Bid Documents
For

Access Control Upgrades

Holland Public Schools
320 West 24th Street
Holland, MI 49423

Distributed by:

Commtech Design
Contact Bret Emerson
616-863-8132
bret@commtechdesign.com

December 3, 2019
SECTION 28 0500 – FRONT END

PART 1 - GENERAL

1.01 INTRODUCTION
A. Holland Public Schools invites qualified contractors to provide proposals for an Access Control Upgrade. This work includes:
   1. The base bid is the cost for the installation of all the access control systems including all equipment, labor, installation, configuration and testing.
   2. Replace existing Lenel system with a new software platform. Re-use existing devices at doors. Replace access control panels if required.
B. The Contractor shall pay all costs of the Work including, but not limited to, labor, materials, equipment, tools, transportation, freight, taxes, royalties, patent fees, support facilities, construction equipment, water, heat, utilities, supervision, overhead, and all other items necessary for the proper execution and completion of the Work.

1.02 CONTACTS
A. The contact for all questions and any addendums during bidding shall be:

   Commtech Design
   Bret Emerson
   616-863-8132
   bret@commtechdesign.com

B. The owner as referred to in this bid is:

   Holland Public Schools
   320 West 24th Street
   Holland, MI 49423

1.03 DUE DATES
A. Bids are due at December 23rd, 2019 3:00PM at

   Holland Public Schools
   320 West 24th Street
   Holland, MI 49423

B. A pre-bid meeting will be held on December 9th, 2019 @ 2:00 PM Meet at:

   Board Room
   Holland Public Schools
   320 West 24th Street
   Holland, MI 49423

C. All questions shall be submitted to the owner no later than December 16th, 2019 at 3:00PM. All questions shall be sent via email to Bret Emerson of Commtech Design.

   Bret Emerson bret@commtechdesign.com 616-863-8132

1.04 BUILDING SITES
A. Work to be completed as part of this bid will be done at the sites as detailed in the drawings and specifications:
B. Access to the sites shall be from 2:30 PM to 11:00 PM Monday thru Friday.
1. Arrangements can be made for additional time on site during each day as scheduled with the owner.
2. All work in the classrooms or hallway shall be completed during the summer or during non-school hours.
3. No work activity shall disrupt the regular school day schedule or in any way intrude upon the teaching and administration of students.

1.05 OWNERS RIGHTS
A. The owner reserves the right to waive any formalities to bid, to reject any or all bids and to accept the bid that is most favorable to the Owner.
B. The owner does not incur any responsibility for Bidder’s costs in preparing the bid proposal.
C. Bidder recognizes that the owner is subject to the Freedom of Information Act. Per formal request the owner will make bid documents available for public review following contract with a successful bidder.

1.06 BID RESPONSE FORMAT
A. The owner requires that all responses include the information listed below.
B. All bid responses shall be submitted in a three-ring binder or bound folder
   1. Provide two copies of the bid response. One shall be marked as the ORIGINAL. The ORIGINAL shall be signed by a duly designated officer of the company.
C. Bid responses shall be provided in the following format with section dividers.
   1. Bid Form –See Bid Documents
   2. Description of the bidder’s company
   3. Description of the bidder’s response and the services they will provide.
      a. Include information about any manufacturer required on-going maintenance costs for software or hardware or upgrades.
   4. Spreadsheet detailing all equipment being submitted per building.
   5. Any information the bidder wishes to include that was not specifically required.

1.07 DOCUMENTS
A. The following drawings are part of the bid package.

<table>
<thead>
<tr>
<th>DWG.</th>
<th>Drawing Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC501</td>
<td>Security Legend, Schedules &amp; Details</td>
</tr>
<tr>
<td>TC502</td>
<td>Security Access Control Details</td>
</tr>
<tr>
<td>TC503</td>
<td>Security Access Control Details</td>
</tr>
<tr>
<td>TC601A</td>
<td>Holland Heights Security Plan A</td>
</tr>
<tr>
<td>TC601B</td>
<td>Holland Heights Security Plan B</td>
</tr>
<tr>
<td>TC602A</td>
<td>Holland High School First Floor Security Plan Area A</td>
</tr>
<tr>
<td>TC602B</td>
<td>Holland High School First Floor Security Plan Area B</td>
</tr>
<tr>
<td>TC602C</td>
<td>Holland High School First Floor Security Plan Area C</td>
</tr>
<tr>
<td>TC602D</td>
<td>Holland High School First Floor Security Plan Area D</td>
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<tr>
<td>TC602E</td>
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<td>TC602F</td>
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<td>TC602H</td>
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<td>TC602J</td>
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<td>TC602K</td>
<td>Holland High School Second Floor Security Plan Area K</td>
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<tr>
<td>TC603A</td>
<td>Holland Language Academy Security Plan Area A</td>
</tr>
<tr>
<td>TC602B</td>
<td>Holland Language Academy Security Plan Area B</td>
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<tr>
<td>TC604A</td>
<td>Holland Middle School Security Plan Area A</td>
</tr>
<tr>
<td>TC604B</td>
<td>Holland Middle School Security Plan Area B</td>
</tr>
<tr>
<td>TC604C</td>
<td>Holland Middle School Security Plan Area C</td>
</tr>
</tbody>
</table>
B. The following specifications are part of the bid package.

