or partial documentation of system configuration, including custom and site-specific free-text information, contractor's notes and option for logo inclusion.

### B. Application Workspace Optimization:

1. Options for optimizing application workspaces in the Management Client software:
  - a. Application Layout: Rearranging layout via drag-and-drop.
2. Options for optimizing application workspaces in the XProtect Smart Client software:
  - a. General: Control general look and feel and navigation properties, such as color mode, camera title bar, grid sizes.
  - b. Personal or Centrally Enforced: Optimization can either be made as individual personalization managed by each operator, or centrally enforced using Smart Client profiles.
  - c. View Layouts: Availability of specific view layouts enforced using Smart Client profiles.
  - d. Themes: User interface color schemes enabling user choice of dark or light themes.

- e. Simple and Advanced Modes: Optional simplified user interface with toggling between “Simple” and “Advanced” mode.
- f. Control Panes Availability: Control availability of control panes and functions in live and playback tabs, and in setup mode.
- g. Timeline Information: Control information included in timeline in playback tab.
- h. Export Behavior: Control behavior and availability of export function.
- i. Keyboard and Joystick Setup: Setup of keyboard short cuts and joystick controls.
- j. Alarm and Access Control Notifications: Control behavior of alarms and access control notifications.
- k. Application Language: Control application language.
- l. Advanced Application Settings: Control advanced application settings such as use of hardware acceleration, videos diagnostics overlay and time zone settings.

C. Device Discovery and Management:

- 1. Add Hardware wizard to automatically discover and upon approval add devices to system using Universal Plug and Play (UPnP) discovery, IP network range scanning, or manual device detection.
- 2. Replace Hardware wizard for swift replacement of malfunctioning devices with preservation of configuration settings and recordings, including those for attached cameras, microphones, speakers, inputs, outputs, and metadata devices.
- 3. Move Hardware wizard for moving devices and related devices from one Recording Server to another during runtime with no loss of settings, recordings, rules, permissions etc.
- 4. User ability to enable and disable devices for purposes of maintenance or temporary deactivation.

D. Camera Image and Video Stream Management: Adjustment of per-camera and per-video stream settings, with each camera allowed one or more streams for live viewing and one stream for recording, including an optional per-camera or per-camera-group preview window:

- 1. Per Camera:
  - a. General Settings: Change all camera specific general settings such as brightness, color level, compression, maximumbit rate, resolution, and image rotation.
  - b. Camera Video Stream Settings: Define as many different streams as specific camera support. Change individual stream settings such as FPS, resolution, image quality, video encoding format and resolution.
- 2. Per Camera Group:
  - a. General Settings: Change all common camera specific general settings for the camera group such as brightness, color level, compression, maximum bit rate, resolution, and image rotation.
  - b. Camera Video Stream Settings: Define as many different streams as specific camera support for the camera group. Change individual stream settings such as FPS, resolution, image quality, video encoding format and resolution.
  - c. One camera can be associated to multiple camera groups.
- 3. Video Streams: Define one camera video stream used for recording and one camera video stream to be used for live viewing.

4. Recording: Manage recording functionality including:
  - a. Related device recording.
  - b. Manual recording timer.
  - c. Pre-buffer use.
  - d. Recording framerate.
  - e. Media storage assignment.
  - f. Automatic retrieval of edge recordings.
5. Fisheye Lens Viewing: Capability for fisheye lens camera views provided through utilization of the ImmerVision Enables panomorph lens technology.
6. Motion Detection: Manage motion detection functionality including:
  - a. Motion sensitivity.
  - b. Processing all frames or keyframes only.
  - c. Generation of motion metadata for smart search.
  - d. Exclusion zones.
7. Camera Events: Define which camera events will be forwarded to the VMS.
8. Client Settings: Define client related functionality including:
  - a. Related devices.
  - b. Keyboard shortcut.
9. Privacy Masks: Permanent and liftable system-defined camera image privacy masks hide certain areas in the camera image for live view, recording, and video export.
  - a. Permanent Masks: Allow a system admin to mask areas in cameras at all times and for all users. Permanently masked areas cannot be revealed once recorded.
  - b. Liftable Masks: Allows a system admin to establish default mask areas in cameras at all times and for all users, but with the option to sufficiently privileged operators to temporarily remove the masks for authorized users if needed – such as during investigation.
  - c. Masking Level: When establishing a privacy mask, system admins may select a mask level on a scale between ‘light blur’ to ‘solid grey’.
- E. PTZ Camera Control: Camera-based and system-based PTZ camera control including the following capabilities.
  1. Camera PTZ preset positions: Camera-based PTZ presets may be imported from the camera and renamed for use in system-based manual and automatic PTZ control.
  2. Automated Use of PTZ Presets: Scheduled and event-based rules capability to move PTZ cameras to pre-set positions.
  3. System-Based PTZ Preset Positions: System-based PTZ presets are definable for use in system-based manual and automatic PTZ control.
  4. PTZ Patrolling: Multiple per-camera PTZ patrolling schemes may be defined with the following options.
    - a. Adjustable wait times between preset position changes.

- b. Disabling of motion detection to avoid false detection alarms.
- c. Multiple patrolling schedules per camera per day, with different schedule for days, nights and weekends.

## 2.7 EVENT AND ALARM MANAGEMENT

- A. Rules Engine: Provide rules for automating of different aspects of the system, including camera control, system behavior and external devices, based on events or time schedules.
  - 1. Trigger Events: Provide a Microsoft-Outlook-style configuration dialog where pre-defined and custom-defined events are used in rules to trigger actions.
    - a. Event Categories: Organize events into the following categories:
      - 1) Hardware: Physical hardware devices connected to the system.
      - 2) Devices: Certain functions and states of devices available via connected hardware devices.
      - 3) External: Relating to VMS integrations.
      - 4) Recording Server: Archiving and database functions.
      - 5) Analytics: From integrated analytics applications and systems.
      - 6) User-Defined: Custom-configured events enabling users to manually trigger actions and events in the system.
  - 2. Start Actions: Triggering events may initiate a wide set of system actions, including, but not limited to:
    - a. Control start and stop of recording, including scheduled and event-based recording.
    - b. Change camera stream properties.
    - c. PTZ camera preset positions and patrols.
    - d. Event-based notifications, including email notifications to single or multiple recipients with optional attachment of a camera still image or AVI video clip.
    - e. External system interactions.
    - f. Play pre-recorded audio.
    - g. Retrieve video and audio from edge storage devices.
    - h. Single rule allows for executing multiple system actions.
    - i. Rule actions shall be triggered by event, time interval or a combination of event and time.
    - j. Rules shall be optionally stopped by event or after a specified time.
    - k. Unrestricted number of rules.
- B. Time Profiles: Provide the following time profile functionality for use with profiles, rules, and triggers:
  - 1. Time profiles contain one, or more, single, or recurring periods of time.
  - 2. A single time period may span one or more days, defined by a starting date and time and an ending date and time.
  - 3. A recurring period of time is defined as a time range with recurrence pattern and range:
    - a. Time range is a starting and ending time within a day.
    - b. Recurrence pattern may be Daily, Weekly, Monthly or Yearly.



- c. Recurrent range is a starting and ending date, or a starting date with a duration in days.
- C. Single-Point Event/Alarm Management: Provide central management of all internal system alarms and external security alarms. Events are pre-defined or user-specified incidents on the VMS that can be set up to trigger an alarm, including analytics events and manual control actions. Event and alarm management capabilities shall include but not be limited to:
  - 1. Alarm Data Settings:
    - a. Customizable alarm priorities, statuses, and categories to enable alignment of the alarm handling workflow with existing workflows and security systems.
    - b. Optional sound notifications for different alarm priorities for notification of new incoming alarms.
    - c. Manage which alarm data are shown in the Alarm Manager, including but not limited to:
      - 1) ID.
      - 2) Image.
      - 3) Location.
      - 4) Message.
      - 5) Owner.
      - 6) Priority Level.
      - 7) Source.
      - 8) State Level.
      - 9) State Name.
      - 10) Time.
    - d. Optional Reasons for Closing to be chosen when an alarm is closed.
    - e. Add audio files in wav-format to be used as alarm notification sounds.
    - f. Manage how long alarms instances are kept in the system before being automatically deleted.
  - 2. Alarm Configuration:
    - a. User-definable alarm descriptions and work instructions.
    - b. Select triggering event and source.
    - c. Alarm time profiles specifying that response actions must take place within the specified time profile.
    - d. Select start and stop events specifying that response actions must take place within the specified event window.
    - e. Select a user defined event to be triggered if an alarm is not acknowledged within a defined time limit.
    - f. Association of alarms with one or more cameras, with automatic display of camera video in the alarm preview window, with a minimum of 15 cameras showing simultaneously in the alarm preview window.
    - g. Association of alarms to maps.
    - h. Association of initial alarm owner (individual user or group) and priority.
    - i. Association of alarm category.
    - j. Select user defined event to be triggered by the alarm.

3. Alarm Manager:
  - a. Alarm list with extensive sorting and filtering capabilities.
  - b. Instant preview of recorded video from primary and related cameras, at the time of the incident.
  - c. Thumbnail image from primary camera, at the time of the incident.
  - d. Alarm disabling option shall enable users to suppress alarms from a given device for a specified time period.
  - e. Alarm handling reports providing information about alarm inflow and alarm handling performance.
4. Alarm Handling:
  - a. Instant preview live video of primary camera.
  - b. Instant preview of recorded video from primary and related cameras, at the time of the incident.
  - c. Option to select any related cameras to be displayed in the live and playback view items.
  - d. Present the alarm work instructions.
  - e. Change priority and status of the alarm.
  - f. Alarm escalation with option to forward alarms to operators with appropriate skills to handle specific types of alarms.
  - g. Present time logged alarm activities.
  - h. Add time logged comments to the alarm incident.
5. Map Integration:
  - a. Present incident location automatically on map.
  - b. Tight integration with the map function allowing operators to indicate and acknowledge active alarms via map.
  - c. All other map functionality must be available when viewing maps in the Alarm Manager.
6. XProtect Web Client: Provide the following alarm list, alarm handling and investigation functionality:
  - a. Alarm List:
    - 1) Alarm list with filtering capabilities:
      - a) All or personal alarms.
      - b) All or specific alarm states.
      - c) All or specific alarm priorities.
    - 2) Thumbnail image from primary camera, at the time of the incident.
    - 3) Click to handle alarm.

- b. Alarm Handling:
  - 1) Instant preview of recorded video from primary and related cameras, at the time of the incident. Available incoming audio for cameras that have related microphones.
  - 2) Present the alarm work instructions.
  - 3) Change priority and status of the alarm.
  - 4) Alarm escalation with option to forward alarms to operators with appropriate skills to handle specific types of alarms.
- 7. Milestone Mobile Client: Provide the following alarm notification, alarm list, alarm handling and investigation functionality:
  - a. Alarm Notification: Receive alarm notifications using Push Notifications. Notifications include access to:
    - 1) Video.
    - 2) Alarm information.
    - 3) Work instructions.
  - b. Alarm List:
    - 1) Alarm list with filtering capabilities:
      - a) All or personal alarms.
      - b) All or specific alarm states.
      - c) All or specific alarm priorities.
    - 2) Thumbnail image from primary camera, at the time of the incident.
    - 3) Click to handle alarm.
  - c. Alarm Handling:
    - 1) Instant preview of recorded video from primary and related cameras, at the time of the incident.
    - 2) Present the alarm work instructions.
    - 3) Change priority and status of the alarm.
    - 4) Alarm escalation with option to forward alarms to operators with appropriate skills to handle specific types of alarms.