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<table>
<thead>
<tr>
<th>Specification</th>
<th>Bid Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>28 0000 Coversheet</td>
<td>X Access Control</td>
</tr>
<tr>
<td>28 0500 Front End</td>
<td>X</td>
</tr>
<tr>
<td>Bid Form</td>
<td>X</td>
</tr>
<tr>
<td>Familial Disclosure</td>
<td>X</td>
</tr>
<tr>
<td>Iran Form</td>
<td>X</td>
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<tr>
<td>28 1000 Communications Overview</td>
<td>X</td>
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<tr>
<td>28 3500 Access Control</td>
<td>X</td>
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<tr>
<td>28 7200 Technology Submittals</td>
<td>X</td>
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<tr>
<td>28 7600 Technology Labeling</td>
<td>X</td>
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<tr>
<td>28 7700 Technology Testing</td>
<td>X</td>
</tr>
<tr>
<td>28 7750 Technology Training</td>
<td>X</td>
</tr>
<tr>
<td>28 7800 Technology Warranty</td>
<td>X</td>
</tr>
</tbody>
</table>

PART 2 - PERSONNEL

2.01 BIDDER

A. Minimum Bidder Qualifications:
   1. Bidder must be fully licensed and insured.
   2. Bidder must be fully authorized by the manufacturer being proposed to install and configure the equipment.
   3. Shall have technicians that are fully certified to install and configure the equipment being provided as part of the bid.

B. Bidder shall address each item in this package as specified. All required labor and equipment must be quoted. Any exception must be noted and explained. All bids must include the entire section bid to be considered.

C. The Contractor can withdraw their bid at any time prior to opening the bids.

D. Work shall be coordinated with the owner’s technology coordinator, architect, construction manager and the technology designer.

2.02 PERSONNEL

A. All personnel working on the project shall be certified by the manufacturer to install, configure and connect the equipment as per the owner’s requirements and the manufacturer’s specifications.

B. The contractor shall assign a Project Manager to the project who will have ultimate authority to make decisions, schedule work and fix or repair any non-conforming equipment.
1. Provide a list of the projects of similar size and scope to the work they will be doing as part of this project. Include examples of three projects with similar scope that the PM has worked on in the last three years.

2. The project manager will be the primary contact for this project

3. The project manager shall attend all project meetings and be fully aware of all work going on as part of the project.

2.03 BACKGROUND CHECKS

A. Contractor’s staff may be required to pass a security clearance check conducted by the Owner.

B. The Contractor shall authorize the investigation of its personnel proposed to have access to facilities and systems on a case-by-case basis.

1. The scope of the background check is at the discretion of the owner and the results will be used to determine Contractor’s personnel eligibility for working within the facilities and systems.

2. Such investigations will include Michigan State Police Background checks (ICHAT) and may include the National Crime Information Center (NCIC) Finger Prints.

3. Proposed Contractor personnel may be required to complete and submit an RI-8 Fingerprint Card for the NCIC Finger Print Check.

4. Any request for background checks will be initiated by the owner or construction manager and will be reasonably related to the type of work requested.

PART 3 - WORK REQUIREMENTS

3.01 DOCUMENTS

A. The contractor shall review all bid documents including specifications and the drawings. The specifications and documents and any addenda detail the requirements of the chosen contractor.

B. It is mandatory that items of material and equipment conform to the Contract Documents and meet the quality standards in every respect.

C. Where any specifications or drawings are not in agreement the higher value or more stringent requirement shall apply and shall be included in the bid pricing.

3.02 PRODUCTS

A. All products shall be of the latest manufacture. No remanufactured or used equipment shall be provided as part of the bid.

B. All equipment shall be provided in the manufacturers shipping container. Provide copy of the shipping lists as part of the project documentation.

3.03 PRODUCT DELIVERY AND LIABILITY

A. The contractor shall be responsible for the complete installation of new and un-damaged products.

B. The contractor shall be liable for all equipment until it is formally accepted by the owner in writing. This shall include the equipment when it is in the contractor’s facility and when it is in the owner’s facility until it is formally accepted.