## 2.8 VIDEO PROCESSING AND VIEWING

- A. Multiple Monitor Support: Support multiple monitors where each monitor shall show multiple floating or full-screen windows for display of views or individual view items.
- B. View Window Aspect Ratios: Support multiple views optimized for 4:3 and 16:9 display settings in both landscape and portrait orientations.

- C. Private or Shared Views: Private views can only be access by the user who created them. Views may be shared generally and available to all roles or restricted to specific roles. Viewing of a content item in a shared view is subject to the viewer's permissions relating to the content item.
- D. View Groups: View groups facilitate view navigation and simplify searching across multiple views by narrowing search scope.
- E. View Layout Persistence: Same view layout in both live and playback modes.
- F. View Arrange and Restore: Support simple drag-and-drop re-arrangement of cameras in views for optimized monitoring of incidents, including replacement of individual cameras with different cameras, with single-click restore of original view layout.
- G. View Creation: Views that display up to 100 view items including cameras, web pages, still images, text, and interactive items. View capabilities include, but are not limited to:
  - 1. Camera View Item: Live and recorded camera video displayed in resizable view windows, utilized in several workspaces within the application. Each camera view item contains the following:
    - a. Video Status Indicator: A round dot indicating one of four states:
      - 1) Green: A connection to the camera is established.
      - 2) Red: Video from the camera is being recorded.
      - 3) Yellow: Playing back recorded video.
      - 4) Gray: The video has not changed for more than two seconds.
    - b. Motion Indicator: An icon of a moving person that appears only when motion is detected since it was last cleared.
    - c. Bounding-Box Display: Display of metadata bounding boxes as provided by supported cameras and integrated analytics in live and playback views.
    - d. Update on motion only: Optimizes CPU use by allowing motion detection to control whether the image should be decoded and displayed.
    - e. PTZ Camera View Item: PTZ camera view item can be configured to provide virtual joystick camera control and PTZ navigation overlay buttons on the video image.
    - f. Overlay Buttons: Used to add manually controlled speakers, events, outputs, PTZ cameras and to start/stop recording.
  - 2. Camera Navigator: User-defined views of specific sets of cameras in relation to each other, for example, according to floor plan, to enable visually tracking people and objects as they move from one camera's field of view to another. Camera Navigator function provides an add-on to the Map with no special configuration needed.
  - 3. Carousel: Allow a specific view item to automatically sequence rotate through pre-defined set of cameras that are not necessarily present in the view at the same time. Operators may select default or custom display times for each camera, and they are able to manually switch to the next or previous camera in the carousel list.
  - 4. Hotspot: Global hotspot function shall allow users to work in detail with any camera selected from any view. Local hotspot function shall allow users to work in detail with a camera selected from the same view.
  - 5. HTML Page: Show interactive HTML page.

6. Image: Show a still image.
  7. Matrix: Shows live video from multiple cameras in any view layout with customizable rotation paths, remotely controlled by the computers sending matrix remote commands.
  8. Navigable Map Pages: Static or active map pages may be used to provide a good overview of premises, and for switching between different views, such as map page displaying a floor plan.
  9. Text: Add text.
  10. 3<sup>rd</sup> party plug-ins: Add 3<sup>rd</sup> party plug-ins to extend the behavior of XProtect Smart Client.
- H. Live Video: Views provide camera live viewing capabilities including, but not limited to:
1. Live Viewing: View live video of camera view items on the Live tab.
  2. Manual PTZ Control: Manual PTZ control options:
    - a. Video overlaid PTZ control.
    - b. Joystick.
    - c. Virtual joystick function.
    - d. PTZ point-and-click control.
    - e. PTZ preset positions.
    - f. Overlay buttons to activate PTZ preset positions.
    - g. PTZ zoom to a defined rectangle.
    - h. Start, stop, and pause patrolling.
    - i. View who have PTZ control and time to automatic release, including anonymous users.
  3. Send Video to Destination: Option to send current camera to the following destinations:
    - a. View item in an existing window.
    - b. New floating window.
  4. Digital Zoom: Magnification of video to facilitate detail viewing.
  5. Bookmarks: Create quick or detailed bookmarks, to facilitate incident review and documentation.
    - a. System generated headline for quick bookmark.
    - b. Optional headline and description information for detailed bookmark.
  6. Independent Video Playback:
    - a. Playback of video in multiple camera view items, each on its own independent timeline.
    - b. Option to initiate playback mode and synchronizing playback timeline with current time in independent playback.
  7. Instant Change of Camera: Drag-and-drop placement of a different camera in a camera view item, instantly changes the content to video from the new camera, according to the camera view item's current timeline position.
  8. Smart Search: Initiate smart search for the camera.
  9. Manual Recording: Start and stop manual recording with automatic stop of recording after a configurable number of minutes.

- I. Video Playback: Views provide additional camera playback capabilities including, but not limited to:
  1. Playback: Time synchronized play back video of camera view items on the Playback tab.
  2. Navigation: Advanced video navigation includes:
    - a. Forward and backwards playback at different speeds:
      - 1) Playback Speeds: ¼x, ½x, 1x, 2x, 4x, 8x, 16x.
      - 2) Instant Realtime Speed: Toggle 1x playback speed or selected playback speed.
    - b. Forward and backwards frame-by-frame.
    - c. Skip to next or previous recorded sequence.
    - d. Skip to beginning or end of recordings.
    - e. Jump to date/time.
  3. Timeline: An overview of recorded sequences and bookmarks via integrated video timeline with time navigation and playback controls, including the following functionality:
    - a. Timeline Video Playback: Video from multiple camera view items integrated to a common video timeline, with common timeline control from any of the integrated camera view item.
    - b. Single and Consolidated Timeline: Two timelines with the first showing overview of selected camera view item and second showing a consolidated overview of all camera view items in the view.
    - c. Timeline Period: Select which period timeline covers.
      - 1) 5, 10, 20 minutes.
      - 2) 1, 2, 4, 8, 12, 16, 20 hours.
      - 3) 1, 2, 4 days.
      - 4) 1, 2, 4 weeks.
    - d. Recorded Sequences Overview: Recorded sequences of video and audio are shown in the timeline. The timeline displaying light-red to indicate recording, red for motion, light-green for incoming audio, and green for outgoing audio. If there are additional sources of data available, these are displayed as other colors.
    - e. Bookmarks Overview: Bookmarks are shown in the timeline with instant preview of the recorded video.
    - f. Integrated Time Interval Selection: Integrated function to select a time interval for export or video and audio retrieval from edge storage devices.
      - 1) Visual selection on timeline.
      - 2) Select start and end date/time.
      - 3) Loop selected period on playback.
    - g. Multi-Window Timeline: Ability to use one timeline to control playback of cameras in multiple view windows.

4. Recording Search: Search listing of camera sequences or bookmarks.
  - a. Preview: Search results may be previewed.
  - b. Print: Print of still image from the selected video clip may be initiated.
  - c. Export: Export of selected video clips may be initiated, reducing time needed to prepare forensic video material.
- J. Two-Way Audio: Audio from cameras with built-in or attached microphones can be configured for listening. Camera built-in or attached speakers can be configured for use to talk to individuals near speakers. Additional capabilities include:
  1. Broadcast: Broad announcements can be made by selecting the All-Speakers option when talking.
  2. Lock to Selected Audio Devices: Enables continued use of microphones and speakers from selected cameras, while viewing video from a different set of cameras. This enables, for example, informing an individual at risk about the safety status of nearby areas.
  3. Level Meter: Level meter indicates the volume of the speaking operator's voice, to indicate whether the operator is at a correct distance from the microphone.
- K. Sequence Explorer: Provides thumbnail-based video review capabilities in support of investigation tasks via several approaches to searching sequences of video, with the ability to create temporary views to display all or a subset of cameras matching search criteria:
  1. Sequence Search: Search in recording sequences on one or more cameras.
  2. Smart Search: Search for motion only in selected areas on a single camera.
  3. Bookmark Search: Search for bookmark headlines or descriptions, with matching results shown instantly in the thumbnail overview.
  4. Navigation: Smooth navigation with sliding preview and "drag-and-throw" function for video thumbnails.
  5. Preview: Selected sequence previews with auto play and direct export support.
- L. Video Export and Documentation: Smart Client options for video export and documentation include, but are not limited to:
  1. Snapshot: Produce instant visual documentation of a camera by saving the camera image to a file.
  2. Print: Produce instant visual documentation of a camera by sending it directly to a printer.
  3. Storyboarding: The storyboarding function makes it possible to include video sequences from different or overlapping time intervals from different cameras in the one and the same export.
  4. Export XProtect Format: Export in XProtect format; including the standalone XProtect Smart Client — Player application for simple instant viewing by authorities.
  5. Export Preview: Review video just prior to export, with looped playback option.
  6. Export Other Formats: Create evidence material in media player format (AVI files), MKV format, or still image format (JPEG images).
  7. Re-Export: Re-Export allows an authorized individual to export a digitally signed selection from the original video exported. Option to disable re-export, during initial export to XProtect format, prevents undesirable re-distribution of sensitive video recordings.

8. Bulk Export: In a single step, export in multiple formats to multiple destinations, including direct export to optical media, to ensure consistency across exported video sequences in various formats, and reduce human error possibilities.
9. Export of Comments: Two video formats support inclusion of comments in exported video:
  - a. XProtect Format: Include general and/or camera-specific comments to a video export file.
  - b. Media Player Format: Include comments as pre/post slides.
10. Video Incident Report Printing: Utilize still images rather than clips to print incident reports including images, surveillance details and free-text user comments.

## 2.9 MAPS

- A. Maps: Provide multi-layered physical overview of surveillance video coverage, with interactive access to and control of the VMS and related devices, including the following elements:
  1. Map Images: Illustrated maps or photographs. Supported image file formats are: BMP, GIF, JPEG, JPG, PNG, TIF, TIFF, and WMP.
  2. Camera Icons: Indicate camera locations on the map. Fixed camera icons show camera view as colored angle radiating from the camera. PTZ camera icons show preset camera views as colored angles radiating from the camera.
    - a. Live Preview: Hover mouse pointer over camera icon to display a live preview in a resizable window.
    - b. PTZ Preset Navigation: Click on PTZ preset view zone moves camera to the preset position.
  3. Microphone Icons: Microphone icons show microphone locations on the map.
    - a. Live Listening: Place mouse over microphone icon; press and hold left mouse button to listen to incoming audio from microphone.
  4. Speaker Icons: Indicate speaker locations on the map.
    - a. Live Speaking: Place mouse over speaker icon; press and hold left mouse button to talk through speaker.
  5. Control Icons: Icons to use for control of objects such as doors, gates, and lights.
  6. Hot Zones: Hot zones to provide vertical navigation through a hierarchy of maps by clicking on a hot zone.
  7. Map Overview Window: Navigable overview of map hierarchy set up in XProtect Smart Client.
  8. Map Image Updates: When map images are replaced by an updated version of the map image of the same scale, map icons and other elements are kept in their original locations.
  9. Map Display Information: Information display options include but are not limited to:
    - a. Real-time status monitoring indication from all system components including cameras, I/O devices and system servers.



- b. Graphical visualization of the system status through color coding.
- c. Hierarchical propagation of status indications to higher ordered maps.
- d. Different levels of status indications available (alarm, warning and errors).
- e. System performance data for cameras and servers including camera resolution, FPS, network use and disk space.
- f. Ability to suppress status indications (such as alarms and operational status) for a given device.
- g. Editable device names in map and map-specific names and references assignable to devices in Map, subject to user permissions.

## 2.10 MEDIA STORAGE MANAGEMENT

### A. Provide multiple media storage containers definable with the following characteristics:

- 1. Container: Each container consists of a live database and optionally one archive database, with container-specific archiving scheme and retention times. Archive database can reside on the same disk as the live database or on secondary disk or network drive.
- 2. Capacity: Maximum recording capacity shall be limited only by available disk space or configured container storage limit.
- 3. Device Assignment: Recording of each device is assigned to a specific storage container. The assigned storage container for a device or group of devices may be changed from one container to another.
- 4. Archiving: Recorded video data may be automatically moved from a container's live database storage to its archived storage. Archived data is still online and available to client software.
- 5. Maximum Recording Times: Maximum recording times may be set for manual recordings, with VMS deleting older video to free up storage for newer video.

### B. Edge Video Storage: Provide utilization of camera-based storage including the following capabilities:

- 1. Video and Audio Retrieval: Retrieving video and audio recordings across low-bandwidth connections based on time schedules, events or manual requests.
- 2. Video and Audio Consolidation: Consolidating video and audio from multiple storage mechanisms:
  - a. Seamless merging of video and audio stored centrally in media database, and video and audio retrieved from associated camera edge storage, or from an interconnected system.
  - b. Optionally consolidate pre-event images recorded locally in camera or video encoder.
- 3. Scalable Video Quality Recording (SVQR): Capability to record high quality video using edge storage and record low quality video centrally, to minimize network bandwidth utilization, using the capabilities described above. High quality video can be retrieved when needed, on an event-driven, scheduled, or manual basis.

## 2.11 MILSTONE MOBILE SERVER

- A. User Authentication: Facilitate the following methods of user authentication:
  - 1. Basic Authentication: Basic user VMS account.
  - 2. Windows Authentication: Via Active Directory or local Windows user account. Possible to use current Windows user to facilitate single sign-on.
- B. Dynamic Bandwidth Optimization: Optimize camera video stream from server to client to make optimum use of bandwidth.
- C. Smart Connect: Easy configuration of internet access to the Mobile Server by automatic configuration of firewalls and internet routers via UPnP, with verification of configuration and operation of internet connection, with option to email connection details to Milestone Mobile client users. Includes automatic Mobile Server on LAN via UPnP.

## 2.12 XPROTECT WEB CLIENT

- A. Provide the following browser-based capabilities:
  - 1. User Authentication:
    - a. Require only username and password.
    - b. User authentication and authorization is handled by Milestone Mobile Server.
  - 2. Inherit System Views: Automatically obtain the user's private and shared views configuration from the system.
  - 3. All-Camera View: Automatically generate a view for all cameras when no views are set up.
  - 4. Listen to Incoming Audio: Listen to incoming audio in live and playback mode for cameras that have related microphones. Audio playback shall be available for investigations, video exports and alarms.
  - 5. Use the Push-to-talk (PTT) Feature: Communicate via the VMS system, through a PC microphone and while watching live video from one camera, with people near a video camera with audio equipment. Push-to-talk (PTT) is also available in Actions.
  - 6. Live Video Monitoring: View live video with PTZ control including use of presets, video playback, and triggering of camera-related outputs and events from within the camera's view.
  - 7. Search: Search function to find cameras, types of cameras, cameras with related microphones, cameras with related speakers and camera views.
  - 8. Video Export: Provide video export, with the option to preview and store exported video on the server, and make it available for later usage or download, for example, when a higher-bandwidth connection is in use.
  - 9. Still Image Export: Provide camera view JPEG image export.
  - 10. Investigations: Ability to export the recordings, download and share them with authorities at a later stage:
    - a. Create AVI, MKV or database export files.
    - b. Option to include audio in the export package.
    - c. Export on the server to avoid moving large video files back and forth.

- d. Store video recordings for a period that is longer than the retention time.
  - e. Play back the recordings even if the recordings have already been deleted from the media database.
  - f. Only download needed files or save them for downloading when on a faster connection.
  - g. Preview exports on the server without downloading them.
11. Secure Connection: Connect to Milestone Mobile Server via HTTPS.
12. Supported Browsers:
- a. Microsoft Internet Explorer
  - b. Microsoft Edge
  - c. Safari
  - d. Google Chrome
  - e. Mozilla Firefox.
13. Browser Plug-Ins or Extensions: No plug-ins or extensions to be installed.

## 2.13 MILESTONE MOBILE CLIENT

### A. Provide the following native-app mobile client capabilities:

- 1. User Authentication:
  - a. Require only username and password.
  - b. User authentication and authorization is handled by Milestone Mobile Server.
- 2. Multiple Server Profiles: Select between multiple server profiles to facilitate easily switching between sites or different connection addresses.
- 3. Inherit System Views: Automatically obtain the user's private and shared views from the system to be use as camera lists.
- 4. All-Camera View: Automatically generate a view for all cameras when no views are set up.
- 5. Listen to Incoming Audio: Listen to incoming audio in live and playback mode for cameras that have related microphones. Audio playback shall be available for investigations, alarms, and access control.
- 6. Use the Push-to-talk (PTT) Feature: Communicate via the VMS system, through the microphone of the mobile device and while watching live video from one camera, with people near a video camera with audio equipment. Push-to-talk (PTT) is also available in access control.
- 7. Full-Screen View: Display cameras in full screen to take better advantage of the mobile device's screen, with camera view navigation in full screen by swiping left or right.
- 8. Pinch-To-Zoom: Digital pinch-to-zoom shall enable mobile users to enlarge a part of the image for closer review and conduct detailed investigation of video.
- 9. Picture-In-Picture: Provide the following functionality for Picture-In-Picture:
  - a. Display a live picture-in-picture frame of the same camera when in playback mode.
  - b. The picture-in-picture shall be movable by dragging.

- c. Double-tapping and will return to live view.
  - d. Hide live picture-in-picture frame.
- 10. Search: Search function to find cameras, types of cameras, cameras with related microphones, cameras with related speakers, and camera views.
- 11. Mobile Video Push: Provide Milestone Mobile client capability for mobile device users to use their mobile device cameras as cameras in the VMS, including the following characteristics:
  - a. No Mobile Setup: No mobile device setup shall be required for mobile video push. Provide central server-side configuration.
  - b. Metadata Support: Mobile users shall be able to include metadata in the video submitted.
- 12. Investigation: Provide access to investigations created in the XProtect Web Client.
- 13. Supported Mobile Operating Systems:
  - a. Android
  - b. iOS.

## 2.14 SDK-BSED INTEGRATION

- A. Provide an SDK for integration with third-party systems including, but not limited to:
  - 1. Seamless integration of video analytics algorithms and other third-party applications in XProtect Smart Client and Management Client.
  - 2. Functionality for external applications to make changes to the system's configuration.
  - 3. Compatibility with XProtect LPR for automatic reading and tracking of vehicle license plates.
  - 4. Event integration via a simple message-based socket communication interface enabling external applications to trigger events in the VMS.
  - 5. Functionality for external applications to trigger user-defined events in the VMS.
- B. Implement the SDK via integration in the following XProtect components:
  - 1. XProtect Smart Client.
  - 2. Management Client.
  - 3. Event Server.

## 2.15 COMPUTER EQUIPMENT

- A. Computer Requirements: Consult with VMS manufacturer to determine current computer requirements appropriate for system design, intended use and desired level of performance. Optimize server computer count, and server application distribution across servers, to account for likely system expansion. The following are minimum requirements.
  - 1. Computer Running Management Server:
    - a. CPU: Intel® Core™ i3 or better.

- b. RAM: 8 GB or more.
  - c. Network: Ethernet 100 Mbit or better.
  - d. Graphics Adapter: Onboard GFX, AGP or PCI-Express, minimum 1024×768, 16-bit color or better.
  - e. Hard Disk Space: 50 GB free or more (depends on number of servers, devices, rules, and logging settings).
  - f. Operating System:
    - 1) For Individual Servers:
      - a) Microsoft Windows 8.1 Pro (64 bit).
      - b) Microsoft Windows 8.1 Enterprise (64 bit).
      - c) Microsoft Windows 10 Pro (64 bit).
      - d) Microsoft Windows 10 Enterprise (64 bit).
      - e) Microsoft Windows Server 2012 (64 bit): Standard and Datacenter.
      - f) Microsoft Windows Server 2012 R2 (64 bit): Standard and Datacenter.
      - g) Microsoft Windows Server 2016 (64 bit): Essentials, Standard and Datacenter.
  - g. Software:
    - 1) Microsoft .NET 3.5 SP1 and .NET 4.7 Framework.
    - 2) 300 Cameras or less: SQL Server Express Edition.
    - 3) For larger systems or to support frequent database backups, run a licensed version of Microsoft SQL Server on its own server.
2. Computer Running Microsoft SQL Server (if not running Microsoft SQL Server Express Edition on Management Server computer):
- a. CPU: Intel® Core™ i3 or better.
  - b. RAM: 8 GB or more.
  - c. Network: Ethernet 100 Mbit or better.
  - d. Graphics Adapter: Onboard GFX, AGP or PCI-Express, minimum 1024×768, 16-bit color or better.
  - e. Hard Disk Space: 100 GB free or more (depends on number of servers, devices, rules, and logging settings).
  - f. Operating System:
    - 1) Microsoft Windows Server 2012 (64 bit): Standard and Datacenter.
    - 2) Microsoft Windows Server 2012 R2 (64 bit): Standard and Datacenter.
    - 3) Microsoft Windows Server 2016 (64 bit): Essentials, Standard and Datacenter.
  - g. Software:
    - 1) Microsoft .NET 4.7 Framework.
    - 2) Microsoft SQL Server:
      - a) Microsoft SQL Server 2012 SP1.

- b) Microsoft SQL Server 2014.
- c) Microsoft SQL Server 2016.

3. Computer Running Recording Server, Event Server, Log Server or Service Channel:

- a. CPU: Intel® Core™ i3 or better.
- b. RAM: 8 GB or more.
- c. Network: Ethernet 100 Mbit or better.
- d. Graphics Adapter: Onboard GFX, AGP or PCI-Express, minimum 1024×768, 16-bit color or better.
- e. Hard Disk Space: 10 GB free or more (depends on number of devices and recording settings).
- f. Operating System:
  - 1) For Individual Servers:
    - a) Microsoft Windows 8.1 Pro (64 bit).
    - b) Microsoft Windows 8.1 Enterprise (64 bit).
    - c) Microsoft Windows 10 Pro (64 bit).
    - d) Microsoft Windows 10 Enterprise (64 bit).
    - e) Microsoft Windows Server 2012 (64 bit): Standard and Datacenter.
    - f) Microsoft Windows Server 2012 R2 (64 bit): Standard and Datacenter.
    - g) Microsoft Windows Server 2016 (64 bit): Essentials, Standard and Datacenter.
- g. Software: Microsoft .NET 4.7 Framework.