3.04 DAMAGE

A. The contractor shall be responsible for all damage made to the building or any of the buildings’ contents during their work as part of this project.

B. The contractor shall not disturb any hazardous material or materials that they are not authorized to work with.

3.05 INCIDENTAL WORK AND PERMITS

A. The contractor shall be responsible for requesting, obtaining and paying for any and all permits required for their work by the local, county, state and federal authorities having jurisdiction (AHJ) over the work being performed.

B. Provide any and all work or equipment required by the Authority Having Jurisdiction (AHJ) that may or may not be specifically noted in these documents.
3.06 INSPECTION OF THE WORK
A. The contractor shall keep up to date as-builts on site for the duration of the project. The engineer may request to see the as-built documents at any time.
B. The Contractor shall promptly facilitate inspection and testing of the Work regardless of expense as necessary or as requested by the Owner, regardless of whether or not the Work in question is his own or that of a subcontractor.
C. If such tests or inspections reveal deficiencies as measured by Construction documents or an independent consultant/testing agency or the owner/engineer, the Contractor shall bear all costs incurred to correct such deficiencies, and the cost to reconstruct any work to meet the contract documents.

3.07 PROJECT MEETINGS
A. The contractor shall attend project meeting as designated by the owner or engineer. Attendance is mandatory.

PART 4 - WORK SCHEDULES

4.01 PROJECT SCHEDULE
A. It is the intention of the owner to take possession of the Work by the established completion date or earlier, within the shortest time possible consistent with good construction practices.
B. The Completion Date Shall be June 1, 2020
C. Upon award of the contract the contractor shall provide a complete schedule for their work. This shall reference dates in the document and be coordinated with the schedule of any other contractors.
   1. Include start date
   2. Products installed
   3. Punch list work complete
   4. Substantial Completion
   5. Final Completion after system has been working for 30 days with no outages or failures
D. If the work is delayed through the fault of the owner (or of any separate contractor employed by the owner)
   1. The Contractor shall notify the owner, in writing, of any condition or situation that in the Contractor's opinion warrants an extension of Contract Time.
   2. The Contractor shall not be entitled to additional compensation or damages due to delays, interference’s or interruptions to the Work or the Project, but shall be entitled only to an appropriate extension of time in accord with the General Conditions of the Contract for Construction.

PART 5 - DEFICIENT WORK

5.01 PRODUCT AND INSTALLATION DEFICIENCIES
A. The Contractor shall expediently correct all deficiencies brought to his attention in writing or verbally by the owner. If, in the opinion of the owner and the technology design or construction manager, the Contractor fails to correct deficiencies, or fails to act expeditiously to correct deficiencies, the owner may:
   1. Accept the deficiencies in the Work and reduce the Contract Sum of the Contractor at fault by a unilateral Change Order issued and signed by the owner in an amount to be determined by the owner.
   2. Have the deficiencies removed in any reasonable manner available to the Owner and charge the Contractor at fault for the costs incurred or reduce that Contractor's Contract Sum by a unilateral Change Order issued by the Owner for the costs incurred.
B. The Contractor shall pay all costs of the Work including, but not limited to, labor, materials, equipment, tools, transportation, freight, taxes, royalties, patent fees, support facilities, construction equipment, water, heat, utilities, supervision, overhead, and all other items necessary for the proper execution and completion of the Work.
PART 6 - GENERAL

6.01 LEGAL REQUIREMENTS
   A. The Contractor shall comply fully with all laws, statutes, ordinances, rules, regulations, codes, and lawful orders applicable to their work, including employment regulations, unless specifically exempted from compliance by the Contract Documents. Where local codes differ from codes of broader jurisdictions, the more stringent code shall apply. The Contractor shall promptly notify the Owner in writing of items in the plans or specifications for this project that violate any applicable codes.

6.02 CLEAN SITE
   A. The contractor shall clean the site daily.
   B. The contractor shall be responsible for disposal and removal from the site any and all waste and debris generated from their work.
   C. All dust or ceiling debris generated as part of the work shall be cleaned each day.

6.03 PREVAILING WAGE
   A. This project is not subject to the Prevailing Wage Law; Michigan Public Act 166 of 1965.

6.04 TAXES
   A. The bidder is responsible to apply all tax information within their proposal. Contractor is responsible for applying such tax with each request for payment and complying with Federal, State and local laws.
   B. All tax costs shall be included in the base bid price.