4. Computer Running Management Client:

- a. CPU: Intel® Core™ i3 or better.
- b. RAM: 4 GB or more.
- c. Network: Ethernet 100 Mbit or better.
- d. Graphics Adapter: Onboard GFX, AGP or PCI-Express, minimum 1024×768, 16-bit color or better.
- e. Hard Disk Space: 1 GB free or more.
- f. Operating System:
  - 1) Microsoft Windows 8.1 Pro (64 bit).
  - 2) Microsoft Windows 8.1 Enterprise (64 bit).
  - 3) Microsoft Windows 10 Pro (64 bit).
  - 4) Microsoft Windows 10 Enterprise (64 bit).
  - 5) Microsoft Windows Server 2012 (64 bit): Standard and Datacenter.
  - 6) Microsoft Windows Server 2012 R2 (64 bit): Standard and Datacenter.
  - 7) Microsoft Windows Server 2016 (64 bit): Essentials, Standard and Datacenter.
- g. Software:
  - 1) Microsoft .NET 4.7 Framework.
  - 2) DirectX 11 or newer.

5. Computer Running XProtect Smart Client or Accessing Remote Client:

- a. CPU: Intel® Core™ i3 or better.
- b. RAM: 1 GB or more.
- c. Network: Ethernet 100 Mbit or better.
- d. Graphics Adapter: Onboard GFX, AGP or PCI-Express, minimum 1024×768, 16-bit color or better.
- e. Hard Disk Space: 500 MB free or more.
- f. Operating System:
  - 1) Microsoft Windows 7 Professional SP1 (32- or 64-bit).
  - 2) Microsoft Windows 7 Enterprise SP1 (32- or 64-bit).
  - 3) Microsoft Windows 7 Ultimate SP1 (32- or 64-bit).
  - 4) Microsoft Windows 8 Pro (32- or 64-bit).
  - 5) Microsoft Windows 8 Enterprise (64-bit).
  - 6) Microsoft Windows 8.1 Pro (32- or 64 bit).
  - 7) Microsoft Windows 8.1 Enterprise (32- or 64 bit).
  - 8) Microsoft Windows 10 Pro (32- or 64 bit).
  - 9) Microsoft Windows 10 Enterprise (32- or 64 bit).
  - 10) Microsoft Windows Server 2012 (64 bit): Standard and Datacenter.
  - 11) Microsoft Windows Server 2012 R2 (64 bit): Standard and Datacenter.
  - 12) Microsoft Windows Server 2016 (64 bit): Essentials, Standard and Datacenter.
- g. Software:
  - 1) Microsoft .NET 4.7 Framework.
  - 2) DirectX 11.0 or newer.

2.16 LICENSING

- A. License Activation: VMS shall offer easy-to-use automatic or manual online activation via the Internet and alternatively, offline activation via email and web for closed surveillance networks.
- B. Server Base License:
  1. Require one mandatory XProtect Professional+ server base license for installing the product.
  2. Server base license shall permit the following deployments within the legal entity purchasing the base license:
    - a. Unrestricted number of Management Server services.
    - b. Unrestricted number of Recording Server services.
    - c. Unrestricted number of XProtect Smart Client, XProtect Web Client and Milestone Mobile client applications.

C. Hardware Device License:

1. Require one license per hardware IP address to connect:

- a. Cameras.
- b. Audio devices.
- c. Video encoders.
- d. Other devices.

D. License Overview Information: License overview shall include add-on products.

E. License Administration: Provide license information presenting the license use.

F. Changes Without Activation: A “Changes without activation” function shall allow additions and replacements of limited number of devices without requiring license device activation or reactivation.

2.17 NETWORK VIDEO RECORDER (NVR)

- A. NVR shall be Milestone Husky X8 series or approved equivalent, with four 10-Terabyte (TB) hard drives for total storage capacity of 40 TB.
- B. Provide storage of minimum 60-days for Owner’s surveillance video footage. Configure cameras to record upon detection of motion, coordinate locations and programming with Owner.

2.18 PoE+ SWITCHES

- A. Network Switches for Video Surveillance System shall be Netgear GS724TPv2 or approved equivalent, PoE+, 24-port, 1 Gigabit/second, with 2 SFP ports.
- B. Media converters if required, shall be as manufactured by Transition Networks or approved equivalent, 1-Gigabit/second, with fiber optic cable and connector type as required per drawings and elsewhere in the project specifications.

2.19 UPS

- A. At each equipment rack where a Network PoE switch is required for the Video Surveillance System (except at new 4-post NVR rack), provide a rack-mount 120V 1000 VA UPS with remote monitoring via IP-address / Ethernet data port, APC # SMT1000RM2UC or approved equal.
- B. At 4-post equipment rack where new NVR is located, provide a rack-mount 120V 3000 VA UPS with remote monitoring via IP-address / Ethernet data port, APC # SMT3000RM2UC or approved equal.



2.20 CAMERAS

- A. Surveillance cameras shall be as manufactured by Hanwha, Avigilon, Panasonic, Axis, or approved equivalent.
- B. Refer to drawing schedules and notes for camera features and requirements.
- C. Outdoor 20 Megapixel (MP) 360-degree view 4-sensor camera shall be Hanwha PNM-9000VQ or approved equivalent.
- D. Indoor 2 MP dome camera shall be Hanwha XND-L6080RV or approved equivalent.
- E. Indoor 2 MP dome camera with audio/microphone shall be Hanwha XND-6080RV or approved equivalent.
- F. Outdoor 2 MP dome camera shall be Hanwha XNV-L6080R or approved equivalent.
- G. Indoor/Outdoor 2 MP dome camera shall be Hanwha XNV-L6080R or approved equivalent.
- H. When option exists from camera manufacturer for various lenses, coordinate lens selection with Owner.
- I. Provide mounting hardware and accessories as required at each camera.

2.21 SURGE PROTECTION

- A. Protect outdoor-mounted cameras and connected components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor entry connection to cameras and components.
  - 1. Provide and connect at each exterior camera, a surge protection module Ditek # DTK-MRJPOE or approved equivalent; install in accordance with manufacturer's guidelines, including bonding each module to ground.
  - 2. Furnish, install and connect at each network equipment rack where cables from exterior cameras terminate, rack-mount 12-port surge protection unit(s) by Ditek, # DTK-RM12POE or approved equivalent. Furnish in quantity as required to terminate each exterior camera cable on one surge protection port. Install in accordance with manufacturer's guidelines, including bonding each module to ground.

2.22 PoE EXTENDERS

- A. Where indicated on drawings, and at any location exceeding cable distance from network equipment rack to camera of 295-feet, provide:
  - 1. PoE camera converter, Veracity Longspan Camera model # VLS-1P-C or approved equal, at camera.
  - 2. PoE base converter, Veracity Longspan Base model # VLS-1P-B or approved equivalent, in network equipment rack where camera is served by Network Switches.

3. 57-Volt Power Supply (connected at PoE base converter), Veracity # VPSU-57V-800.
4. All connections as required, and by manufacturer's guidelines, for complete and operational system.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

##### A. Verification of Conditions:

1. Visit site and verify that site conditions are in agreement with design package. Report all changes to the site or conditions which will affect performance of the system to the Owner. Do not take any corrective action without written permission from the Owner.
2. General:
  - a. Verify that existing site conditions are acceptable for product installation in accordance with manufacturer's instructions.
  - b. Verify that wire runs, related items, and conditions are ready to receive work of this Section.
3. Cable and Wiring:
  - a. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
  - b. Examine roughing-in for LAN and control cable conduit systems to PCs and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.
4. LAN / WAN:
  - a. Provide Power-over-Ethernet switches for connection and power to surveillance cameras.
  - b. Provide Security Surveillance LAN connections for server and workstation computers.
  - c. Provide access to the internet for the Mobile Server:
5. Power Connections:
  - a. Verify power circuits which are existing or have been previously installed under other sections are acceptable for product installation in accordance with manufacturer's instructions.
  - b. Owner is providing new power circuits, receptacles and hard-wired connections as required. Coordinate locations with Owner.

### 3.2 PREPARATION

- A. Review configurable features of the VMS with the Owner's Representative and document the results of the meeting in the Project planning documents. The following configuration topics shall be resolved prior to configuring equipment and services:
  - 1. Internet Service Provider, firewall, and IP schema for VMS devices.
  - 2. Time server synchronization scheme for overall security system.
  - 3. Plan for system testing, startup, and demonstration.
  - 4. Acceptance test concept and, on approval, develop specifics of the test.
  - 5. List of default user IDs and passwords (factory defaults) for VMS application, servers and workstations.
  - 6. Prepare root certificate and necessary child certificates for secure connection between system components.
- B. Provide a schedule with a list of participants to attend monthly coordination and progress update meeting until job completion. Attendees shall include:
  - 1. Owner's Representative of Facilities Management, Information Services, Security Management.
  - 2. Contractor Project Manager.
  - 3. Manufacturer(s) Employed Representative.
  - 4. Architect / Engineer / Security Consultant.
- C. At all coordination meetings with Owner's Representative, present Project planning documents and review, adjust, and prepare final setup documents. Use final documents to set up system software.
- D. Owner's Representative and Owner shall assist in establishing procedural guidelines and in defining terminology and conditions unique to the Owner's operation.
- E. Supervise installation to appraise ongoing progress of other trades and contracts, make allowances for all ongoing work, and coordinate the requirements of the installation of the VMS.
- F. Coordinate Owner installation or update of workstation operating system software and web browser software to a version as specified by the VMS provider.
- G. Coordinate Owner-managed computer and network security practices as specified by the VMS provider.

### 3.3 INSTALLATION

- A. Deploy VMS in accordance with manufacturer's Deployment Best Practice Guide, including workstation and integration instructions and requirements.
- B. Collaborate with Owner's Representative on the application of manufacturer's hardening guide recommendations.

- C. Supervise installation to appraise ongoing progress of other trades and contracts, make allowances for all ongoing work, and coordinate the requirements of the VMS installation.
- D. Drawings and Diagrams:
  - 1. System devices identified on building drawings are intended to generally indicate areas where such devices are to be located. Determine final location of these devices in accordance with Owner's requirements.
  - 2. Drawings are schematic and do not show every conduit, wire box, fitting, or other accessories. Provide such materials as necessary for a complete and functioning installation.
- E. Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions and product carton installation instructions.
- F. All firmware in products shall be the latest and most up-to-date provided by the manufacturer, or of a version as specified by the provider of the VMS to ensure approved integration compatibility.
- G. Install, configure, and test VMS for complete and proper operation.