6.05 PAYMENTS
   A. The contractor shall submit an invoice on the AIA form G702/G703 each month. The invoice shall include only work completed at the time of submission.
   B. The contractor can be paid for equipment in storage at the owner’s site as long as the owner is provided with proof of insurance for the equipment.
   C. The owner will provide payment on the invoice within 21 days of a signed invoice by the engineer and contractor.
   D. The owner will retain 10% of the total cost of the project until the system is considered finally complete as detailed in the project documents.

PART 7 - REVIEW OF BIDS

7.01 OWNER REVIEW
   A. The Owner reserves the right to waive any formalities to bid, to reject any or all bids, or to accept the bid that is most favorable to the Owner. The Owner does not incur any responsibility for Bidder’s costs in preparing the bid proposal.

7.02 BID BOND
   A. Provide with the bid response a 5% Bid Bond which is required for all proposals. The bond must be in the form of a certified check or a bond executed by a surety company authorized by the State of Michigan. The amount of the bond shall be forfeited if the Contractor, after being awarded the bid, fails to enter into an appropriate contract with the Owner within (30) days.

7.03 PERFORMANCE BOND
   A. Successful bidders, for work valued at $50,000 or more, will be required to secure Performance, Labor and Material Bonds issued for the full amount (100% value) of the contract by a company licensed to do business in the State of Michigan and having an A.M. Best rating of A- or better. The cost of these bonds is to be included in the proposal amount.

7.04 INSURANCE
   A. Contractors must have the proper insurance forms submitted prior to start of their Work. The required insurance shall be written for not less than the limits shown below, or greater if
required by law. Contractors will require all subcontractors to maintain similar coverage limits. The Contractor shall name the Owner as additional insured.

1. Standard Workers Compensation and Employers Liability Employers Liability
   a. $500,000 Bodily Injury by Accident—each accident
   b. $500,000 Bodily Injury by Disease—each employee
   c. $500,000 Bodily Injury by Disease—policy limit

2. General Liability Combined Single Limit Liability
   a. $1,000,000 each occurrence
   b. Or Split Limit Liability
   c. $500,000 Bodily Injury—each occurrence
   d. $500,000 Property Damage—each occurrence

3. Aggregates
   a. $1,000,000 General Aggregate
   b. $1,000,000 Products-completed operations
   c. Automobile Liability Combined Single Limit Liability
   d. $500,000 each accident
   Or
   e. Split Income Liability
   f. $500,000 Bodily injury—each person
   g. $500,000 Bodily injury—each accident
   h. $500,000 Property Damage—each accident

4. Umbrella Insurance
   a. $2,000,000 Limit over primary insurance

7.05 REVIEW OF BIDS
A. Bids will be reviewed based on the following criteria:
   1. Compliance with bidding documents
   2. Price
   3. Responsiveness to owner’s requirements
   4. Experience and references with similar projects
   5. Manufacturers relationships and personnel that are certified in the manufacturer’s equipment.
   6. Any on-going costs associated with the equipment or installation.
   7. The owner reserves the right to make any decision which they deem to be in their best interest regardless of price or experience of the bidders.

END OF SECTION 28 0500
BID FORM
Holland Public Schools
Access Control System

Access Control Upgrades

TO: Holland Public Schools
320 West 24th Street
Holland, MI 49423

Company Name: ________________________________
hereinafter called "Contractor", does agree to provide equipment and labor as described in the specifications and drawings.

Total Base Bid: $ __________________________ (in numbers)
The base bid is the cost to provide and install all the access control systems.
Work shall include all equipment, labor, installation, configuration, warranty and testing.
Shall include providing and installing all new door hardware noted on the drawings and specs.

Authorized Signature: ________________________________

Name (printed): ________________________________

Date: ________________________________

Email: ________________________________

Telephone: ________________________________
Addenda
The Contractor acknowledges receipt of the following addenda and has included their costs in the Total Base Bid price shown above.

Addendum # __________ Dated: ____________ Addendum # __________ Dated: ____________

Contractor Address: ____________________________ Phone: ____________________________
______________________________ Fax: ____________________________
______________________________ E-mail: ____________________________

Voluntary Alternates:
Voluntary alternates are allowed and may be considered at the discretion of the owner. For each voluntary alternate, provide a brief written description and attach additional information as required to fully describe intent. All alternates shall be completely inclusive and shall not require any additional work by other trades.

1. Description
Add / Deduct (circle one) $ ____________________________

2. Description
Add / Deduct (circle one) $ ____________________________

Breakout Pricing:
Include pricing on a school by school basis.