### 3.4 SITE QUALITY CONTROL

- A. Site Tests and Inspections:
  - 1. Submit documented test plan to Owner at least 14 days in advance of final acceptance test, inspection and check-off.
  - 2. Perform acceptance reviews with Owner's representative of device and system configurations and their documentation.
  - 3. Perform final acceptance testing in the presence of Owner's representative, executing a point-by-point inspection against a documented test plan that demonstrates compliance with system requirements as designed and specified, including response times for control actions and sequences, and rules-based actions. Tests shall demonstrate the functionality of each individual device control item, including as camera alarm outputs and control relays.
  - 4. Conduct acceptance tests in presence of Owner's representative, verifying that each device point and sequence is operating correctly and properly reporting back to control panel and control center, and provide Owner's Representative with written report of test results.
  - 5. Specific tests shall be witnessed by Authorities Having Jurisdiction if necessary.
  - 6. Consider VMS accepted only after all acceptance test items have been successfully checked-off.
    - a. Beneficial use of part or all the system shall not be considered as acceptance.
  - 7. As required to sufficiently demonstrate the VMS functionality, request the console operator on duty and his/her superior to perform certain daily operations using the VMS.
  - 8. Complete all required training prior to initiation of the final acceptance test.

9. Inspect the installation of all field computers and devices.
  - a. Point out general neatness and quality of installation, test the full functionality of each individual device, and show that mounting, backbox and conduit meet compliance requirements.
10. Owner's Representative shall, upon successful completion of the final acceptance test (or subsequent punch list retest), issue a letter of final acceptance.
11. Owner's Representative retains right to suspend and/or terminate testing at any time when the system fails to perform as specified.
  - a. Collaborate with Owner's Representative prior to start of testing, to establish criteria pass/fail criteria and classification of test execution problems, such as:
    - 1) Pass/fail: Criteria determining what constitutes a test pass or failure.
    - 2) Suspension and resumption: Criteria determining when testing must be suspended and resumed later.
    - 3) Show Stopper: Stop test, fix problem and restart test from beginning.
    - 4) Major Problem: Fix problem before test can be resumed or concluded.
    - 5) Minor Problem: Add problem to "punch list", complete test.
    - 6) Special Issue: Investigate to determine which problem category above category applies.
  - b. If it becomes necessary to suspend testing or inspections, work diligently to complete/repair all outstanding items to the condition specified in Specification and as indicated on related drawings.
  - c. Supply Owner's Representative with detailed completion schedule outlining phase by phase completion dates and a tentative date for a subsequent punch list retest.
  - d. During final acceptance test, make no adjustments, repairs or modifications to system without permission of Owner's Representative.

### 3.5 ADJUSTING

- A. Perform field software changes after the initial programming session to "fine tune" operating parameters and sequence of operations based on any revisions to the Owner's operating requirements.
- B. Installer/Factory User Accounts:
  1. Remove all default, installer, or temporary user accounts and passwords used during installation that are not part of End-user's final operational requirements.
  2. Assign new passwords that are substantially different from factory default passwords to user accounts that match factory-default user accounts.
  3. Apply appropriate measures from manufacturer's system hardening guide.

### 3.6 CLOSEOUT ACTIVITIES

- A. Training:
  - 1. General:
    - a. Submit training plans and instructor qualifications to Owner's Representative for approval.
    - b. Coordinate with Owner's Representative to accommodate owner shift schedules to reduce impact to regular operations.
- B. Provide training as scheduled.
- C. Deliver printed or electronic reference materials that cover the entire training presentation.

### 3.7 PROTECTION

- A. Maintain strict site security during the installation of equipment and software.
  - 1. Equipment Rooms: Lock and secure rooms housing accessible equipment that has been powered up.
  - 2. Dedicated Workstations: Shut down, lock and secure rooms containing workstations during periods when a qualified operator in Contractor's employ is not present.
- B. Protect installed work of other trades when working in the same location, protecting all completed work prior to acceptance by Owner, unless Owner has specifically relieved Contractor from this responsibility.
- C. Incremental and As-built Configuration Backup:
  - 1. Perform full back-up of all configuration settings and system data from VMS at the completion of critical installation milestones, immediately prior to start of acceptance testing, and immediately after acceptance testing is completed.
  - 2. Deliver instructions for restoration of the VMS backups upon completion of acceptance testing.

### 3.8 MAINTENANCE

- A. Provide maintenance updates by VMS manufacturer per agreed schedule.

END OF SECTION 282300

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## SECTION 283111 - FIRE ALARM AND DETECTION SYSTEMS ADDRESSABLE

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Fire alarm and detection systems.
- B. One-way emergency communications system with voice notification within-building, coverage.

#### 1.2 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section 280500 - Common Work Results for Electronic Safety and Security.

#### 1.3 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in smoke detection and fire alarm systems with ten years' experience.
- B. Installer: A factory-authorized Electrical or Security Contractor licensed with the State and local jurisdiction with five years' experience in the design, installation, and maintenance of fire alarm systems by that manufacturer.
- C. Qualifications: The person managing/overseeing the preparation of shop drawings and the system installation/programming/testing shall be trained and certified by the system manufacturer and shall be Fire Alarm Certified by NICET, minimum Level 3. This person's name and certification number shall appear on the start-up and testing reports.

#### 1.4 REFERENCES

- A. ASME A17.1 - Safety Code for Elevators and Escalators
- B. NFPA 70 - National Electrical Code (NEC)
- C. NFPA 72 - National Fire Alarm and Signaling Code
- D. NFPA 101 - Life Safety Code
- E. UL 2017 - General Purpose Signaling Devices and Systems



1.5 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 013300 and as noted below.
  - 1. Failure to comply with all the following and all the provisions in 013300 will result in the shop drawing submittal being rejected without review.
  - 2. Failure to submit the fire alarm without all requirements fulfilled in a single comprehensive submittal will be grounds to require a complete resubmittal.
- B. Provide product catalog data sheets as shop drawings.
  - 1. Provide a product catalog data sheet for each item shown on the Electrical Symbols List and for each piece of equipment that is not shown on the drawings, but required for the operation of the system.
  - 2. Where a particular Electrical Symbols List item has one or more variations (such as those denoted by subscripts, etc.) a separate additional product catalog data sheet shall be provided for each variation that requires a different part number to be ordered. The corresponding Electrical Symbols List symbol shall be shown on the top of each sheet.
  - 3. Where multiple items and options are shown on one data sheet, the part number and options of the item to be used shall be clearly denoted.
- C. Submit CAD Floor Plans as Shop Drawings:
  - 1. The complete layout of the entire system, device addresses, auxiliary equipment, and manufacturer's wiring requirements shall be shown.
  - 2. Indicate the precise routing of notification appliance circuits under the provisions of circuit survivability. Refer to "Wiring" under Part 3 - Execution of this specification section for requirements.
  - 3. A legend or key shall be provided to show which symbols shown on the submittal floor plans correspond with symbols shown on the Contract Documents.
- D. About all fire alarm circuits, provide the following: manufacturer's wiring requirements (manufacturer, type, size, etc.) and voltage drop calculations.
- E. Provide installation and maintenance manuals under provisions of Section 013300.
- F. Submit manufacturer's certificate that system meets or exceeds specified requirements.
- G. Provide information on the system batteries as follows: total battery capacity, total capacity used by all devices on this project, total available future capacity.
- H. Voice Alarm Communication System: Submit equipment rack or console layout, grounding schematic, amplifier power calculations, and wiring diagram.
- I. Incident Commander Display: Submit sample display screen layouts and list of functions for Authority Having Jurisdiction (AHJ) review and coordination.
- J. Submit photocopy proof of NICET certification of the person overseeing the preparation of drawings and installation/testing.

- K. When required to comply with local or state regulatory reviews, the fire alarm submittal shall have a NICET Certification of the state in which the project is completed.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of Section 280500.
- B. Store and protect products under provisions of Section 280500.

#### 1.7 REGULATORY REQUIREMENTS

- A. System: UL or FM Global listed.
- B. Conform to requirements of NFPA 101.
- C. Conform to requirements of Americans with Disabilities Act (ADA).
- D. Conform to UL 864 Fire Alarm, UL 1076 Security, and UL2017 General Signaling.

#### 1.8 SYSTEM DESCRIPTION

- A. Performance Statement: This specification section and the accompanying fire alarm specific design documents describe the minimum material quality, required features, and operational requirements of the system. These documents do not convey every wire that must be installed and every equipment connection that must be made. Based on the equipment described and the performance required of the system, as presented in these documents, the Vendor and the Contractor are solely responsible for determining all wiring, programming and miscellaneous equipment required for a complete and operational system.
- B. This section of the specifications includes the furnishing, installation and connection of the microprocessor controlled, intelligent reporting, fire alarm equipment required to form a complete coordinated system that is ready for operation. It shall include, but is not limited to, alarm initiating devices, voice evacuation equipment, control panels, auxiliary control devices, annunciators, power supplies, and wiring as indicated on the drawings and specified herein.
- C. The system will replace the existing Siemens MXL system. All addressable devices, control panels and amplifiers shall be replaced. Speakers, door hold opens, phone jacks and all cabling shall be reused. If new system is by Siemens, then speaker/strobes, strobes and strobe power supplies shall be reused. If new system is non-Siemens, then speaker/strobes and strobe power supplies shall be replaced. The system shall be a networked, fully peer-to-peer, microprocessor-controlled fire detection and emergency voice alarm communications system shall be installed in accordance with the specifications and as indicated on the drawings. During the switch over process, the new and existing system shall be interconnected such that at the end of every work day the building shall be fully protected without any missing devices.

- D. The existing control panel shall remain and shall be operational throughout construction until all new and existing devices have been connected to new control panel. The system shall only be disabled to make new connections and to modify the programming. All system outages must be scheduled with the Owner at least one week prior. Individual initiation and notification circuits shall be disabled, one at a time to replace devices on circuits, but all circuits and devices must be operational when the Contractor is not physically on site. New initiating devices shall be connected to the existing signaling line circuits. All new devices shall be programmed to provide the same sequence of operation as the existing devices of the same type, unless noted otherwise.
- E. Fire Alarm System: NFPA 72; Automatic and manual fire alarm system, non-coded, analog-addressable with automatic sensitivity control of certain detectors, multiplexed signal transmission.
- F. In-Building Network: A complete fire alarm system network shall be provided. Provide quantity of control panels as indicated on the drawings. The network shall be a Style 7 token ring, peer-to-peer network. The network shall be characterized by simultaneous or sequential transmission, or both, and reception of multiple signals on a signaling line circuit or communication channel. The distributed intelligent characteristic of the network shall provide for all nodes independently making pertinent system decisions with no need for a central controller. Each node shall be capable of independent operation should loss of network communications occur. In no case shall read-only network annunciation be acceptable as the only networking function. Existing network cabling shall remain and be reused.
- G. Voice Communication: The facility shall have an emergency voice alarm communication system. The digitized recorded voice message shall notify occupants that a fire condition has been reported. Emergency manual voice override shall be provided. Existing speakers and cabling shall remain and be reused.
- H. Firefighter Phone System: A two-way talk path shall be provided for the fire department's use from the voice command center to the secondary fire alarm attack entrances, elevator lobbies, primary and backup power rooms and the entrance to all enclosed stairways. Existing phone jacks and cabling shall remain and be reused.
- I. System Supervision: Provide electrically supervised system, with supervised Signal Line Circuit (SLC) and Notification Appliance Circuit (NAC). Occurrence of single ground or open condition in initiating or signaling circuit places circuit in TROUBLE mode. Component or power supply failure places system in TROUBLE mode.
- J. Alarm Reset: Key-accessible RESET function resets alarm system out of ALARM if alarm initiating circuits have cleared.
- K. Lamp Test: Manual LAMP TEST function causes alarm indication at each zone at fire alarm control panel and at annunciator panels.
- L. Drawings: Only device layouts and some equipment have been shown on the contract drawings. Wiring and additional equipment to make a complete and functioning system has not been shown, but shall be submitted on the shop drawings.