1 High School Cost: $ ____________________________
2 Middle School Cost: $ ____________________________
3 Holland Heights Cost: $ ____________________________
4 Hollang Lang. Acad. Cost: $ ____________________________
5 Holland West Cost: $ ____________________________
6 Jefferson Cost: $ ____________________________
7 Longfellow Cost: $ ____________________________
8 Maintenance Bldg. Cost: $ ____________________________
STATEMENT REGARDING FAMILIAL RELATIONSHIP

AFFIDAVIT OF ____________________________________________

(name of affiant)

STATE OF MICHIGAN

COUNTY OF _______________

_________________________________________ makes this Affidavit under oath and states as follows:

1. I am a/the □ President
   □ Vice-President
   □ Chief Executive Officer
   □ Member
   □ Partner
   □ Owner
   □ Other (please specify) ____________________________

Of ____________________________________, a bidder on a construction project for

(insert name of contractor)

_________________________________________ that involves, at least in part, construction

(insert name of school district)

of a new school building or an addition to or repair or renovation of an existing school
building.

2. I have personal knowledge and/or I have personally verified that the following are all of
the familial relationships existing between the owner(s) and employees(s) of the
aforementioned contractor and the school district’s superintendent and/or board
members

_________________________________________

_________________________________________

_________________________________________
3. I have authority to bind the aforementioned contractor with the representations contained herein, and I am fully aware that the school district will rely on my representations in evaluating bids for the construction project.

4. I declare the above information to be true to the best of my knowledge, information and belief. I could completely and accurately testify regarding the information contained in this affidavit if requested to do so.

______________________________
(signature of affiant)

Dated _____________________

Subscribed and sworn before me in _____________ County, Michigan, on the _____ day of _________________, 200__

______________________________ (signature)

______________________________ (printed)

Notary public, State of Michigan, County of _____________

My commission expires on __________________________

Acting in the County of __________________________
Iran Economic Sanctions Act Certification

I am the _______________ of ________________, or I am bidding in my individual capacity ("Bidder"), with authority to submit a binding bid for the Access Control Upgrades at Holland Public Schools. I have personal knowledge of the matters described in this Certification, and I am familiar with the Iran Economic Sanctions Act, MCL 129.311, et seq. ("Act"). I am fully aware that the school district will rely on my representations in evaluating bids.

I certify that Bidder is not an Iran-linked business, as that term is defined in the Act. I understand that submission of a false certification may result in contract termination, ineligibility to bid for three (3) years, and a civil penalty of $250,000 or twice the bid amount, whichever is greater, plus related investigation and legal costs.

_________________________________________
(signature)

_________________________________________
(printed)

_________________________________________
(date)
SECTION 28 1000 – COMMUNICATIONS OVERVIEW

PART 1 - GENERAL

1.01 SECTION INCLUDES
A. This section provides a project overview and general project and Contractor requirements for technology work.
B. The “Contractor” as referred to in these specifications, shall be the bidder whose bid is eventually chosen as the winner.
C. The “Engineer” as referred to in these specifications, shall be Commtech Design and its representative on this project.
D. The “Owner” as referred to in these specifications, shall be Holland Public Schools and its representatives.
E. In the detailed specifications and on the contract drawings, the phrases “or equivalent,” “approved equivalent,” “approved equal,” “or equal” and “engineer approved equivalent” shall be used interchangeably and shall mean the same thing.
F. All equals, equivalents, or alternates shall be approved by the Engineer prior to ordering or installation. Without approval, deviation from the products listed in the specifications and on the drawings, shall be presumed to be nonconforming and shall be removed and replaced at the direction of the Engineer and at the Contractor’s expense.

1.02 DESCRIPTION OF PROJECT
A. Access Control System
1. There is an existing LENEL access control system in the district. This exists in each building.
2. The Holland Public schools is obtaining bids to replace this access control system.
3. The scope of work includes a replacement of the software and any hardware required to support the new software.
   a. Provide and install all equipment and servers and software required.
4. The intent is to re-use cabling and security devices that are in place throughout each building.
   a. The bidder and eventual contractor will include in their bid any and all hardware, cabling and software required to update the existing system to the new system.
5. If new security/access control panels are required as part of the new access control system then the existing panels shall be replaced.
6. Provide raceways as shown on the drawings.
7. Install all cabling required connect each new access control device to the security panels
   a. Security panels shall be located in each communications room. See drawings.
   b. Wire from each power supply to the panels and to the devices at the doors
8. Install intercoms. Where the intercom is connected to the data network the contractor shall provide all patch cables and configure the network to support the intercoms
9. Configure the system as per the owner’s requirements. Meet with them to determine configuration parameters
10. The extent of the work shall be as shown on the drawing and detailed in these specifications
B. Post installation documentation
1. Each contractor shall provide post installation documentation as per the specifications. Shall include but not be limited to:
   a. Red-lined as-built drawings
   b. As-built detailed connectivity of AV and Network Systems
   c. As-built cable locations and cable labels at each location.
   d. Mark all splice locations
   e. Update of all access control locations and equipment at each door
f. Camera locations and camera numbers.
g. Spreadsheet (hard copy and Excel file) for all network, Wireless, telephones and cameras detailing:
   A) Mfg. Part number
   B) IP Address
   C) MAC Address
   D) Device number (Camera #, Telephone # etc)