## 1.9 PROJECT CONDITIONS

- A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
1. Notify Owner's Project Manager no fewer than three (3) days in advance of proposed interruption of fire-alarm service.
  2. Do not proceed with interruption of fire-alarm service without Owner's written permission.
  3. Interruption of fire-alarm service for four (4) or more hours will require the implementation of a fire watch by facility personnel. Contractor shall request fire watch, when needed, no fewer than three (3) days in advance.

## 1.10 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment.
- C. The following general sequence of work shall be implemented for the replacement of the existing fire alarm system:
1. The new fire alarm panel interiors will be unpacked, built, tested, and programmed within installer's facility to match programming and configuration of existing panels.
  2. All cabling within the existing fire alarm panels will be labeled to facilitate landing of the existing cables on the new panels.
  3. If the new system is by Siemens, then the existing panel interiors will be replaced within the two (2) existing fire alarm panel enclosures. If the new system is non-Siemens, then new control panels shall be temporarily mounted next to existing system and a temporary connection shall be made so an alarm on either panel will alarm on other panel.
  4. If the new system is by Siemens, the existing cabling in the panels will be landed on the new interiors. New panels will be tested to ensure all existing devices operate properly and any issues found will be corrected, and all existing field devices to be replaced will be replaced one loop at a time.
  5. If new system is non-Siemens, then device loops will be temporarily interfaced with loops in existing panel one at a time and all devices on that loop shall be replaced before moving to next loop.
  6. The existing Network Command Centers (NCC) will be upgraded to the new Network Command Centers.
  7. The Owner will be trained on the Network Command Centers.
  8. Once devices have been upgraded and all "troubles" on new panel are cleared, a complete system test will be conducted.

9. Any issues found during testing will be corrected and additional Owner training, if required, will be provided.
10. If new system is non-Siemens, then the existing Siemens panels shall be removed and the new panels shall be permanently installed at location of existing panels.

#### 1.11 PROJECT RECORD DOCUMENTS

- A. Submit documents under the provisions of Sections 013300 and 280500.
- B. Include location of end-of-line devices.
- C. Provide a CAD drawing of each area of the building (minimum scale of 1/16" = 1'-0") showing each device on the project and its address. The devices shall be shown in their installed location and shall be labeled with the same nomenclature as is used in the fire alarm panel programming.

#### 1.12 OPERATION AND MAINTENANCE DATA

- A. Submit data under provisions of Section 013300.
- B. Include operating instructions, and maintenance and repair procedures.
- C. Include results of testing of all devices and functions.
- D. Include manufacturer's representative's letter stating that system is operational.
- E. Include the CAD floor plan drawings.
- F. Include shop drawings as reviewed by the Architect/Engineer and the local Authority Having Jurisdiction.

#### 1.13 WARRANTY

- A. Provide one (1) year warranty on all materials and labor from Date of Substantial Completion.
- B. Warranty requirements shall include furnishing and installing all software upgrades issued by the manufacturer during the one (1) year warranty period.

#### 1.14 ANNUAL INSPECTION/TESTING AND SERVICE CONTRACT

- A. Provide cost to furnish service, inspect, and test all devices of the fire alarm system per the requirement of NFPA for one (1) year, starting one year after the Date of Substantial Completion. Submit written reports of inspection testing per NFPA 72, Chapter 14.
- B. Provide an alternate cost for a complete inspection/testing and service/maintenance contract for the fire alarm system for two (2) years, starting one year after the Date of Substantial Completion. Submit sample contract terms and conditions for review with shop drawings.

- C. The Owner may enter into a contract directly with the vendor after shop drawing submittals. This specification is not a contract between the Owner and the vendor to perform these services.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Johnson Controls - Simplex
- B. Notifier by Honeywell
- C. Edwards - EST
- D. Siemens Fire Safety
- E. Gamewell - FCI

### 2.2 FIRE ALARM CONTROL PANEL

- A. Control Panel: Modular, power-limited electronic design. Provide flush surface wall-mounted enclosure as shown on plans. Enclosure shall be minimum 0.060 steel with provisions for electrical conduit connections into the sides and top. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. Existing enclosures may be revised if compatible with new control panel.
- B. Each Signaling Line Circuit (SLC loop) shall not be loaded over 80% of the maximum device capacity. For example, in the minimum system capacity column listed below, if the fire alarm manufacturer's system capacity of analog sensors per loop is 99 devices, then no more than 79 devices shall be wired on that loop. The minimum system capacity shall be as follows:
  - 1. Minimum Total Addressable Points: 250 500 2000
  - 2. Minimum Total SLC Loops (including board, ready for field connections): 1 2 4 6 8 10
  - 3. Panel Expansion Capability, Minimum Total SLC Loops: 10
  - 4. Minimum Node Capacity for Network System: 100
- C. Signal Line Circuit (SLC) and Notification Appliance Circuit (NAC) Boards:
  - 1. Each board shall communicate directly with each addressable analog sensor and binary input to determine normal, alarm, or trouble conditions. Analog signals would be used for automatic test and determination of maintenance requirements.
  - 2. Each board shall contain its own microprocessor and shall be provided to monitor addressable inputs and to control addressable outputs (addressable relays). The board shall communicate and provide power to all devices on its loop over a single pair of wires, except where 4-wire devices require a separate power circuit.
  - 3. Existing circuits and cabling shall remain and be reused.

- D. Interconnection of Multiple Fire Alarm Panels:
  - 1. Existing interconnect cabling shall remain and be reused.
- E. Central Processing Unit:
  - 1. The central processing unit (CPU) shall communicate with the monitor and control all other modules in the panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the CPU.
  - 2. The CPU shall execute all control-by-event programs for specific action to be taken if a designated situation is detected in the system. A real-time system clock for time annotations on the display and printer shall be included.
  - 3. All power for the unit shall be supervised and supplied by the FAP.
- F. Display:
  - 1. The board shall provide all controls and indicators used by the system operator and may also be used to program all control panel parameters.
  - 2. The board shall provide an alphanumeric array for display of custom alphanumeric labels for all addressable points. It shall also provide indicators for AC Power, System Alarm, System Trouble, Display Trouble and Signal Silence.
  - 3. Displayed descriptions of addressable points shall include actual room names/numbers selected by the Owner. This information shall be obtained prior to programming. Room names/numbers shown on floor plans shall not be used.
  - 4. The board shall provide a touch key-pad with control capability to command all system functions and entry of any alphanumeric information. Twenty different passwords with four levels of security shall be supported to prevent unauthorized manual control or programming.
- G. Memory: The CPU and display interface board shall be augmented by non-volatile field programmable memory. EPROM memory will also be allowed provided the memory is burned in with minimum expansion capability equal to the total system capacity of the panel. Memory shall not be lost upon primary and secondary power failure.
- H. Serial Interface Board: The board shall provide interfaces to a printer, LCD display and other monitoring devices through RS-232 connections. The minimum operational distance between the board and the peripheral devices shall be 500 feet. Up to three (3) RS-232 outputs shall be supported.
- I. Power Supply:
  - 1. Input power shall be obtained from existing emergency 120 VAC, 60 Hertz circuits currently serving panels. Output power shall be as noted on the device specifications and drawings.
  - 2. Adequate to supply 125% of all control panel and peripheral power needs as well as 125% of power required for all external audio-visual devices. The power supply may be increased as needed by adding additional modular expansion power supplies. Over-current protections shall be provided on all power outputs.
  - 3. All power supplies shall be designed and installed to meet UL and NFPA requirements for power-limited operation on all external initiating and indicating circuits.

4. The power supply shall provide integral charger for use with internal batteries. Battery capacity shall be sufficient for operation of the entire system for 24 hours in a non-alarm state followed by alarm mode for 15 minutes, plus 25% spare capacity for future devices.

J. Surge Protection:

1. All fire alarm control panels, NAC panels, etc. shall be provided with a surge protection device (SPD). The SPD shall be UL listed to Standard 1449 Rev 3. The SPD shall have thermal fuses to protect against fire in short circuit conditions. The unit shall provide visual indication that the unit is protecting and functioning.
2. Any communications or signaling circuits associated with the fire alarm system, which leave or enter a facility, shall be provided with a surge protection device. The devices shall be as recommended by the fire alarm system manufacturer.

K. Dual Digital Communicator:

1. Provide dual phone line interface capable of fire alarm notification to the local fire department, fire protection agency, or monitoring service. Communicator shall report in SIA and most major communication formats, with the capability of transmitting each device address point in a format compatible with the central station receiver.
2. Monitoring fees and initial connection charges are not part of this project.
3. Communicator shall be fully supervised and shall operate on loop start phase lines ahead of the building PBX system.
4. Communicator shall be FCC registered. Contractor to provide connection of communicators to Owner's telephone system as shown on the drawings.
5. Approvals: UL listed - UL 864/NFPA 72, FM approved.
6. The communicator shall be provided integral to the fire alarm panel as furnished by the fire alarm panel manufacturer.

L. Digitized Voice Command Center: Include integral with fire alarm system.

1. The Digitized Voice Command Center shall contain all equipment required for all audio control, firefighter phone system control, signaling, and supervisory functions. This shall include digital voice units, speaker zone indication, firefighter phone circuit indication and control, and main firefighter phone handset.
2. Function: The Voice Command Center equipment shall perform the following functions:
  - a. Operate as a supervised single channel automatic digitized voice evacuation system with manual emergency voice communication system.
  - b. Operate as a two-way emergency firefighter phone system control center. The two-way emergency telephone system shall support a minimum of seven (7) handsets online without degradation of the signal.
  - c. Audibly and visually annunciate the active or trouble condition of every signal circuit and firefighter phone circuit.
  - d. Audibly and visually annunciate any trouble condition of tone generators and digital voice units required for normal operation of the system.
  - e. Provide all-call activities through activation of a single control switch.
  - f. Provide automatic, digitally recorded voice messages and tones.



3. Audio Amplifiers: Include integral with fire alarm system.
  - a. The audio amplifiers will provide a single channel audio power at 25/70 volts RMS for distribution to speaker circuits.
  - b. Provide multiple audio amplifiers mounted in the transponder or in the main fire alarm control panel, either to supply incremental audio power, or to function as an automatically switched backup amplifier(s).
  - c. The audio amplifier shall include an integral power supply, and shall provide the following controls and indicators:
    - 1) Normal Audio Level LED
    - 2) Incorrect Audio Level LED
    - 3) Battery Trouble LED
    - 4) Amplifier Trouble LED
    - 5) Audio Amplifier Gain Adjust
  - d. Includes audio input and amplified output supervision backup input and automatic switchover function, if primary amplifier should fail.
  - e. Amplifier shall be backed up in groups (one amplifier backs up several). Failure of any one amplifier in the system shall not degrade system performance in any way.
4. Audio Message Generator (Digitized Voice):
  - a. Each initiating zone or intelligent device shall interface with an emergency voice communication system capable of transmitting a digitized voice message to all speakers in the building.
  - b. Actuation of any alarm initiating device shall cause a digitized message to sound over the speakers. The message shall be repeated four (4) times.
  - c. A built-in microphone shall be provided to allow paging through speaker circuits.
  - d. The audio message generator shall have the following controls and indicators to allow for proper operator understanding and control:
    - 1) All Call LED
    - 2) On-Line LED
    - 3) All Call Switch
5. Voice Messages:
  - a. A pre-programmed custom digital voice message shall be used for notification appliance speaker circuits. The messages shall be approved by the Authority Having Jurisdiction (AHJ). Voice messages shall be from a female voice. The messages shall be provided in the multi-lingual language of the predominant building population.
  - b. Message shall be preceded by a tone and message shall be repeated four times until silenced.
  - c. Messages shall be annunciated by a single channel in all evacuation signal zones throughout the building.