1.03 STORAGE OF MATERIALS
   A. All materials shall be secured when not in use by the Contractor.
   B. It shall be the Contractor’s responsibility to secure all equipment including all material to be installed as part of the contract. No changes shall be made to the contract due to loss or theft of equipment and materials not officially accepted by the Owner.

1.04 PERMITS
   A. The State of Michigan requires that the Contractor apply for and obtain permits for data telecommunication installation.
   B. This is required under State of Michigan Public Act 230. The inspector at the State of Michigan states that the code never exempted data telecommunications from permits and previous rules had overstepped their bounds. Only exemptions to the permit requirements are found in Public Act 230 MCL125.1528a.
      1. There is not a license required to apply for a permit per Public Act 407 MCL339.5737(3)(o).
   D. People who can obtain the permit include the Owner of the building or a company representing the owner. See Public Act 230 MCL125.1510.
      1. Contractor shall be required to apply for and obtain the permit
      2. Contractor shall be required to install the data telecommunications system to fully meet all code requirements and requirements of the Inspector and Authority Having Jurisdiction (AHJ)
   E. State inspector has noted that the inspection process for data telecommunications is the same as any other inspection.
      1. Do not cover or conceal any wiring without approval.
      2. Electrical Inspectors will be conducting the inspections.
      3. Contractor shall be responsible for scheduling the inspections and attending the inspections with the inspector
   F. State inspector has noted that the inspectors will be inspecting for code compliance including manufacture’s installation instructions for the cables and terminations.
   G. An installation may not pass inspection if there is any Non-compliance with the code.

1.05 REFERENCE SPECIFICATIONS-CABLING
   A. All work applicable shall conform to the following standards:
   B. ANSI/TIA-568-C.0, “Generic Telecommunications Cabling for Customer Premises”,
   C. ANSI/TIA-568-C.1, “Commercial Building Telecommunications Cabling Standard”,
   F. ANSI/TIA/EIA-569-B Commercial Building Standard for Telecommunications Pathways and Spaces
   G. IA-606-B: Administration Standard for the Telecommunications Infrastructure of Commercial Buildings including all Updates and Addenda.
   H. TIA-607-C: Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises.
   I. EIA-472 General Specification for Fiber Optic Cable
   J. EIA-472A Sectional Specification for Fiber Optic Communication Cables for Outside Aerial
K. EIA-472B Sectional Specification for Fiber Optic Communication Cables for Underground and Buried Use
L. EIA-472C Sectional Specification for Fiber Optic Communication Cables for Indoor Use
M. EIA-472D Sectional Specification for Fiber Optic Communication Cables for Outside Telephone Plant Use
N. NEC, 2015, or latest edition available
O. IEEE 802.3af PoE • Ratified in 2003 • 15.4W at the PSE, with min of 12.95W available to the PD
P. IEEE 802.3at PoE+ • Ratified in 2009 • 34.2W at the PSE, with min of 25.5W available to the PD
Q. Pending (higher power) PoE standards Projected to be Ratified by IEEE in 2017 powering all 4 pairs:
   1. Proposed IEEE 802.3bt PoE Type 3 • 60W at PSE • with 49 watts at the PD
   2. Proposed IEEE 802.3bt PoE Type 4 • 100W at PSE • with 96 watts at the PD

1.06 REERE CNE STANDARDS NETWORKING
A. EE 802.3™: Ethernet
B. IEEE 802.11™: Wireless Lans
C. IEEE 802.22™: Wireless Regional Area Networks
E. IEEE 802.3af PoE • Ratified in 2003 • 15.4W at the PSE, with min of 12.95W available to the PD
F. IEEE 802.3at PoE+ • Ratified in 2009 • 34.2W at the PSE, with min of 25.5W available to the PD
G. Pending (higher power) PoE standards Projected to be Ratified by IEEE in 2017 powering all 4 pairs:
   1. Proposed IEEE 802.3bt PoE Type 3 • 60W at PSE • with 49 watts at the PD
   2. Proposed IEEE 802.3bt PoE Type 4 • 100W at PSE • with 96 watts at the PD

1.07 CONTRACTOR–ALL
A. Each contractor shall be responsible for inspecting their own work and ensuring it meets the project requirements.
B. Contractor shall have a project manager who will be responsible for all work, workers, equipment, cabling and project management for their work. The project manager shall have the authority to make decisions for the contractor and schedule all workers.
C. Contractor shall attend all project meetings throughout the project.
D. All work on the project shall meet all applicable state, federal, local and industry codes and be installed according to the requirements of the Authority Having Jurisdiction (AHJ).