- d. Primary messages shall be annunciated in the zone of fire alarm and adjoining areas' evacuation signaling zones, and the secondary message in all other evacuation signaling zones.
  - e. Fire Alarm Pre-Recorded Messages: Refer to drawings for fire alarm pre-recorded message schedule. Message shall be as shown in the schedule.
6. Speaker Circuit Control Switches/Indicators:
- a. The speaker circuit control switches/indicators shall include visual indication of active and trouble status for each speaker circuit in the system.
  - b. The speaker circuit control panel shall include switches to manually activate or de-activate each speaker circuit in the system.
  - c. Buttons shall be provided on the voice command center to manually activate all auxiliary messages. (i.e. all clear, severe weather, homeland security warning, custom message).

## 2.3 FIRE ALARM TERMINAL CABINET

- A. Fire Alarm Terminal Cabinet with locked hinged door. Provide as an extension of the main fire alarm system. Existing enclosures may be reused if compatible with new system.

## 2.4 EMERGENCY TELEPHONE DEVICES

- A. Portable Emergency Telephone Handset Jack:
  - 1. Existing phone jacks and cabling shall remain and be reused.

## 2.5 SIGNALING LINE CIRCUIT DEVICES

- A. Combination Devices: Subscripts identify combination type devices when applicable. Contractor shall provide the combination device or provide multiple device(s) to meet the functionality when the manufacturer does not offer the required functionality with a single device.
- B. Signal Line Device(s):
  - 1. Subscripts: Subscripts are used to define the device type, installation, and identify the device with a specific sequence of operation.
    - a. Device type as follows:
      - 1) W = Weather Proof
      - 2) WG = Wire guard is required
      - 3) Candela Ratings:
        - a) ## = 15 Candela, 30 Candela; 75 Candela; 110 Candela; 177 Candela

C. Smoke Detectors:

1. Intelligent Photoelectric Type Sensor: Shall use the photoelectric principle to measure smoke density and send data to the control panel representing the analog level of smoke density measured.
2. Each smoke detector shall connect directly to an existing SLC loop.
3. Each detector shall be mounted, where shown on the drawings, on a twist-lock base with all mounting hardware provided. Provide a two-piece head/base design.
4. Each detector shall have a manual switching means to set the internal identifying code (address) of that detector, which the control panel shall use to identify its address with the type of sensor connected.
5. Dual alarm and power indicators shall be provided that flash under normal conditions and remain continuous under alarm or trouble conditions. Remote indicator terminals shall be provided. Provide a remote LED indicator device if detector is not visible from a floor standing position.
6. A test means shall be provided to simulate an alarm condition.

D. Duct Smoke Detectors, Sampling Tube Type:

1. Subscripts are used to define the device type, installation, and identify the device with a specific sequence of operation.
  - a. Device types as follows:
    - 1) # = Equipment or system
  - b. Duct-type smoke detectors shall use the same intelligent photoelectric sensor technology, with the same features specified for standard smoke detectors, except with additional features as specified below.
  - c. Provide sampling tubes and mounting hardware to match the duct to which it is attached. Where the detector housing is larger than the duct height, Contractor shall fabricate a mounting bracket for the detector and attach according to the fire alarm manufacturer's recommendations.
  - d. Provide a remote alarm LED indicator device if detector is not visible from a floor-standing position. If detector is located above a suspended ceiling, mount remote indicator in ceiling directly below detector with a white single-gang faceplate labeled: Duct Smoke Detector.

E. Manual Pull Stations:

1. Manual pull station, addressable, single action, reset key lock, semi-flush mount, red high abuse plastic or cast metal construction with white lettering. Provided with all necessary mounting hardware.
2. Manual stations shall connect directly to an existing SLC loop. Stations shall provide address setting means using rotary decimal or DIP switches.
3. Manual stations shall be lockable for activation and, where indicated on plans, tamper-proof.

F. Heat Detectors:

1. Combination rate of rise and 135°F fixed temperature analog thermal type sensor. Factory programmed to alarm at 135°F and at 15°F per minute rate-of-rise. Sensor shall measure heat level and send data to the control panel representing the analog level of thermal measurement and rate-of-rise.
2. Provide a two-piece head/base design, with a manual switching means to set the internal identifying code (address) of that detector, which the control panel shall use to identify its address with the type of sensor connected.
3. Heat detectors shall connect directly to existing SLC loops.
4. Detectors shall be mounted, where shown on the drawings, on a twist-lock base with all mounting hardware provided.
5. Provide a remote LED indicator device if detector is not visible from a floor-standing position.
6. Dual alarm and power indicators shall be provided that flash under normal conditions and remain continuous under alarm or trouble conditions. A connection for attachment of a remote indicator shall be provided.
7. A test means shall be provided to simulate an alarm condition.

G. Monitor Modules:

1. Monitor Module shall connect directly to an existing SLC loop and receive power from a separate 24 VDC circuit. It shall interface initiating devices with the control panel using Style D or Style B circuits. Contractor Option: Use an interface module (2-wire operation) for Style B circuits connected to normally-open dry contacts, such as a flow switch.
2. The module shall be mounted in an enclosure located in an accessible service location as near as possible to the device(s) being monitored, or where shown on the drawings. All mounting hardware shall be provided.
3. The module shall supply the required power to operate the monitored device(s).
4. The module shall provide address setting means using rotary decimal or DIP switches.

H. Addressable Control Module:

1. Relay that represents an addressable control point used primarily for the control of auxiliary devices as indicated on the drawings. Contractor to provide additional child relay(s), as required, rated for the electrical load being controlled (Contractor to match voltage, amps, etc.).
2. Relay shall connect directly to an existing SLC loop and receive power from a separate 24 VDC circuit.
3. The relay shall be mounted in an enclosure located in an accessible service location as near as possible to the device(s) being controlled, unless otherwise shown on the drawings. All mounting hardware shall be provided.
4. The relay shall supply 24 VDC power to the device(s) being controlled, unless otherwise indicated on the drawings.

I. Isolation Module:

1. Provide fault isolation modules or isolator detector base capable of isolating and removing the fault from Class A or Class X addressable loop data circuits while allowing the remaining data loop to continue operation. Provide a minimum of two isolation modules or bases and between every 15 devices.

2.6 NOTIFICATION APPLIANCE DEVICES

A. Notification Appliance Device(s):

1. Subscripts: Subscripts are used to define the device type, installation, and identify the device with a specific sequence of operation.

a. Device types as follows:

- 1) W = Weather Proof
- 2) WG = Wire guard is required
- 3) Candela Ratings:

a) ## = 15 Candela; 30 Candela; 75 Candela; 110 Candela; 177 Candela

B. Notification Device(s):

1. Wall Mounted: Red housing with white lettering or pictogram.
2. Ceiling Mounted: Red housing with white lettering or pictogram.

C. Visual Alarm Devices:

1. Wall or ceiling mounted, refer to plans.
2. High intensity (Candela rating as scheduled on the drawings) xenon strobe or equivalent under a lens. Candela rating shall be visible from exterior of the device.
3. The maximum pulse duration shall be 0.2 seconds with a maximum duty cycle of 40%. The flash rate shall be 1 Hz. Where more than two strobes are visible from any one location, the fire alarm visual devices shall be synchronized.
4. Device, housing, and backbox shall be UL listed for fire alarm/emergency applications.
5. (W) Weatherproof Visual Notification Device: High intensity strobe, square housing, 75 Candela rating, suitable for wet locations. Provide with weatherproof back box.

a. Mounting: Semi-flush wall.

D. Audio (Speaker) Alarm Devices:

1. Existing speakers to remain and be reused.

E. Combination Audio (Voice) and Visual Alarm Device:

1. Wall or ceiling mounted, refer to plans.
2. Combine speaker and visual components into a single device. Refer to the corresponding paragraphs above for requirements of each component.

3. (W) Weatherproof Voice/Visual Notification Device: Speaker with high intensity 75 Candela rated strobe. 25 VRMS with a minimum of four (4) tap settings which shall allow field adjustment of the sound output across a minimum range of 78 to 87 dBA (UL 1480), 400 Hz to 4 KHz (6dBA cutoff) frequency range.

- a. Mounting: Semi-flush wall.

## 2.7 DOOR HOLD-OPEN DEVICES

### A. Electromagnetic Door Holder Devices:

1. Existing devices to remain and be reused.

## 2.8 NOTIFICATION APPLIANCE CIRCUIT PANEL (NAC)

- A. Furnish and install NAC extender panels as necessary to provide remote power supply for notification appliance circuits (NAC). Contractor shall indicate quantity and locations of each NAC on the shop drawing submittals.
- B. Each NAC shall be self-contained remote power supply with batteries, and battery charger mounted in a surface lockable cabinet. Battery capacity shall be sufficient for operation for 24 hours in a non-alarm state followed by alarm for 15 minutes, plus 25% spare capacity for future devices. Each NAC provides a minimum of up to 4 outputs, 2A continuous, or 6A full load total capacity.
- C. Power for each NAC shall be from the existing 120 VAC emergency circuit currently serving existing panels.
- D. Mounting: Flush Surface.

## 2.9 ANNUNCIATION

### A. Network Command Center:

1. The annunciator shall provide custom color graphics displays for the control panel to annunciate the status of the panel and every peripheral device. It shall record and display system historical information on an LCD flat panel display.
2. The annunciator shall have the ability to display a minimum of 256 custom screens and shall be fully field programmable. The fire alarm vendor shall develop screens from DXF or DWGCAD files provided by the Owner.
3. Operator control shall be via an attached keyboard and mouse.
4. The annunciator shall store all alarms, troubles and operator activity to an internal hard drive and shall have a capacity of 10,000 events without data loss.
5. Events shall have a time and date stamp.
6. Graphics shall contain eight (8) different colors from a palette of sixty-four (64).