1.08 CONTRACTOR – SECURITY
A. The Contractor shall show proof of an existing contractual relationship with the approved equipment manufacturer of the video security system and access control system and shall pass through the manufacturer’s certification to purchaser.
B. All hardware shall be sourced from the certifying manufacturer to assure quality control and validity of the manufacturer’s warranty.
C. The Contractor shall accept complete responsibility for the installation, certification, and support of the security system. Contractor must show proof that he has the certifying manufacturer’s support on all of these issues.
D. All work shall be performed and supervised by security technicians and project managers who are qualified to install security systems, and to perform related tests as required by the manufacturer in accordance with the manufacturer’s methods.
E. The security technicians employed shall be fully trained and qualified by the manufacturer on the installation and testing of the equipment to be installed. Evidence that the vendor is a current certified installer of the manufacturer must be provided in writing prior to work commencing on the video security system.
F. The Contractor (including Subcontractor(s) if any) shall have a proven track record in security projects. This must be shown by the inclusion of details of at least 3 projects similar in scope and requirements which have been completed by the vendor in the last 2 years. Names, addresses, and phone numbers of references for the 3 projects shall be included.

PART 2 - PRODUCTS

2.01 FIRESTOPPING

A. Each contractor shall be responsible for firestopping around their cables and the raceways.
B. Shall be completed inside and around all conduits after cable installation.
C. Firestop for the area between the cable and the edge of the conduit shall be Nelson No. FSP, CLK or LBS+. Contractor shall install the best firestop for each individual installation.
   1. Firestop shall be installed with regard to local and national building codes.
   2. The firestop shall be a putty like substance that expands under heat and will not allow flame to pass for a designated period of time.
   3. Firestop shall conform to all NEC, NFPA, and UL requirements.
   4. Some wall pass-thru’s are shown on the drawings. The Contractor shall utilize these where possible.
   5. Where the contractor must install cables through a wall where there is no pass-thru already provided, the Contractor shall be responsible for installing a fire-rated pass-thru and fire-stopping the conduit after cable installation.
D. Firestopping is required at all riser conduits and all pass thru’s.
   1. Each cable tray penetration of a wall shall be firestopped after cable installation. Use pillow type firestop to allow additional cables to be installed in the future.
   2. Where riser conduits pass through floors, the area between the concrete and the conduit shall be firestopped. This shall be completed with a putty or liquid firestop product. Fill in the space with mineral wool, and then install the firestop on top. All firestop shall be of sufficient thickness to secure the rating required by code.
   3. After final cable installation, install a putty firestop around all cables where they enter and exit conduit pass thru’s and conduit risers.
   4. All firestop shall be installed to provide the fire rating as described by local fire code.
   5. It shall be the responsibility of the Contractor to verify that all conduits, walls, and raceways required to be firestopped have been firestopped.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Contractor shall be familiar with the location(s) where the work will be done. No additional compensation will be made for items the Contractor claims he was not aware of during bidding.
B. Work Area:
   1. All work areas shall be cleaned at the end of each day. All debris shall be cleaned and removed from the site and disposed of in the approved container for the site.
   2. All equipment shall be moved out of common areas and stored in the Contractor’s lay down area, or in other approved storage locations on site.
   3. Any work that is low hanging, or may otherwise impede the general use of the space, and cannot be removed, shall be flagged and cordoned off by the Contractor.
C. All equipment and parts shall be installed in a neat and workmanlike manner. Good installation principles shall be used throughout the project.
D. All cables routed above the drop ceiling or in the ceiling area shall be installed square to the building. Diagonal cable runs are not permissible.
E. All cut edges of conduits, boxes, raceway, etc., shall be trimmed and filed so that no burrs or rough edges will damage cable as it is installed.
F. All surface raceways, including conduits in exposed areas shall be painted to match the existing colors of the surrounding area.

G. If, in the course of the work, the Contractor damages, marks, or misplaces any ceiling tiles, the Contractor shall repair, and/or replace the ceiling tile to the original condition.
   1. The Engineer shall decide if ceiling tiles have been damaged. Based on the Contractors proposed fixes, the Engineer shall decide the best course of action to repair any damage done by the Contractor to the ceiling tiles.