7. Graphics software shall be provided to display on single or multiple screens, the status of every device located on a floor plan of the building. Alarms shall be audio and visual and shall annunciate regardless of the screen that is currently visible. Text on screens shall be a minimum of 1/10" high. Coordinate with the Owner, the floor plan on each screen prior to programming.
8. Provide TROUBLE ACKNOWLEDGE, DRILL, and ALARM SILENCE capability at the color graphics annunciation location.
9. The systems shall operate on the most current UL 864 listed computer system. The system shall be supplied by the fire alarm vendor and be listed for fire alarm use.
10. Provide an uninterruptible power supply (UPS) to provide a minimum of 10 minutes of operating power for the computer graphic annunciator upon loss of normal power.
11. All equipment for the color graphics network annunciator shall be suitable for locating on a desk, provided by the Owner. When multiple workstations are required (multiple locations within a facility or multiple buildings on a campus), they shall be server/client based configuration.
12. Remote Client Workstations: All workstations shall have the same user functionality. User shall have the ability to take over network control functionality from any station as follows:
  - a. Request to take control
  - b. Accept/deny control request
  - c. Restore command center to normal operation
  - d. Priority request override
13. PC computer workstation shall have the following minimum operating system requirements:
  - a. Operating system shall be a minimum of Microsoft Windows 7.
  - b. 3.0 GHz processor (server workstation)
  - c. 128 GB RAM installed (server workstation)
  - d. i7 Intel processor (client workstation)
  - e. 32 GB RAM installed (client workstation)
  - f. 500 GB hard drive
  - g. 22-inch LCD monitor minimum

B. Printer:

1. Printer shall be UL 864 listed and shall be the automatic type with code, time, date, location, category and condition.
2. The printer shall provide hard copy printout of all changes in status of the system and shall time-stamp such printouts with the current time of day and date. The printer shall be standard carriage with 80 characters per line and shall use standard bond paper. The printer shall be enclosed in a separate enclosure, suitable for placement on desk or countertop. The printer shall communicate with the control panel using an interface complying with Electrical Industries Association Standard EIA-232D. Power to the printer shall be 120 VAC, 60 Hertz.
3. The printer shall be connected to the graphics annunciator PC and shall have all interfaces in place to be connected to the Fire Command Center and all transponders in case of network or hardware failure.

C. FAA; Remote LCD Annunciators:

1. Auxiliary annunciators shall indicate alarm and trouble conditions visually and audibly as shown on the drawings. Provide local TROUBLE ACKNOWLEDGE, TEST, and ALARM SILENCE capability. Minimum 80-character display.
2. Communications and power to the annunciators shall be supervised. The annunciator shall receive power from the fire alarm control panel.
3. A single key switch shall enable all switches on the annunciator.
4. Mounting: Flush Surface.

D. Fire Alarm Remote Indicator:

1. Red LED type.
2. Mounts flush to a single gang box.

E. Fire Alarm Remote Indicator and Test Switch:

1. Red LED type.
2. Key switch test selector.
3. Mounts flush to a single gang box.

2.10 CONNECTIONS TO AUXILIARY DEVICES PROVIDED BY OTHERS

A. Smoke and Fire/Smoke Damper Controller:

1. Existing relays and connections to remain and be reused.

B. Flow Switch:

1. Existing connection to switch to remain and be reused. Associated addressable monitor, specified hereinbefore, shall be replaced as shown on plans.

C. Tamper / Monitor Switch:

1. Existing connection to switch to remain and be reused. Associated addressable monitor, specified hereinbefore, shall be replaced as shown on plans.

D. Door Hold Device:

1. Existing door hold devices to remain and be reused.

2.11 WIRING

- A. Existing fire alarm wiring/cabling throughout facility shall remain and be reused. Any new wiring/cabling required shall be furnished and installed by the Contractor in accordance with the manufacturer's recommendations and pursuant to National Fire Codes. Cabling shall be UL listed and labeled as complying with the Electrical Code for power-limited fire alarm signal service.



B. Fire Alarm Cable:

1. Manufacturers:
  - a. Comtran Corp.
  - b. Helix/HiTemp Cables, Inc.
  - c. Rockbestos-Suprenant Cable Corp.
  - d. West Penn Wire/CDT.
  - e. Radix.

PART 3 - EXECUTION

3.1 SEQUENCES OF FIRE ALARM OPERATION

A. General:

1. Programming and system operation shall match functions of existing system.
2. The GUI/graphic annunciator shall display audible and visual alarms. The device activated shall be immediately displayed on a CAD floor plan at approximately 1/8" scale. Visual indication shall further indicate the device by utilizing an easily recognized color change of the symbol. The use of flashing symbols is encouraged.
3. All system output programs assigned via control-by-event equations to be activated by the particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.

B. Panel/Annunciator Alarm, Trouble, Supervisory Indication:

1. Appropriate system Alarm, Trouble, or Supervisory LED shall flash at the control panel, transponder, and annunciator locations.
2. A local signal in the control panel and the color graphics PC shall sound.
3. The LCD display shall indicate all information associated with the condition, including the name of the item, type of device and its location within the protected premises.
4. Printing and history storage equipment shall log the information associated with the fire alarm control panel (FAP) condition, along with the time and date.
5. Transmit the appropriate signal (supervisory, trouble, alarm) to the central station via the digital communicator.

C. Audible Alarms Sequence:

1. Voice announcement/audible alarms shall be played throughout the building.

D. Visual Alarms Sequence:

1. Visual alarms throughout the building shall flash.

E. Kitchen Hood Fire Suppression System Sequence:

1. The fire alarm system shall utilize an addressable monitor module to monitor the fire suppression system.

F. Smoke Damper Control Sequence:

1. The fire alarm system shall utilize an addressable relay to open the power connection to smoke or fire/smoke dampers and allow them to close. Coordinate other requirements with damper installer.
2. Where a damper is in a main air duct, where closure of that single damper will entirely block airflow in the duct system, the smoke damper sequence shall also initiate the AHU and mechanical fan shutdown sequence for the affected unit.
3. The AHU and mechanical fan shutdown sequence shall be initiated only when ALL the dampers associated with that unit or mechanical fan are closed. Otherwise, the AHU or mechanical fan shall continue to serve other areas.
4. Smoke and fire/smoke dampers located in branch ductwork shall be closed individually or in groups, as identified on the plans.

G. AHU and Mechanical Fan Shutdown Sequence:

1. The fire alarm system shall utilize addressable relays to de-energize all AHU motor controllers and mechanical fans.
2. The fire alarm system shall directly shut down the AHU or mechanical fan through the local HVAC control device (i.e., variable frequency drive or motor starter).
3. Where a facility has more than one AHU or mechanical fan, each shall be shutdown individually based on input from initiation devices in the area served by the unit or designated for each air distribution system.

H. Fire Door Release Sequence:

1. The fire alarm system shall utilize an addressable relay to signal the fire door or curtain to close. Once the alarm is cleared, the addressable relay shall allow the door to open.
2. Where a facility has more than one fire door, each shall release individually based on input from initiation devices in the vicinity of each door and noted specifically for door closure.

I. Door Holder Release Sequence:

1. All door holders throughout the building shall release simultaneously.

J. Elevator Recall Sequence:

1. Elevator recall sequences shall meet the requirements of ASME/ANSI A17.1 and NFPA 72.
2. Upon signal from a smoke detector in the machine room, hoistway, or any elevator lobby other than the "designated level" the fire alarm shall utilize an addressable relay to signal the elevator to recall to the designated level as determined by the Authority Having Jurisdiction.
3. Upon signal from a smoke detector in the elevator lobby of the "designated level," the fire alarm system shall utilize an addressable relay to signal the elevator to recall to the "alternate level" as determined by the Authority Having Jurisdiction.
4. All elevators, throughout the building, shall be recalled simultaneously.

K. Firefighter's Cab Visual Alarm Sequence:

1. Upon signal from a detector in the machine room or elevator hoistway, the fire alarm system shall utilize an addressable relay to signal the elevator controller to illuminate and flash the firefighters cab visual alarm.

L. Elevator Shutdown Sequence:

1. Elevator shutdown shall meet the requirements of ASME/ANSI A17.1.
2. All elevators that share the same hoistway, machine room, or lobby shall be shut down simultaneously. Elevators served by different machine rooms, hoistways, and lobbies shall continue to operate.
3. The fire alarm system shall utilize an addressable relay to energize the shunt trip of the main elevator breaker, disconnecting power to the elevator.
4. The fire alarm system shall utilize an addressable relay to de-energize the relay on the elevator power module, disconnecting power to the elevator.

M. Access Control Override Sequence:

1. The fire alarm shall use addressable output relay(s) to signal the access control panel.
2. The fire alarm shall initiate an override of delayed egress doors.

3.2 INSTALLATION

A. Comply with NFPA 72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire-alarm control units within existing enclosures currently housing control units to be replaced. Associated amplifiers shall be installed within existing enclosure or furnished with new enclosure, as indicated on plans.

1. Replacement of each control unit shall be carefully coordinated with facility and down-time of system shall be kept to a minimum.
2. Contractor shall ensure the facility is provided with an operational fire-alarm system at the end of each work day.

C. Connecting to Existing Equipment:

1. All existing conductors and cabling to each fire-alarm control unit shall be re-connected to new unit as required to keep existing circuits and devices operational.

D. Device Mounting:

1. Existing devices shown to be removed shall have their associated back boxes and cabling remain for re-use.
2. New devices shall be mounted on the existing back box currently being used by device to be replaced and re-connected to existing conductors or cabling in back box.
3. New devices shall not be installed until new fire-alarm control units have been installed. Installation of devices shall be done in one area of the facility at a time and carefully coordinated with facility.

3.3 IDENTIFICATION

- A. Identify system components and terminals.

3.4 GROUNDING

- A. Grounding fire-alarm control unit and associated circuits; comply with IEEE 1100.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 280500.
- B. Test in accordance with NFPA 72, Chapter 14 and local fire department requirements. Submit documentation with O & M manuals in accordance with Section 14.6 of the Code.
- C. Contractor shall test and adjust the fire alarm system as follows:
  - 1. Speaker taps shall be adjusted to the lowest tap setting which achieves a sound level higher than or equal to the greatest of the following:
    - a. 70dBA.
    - b. 15 dBA above ambient levels as indicated in NFPA 72 Table A.18.4.3.
    - c. 15 dBA above measured ambient. 5 dBA above the maximum measured sound level with duration of more than 60 seconds.
    - d. As specified on the drawings.

3.6 MANUFACTURER'S FIELD SERVICES

- A. Provide manufacturer's field services under provisions of Section 280500.
- B. Include services of the manufacturer's software programmer to write initial custom-user program (for Color Graphics Annunciation System).
- C. Include services of certified technician to supervise installation, adjustments, final connections, and system testing.
- D. Note that room numbers depicted on the architectural/engineering drawings will not necessarily reflect the actual room (signage) numbers that the Owner selects. Contractor and fire alarm manufacturer shall coordinate the actual room numbers as the Owner directs to identify each device. This list shall be a part of the floor plan record drawing to be turned in at the project closeout.
- E. Include the services to train up to three of the Owner's staff in operation, maintenance, and programming of the fire alarm system at the manufacturer's factory. Airfare and lodging expenses for the Owner's staff will be by the Owner.

- F. System Occupancy Adjustments: When requested by Owner within 12 months of date of Substantial Completion, provide on-site system adjustments to suit actual occupied conditions. For this purpose, provide up to two (2) site visits, four (4) hours each visit, outside normal occupancy hours.

### 3.7 SYSTEM TRAINING

- A. System training shall be performed under provisions of Section 280500.
- B. Minimum on-site training times shall be:
  - 1. System Operators: One (1) day.
  - 2. GUI Operation and Editing: One (1) day.

END OF SECTION 283111