H. It shall be the responsibility of the Contractor to repair any damage done to the structure or finishes in the building by the Contractor. The building shall be returned to its original condition prior to final sign off of the project.

I. Firestop shall be installed to meet national and local codes.

3.02 DOCUMENTS
   A. The Contractor shall fully read the contract documents including the detailed specifications, and the detailed drawings.
   B. No additional compensation shall be made for any portion of the project which the Contractor did not know of or understand prior to providing the bid response.
   C. In the case of any discrepancies between the detailed drawings and the detailed specifications, the Contractor shall provide the higher quality or more stringent requirement.

3.03 WORK PLAN-POST BID (CHOSEN CONTRACTOR ONLY)
   A. Along with the submittals the Contractor shall provide a work plan for the implementation of the telephone switch and data/wireless network. The plan shall include scheduled dates for major milestones, and all phases required for completion prior to final cutover.
   B. The work plan shall list all items that must be completed by the Contractor or Owner to provide a smooth install of the telephone system and data network. The Contractor shall be responsible for all costs associated with the planning and cutover. The Owners only responsibility is to act as a liaison between the Contractor and the users.
   C. The work plans shall include a time line and a cutover date for the systems within each building. Contractor shall be responsible for all aspects of scheduling the work, including notification of the users, the administration, and the telephone service provider.
   D. The work shall commence within 10 days of award of the contract. The Contractor shall be responsible for attending weekly project meetings at the Owner’s site to report on progress and keep the project team informed of the work being done.
   E. The work plan will be reviewed at each weekly meeting for compliance and updates.
   F. Work shall immediately begin on site surveys to determine the existing infrastructure and determining placement of new system electronics. The Contractor shall be responsible for moving, relocating, and reconnecting any and all existing equipment required for the installation of the new systems.
   G. After work plan and system approval by the Engineer the Contractor can begin work on infrastructure work that does not impede users.
   H. The Contractor shall be responsible for working with the Owner's Information Technology staff and administrators.

END OF SECTION 28 1000
SECTION 28 3500 – ACCESS CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES
A. This section includes parts and equipment required for installation and termination of a building-wide Access Control and intrusion detection system. This system shall be referred to as the “security system” throughout these specifications.

1.02 SYSTEM DESCRIPTION
A. The security system shall be supplied and installed by a Contractor able to show examples of similar projects and installations within the last 3 years.
B. The security system shall serve the building but shall be able to be expanded to serve additional buildings in the future.
C. The Security System shall provide a solution for access control. This shall be through a central server with PC attached workstations for monitoring and control. Shall include:
   1. Access Control
   2. Badging and user database/Photo imaging
   3. Video and Audio intercoms
D. Contractor shall provide all software required for connection of the security system to the in-house data network and associated control PC’s.
E. The security system client-server architecture shall communicate with native TCP/IP over an existing Ethernet TCP/IP enterprise network.

1.03 COORDINATION
A. All cables shall be coordinated with the existing doors and new door hardware being installed as part of this project.
B. Access Control/Intrusion detection cable shall be a unique color from the Telecommunications cable, fire alarm cable and lighting control cable. Coordinate this with the Electrical Contractor prior to ordering the equipment and installation of the cables.

1.04 PROJECT PLAN
A. The contractor shall provide a project plan to the owner and contractor that describes the system and its capabilities and the possible configurations.
B. Provide a project approach which describes the installation and implementation plan and schedule and all sequencing.
C. Meet with the owner numerous times to determine how the system should work and how it should be monitored. Configure the system prior to installation to meet these requirements. Demonstrate the system use to the owner prior to installation and obtain approval to move forward with the installation.
D. Contractor shall conduct numerous site reviews to establish pathways and routes for all raceways required.
E. Contractor shall install all raceways required for connection of the security system.
F. Generate a testing plan and have that plan approved by the owner and engineer prior to installing the system.
G. The system shall be installed and tested prior to cutting over any doors to the system. Provide and install temporary card readers, door contacts etc to the system for testing. Demonstrate that this works prior to cutover.

1.05 RELATED STANDARDS
A. The security system shall conform to the following international and national standards:
1. FCC Rules and Regulations
2. UL 294 Access Control Systems
3. UL 1076 Line Supervision
4. 21 CFR part 11
5. Part 15, Radio Frequency Devices
7. Applicable Federal, State and Local laws, regulations, codes
8. Americans with Disabilities Act (ADA).

PART 2 - PRODUCTS

2.01 MANUFACTURERS
   A. Approved vendors for security cables are:
      1. General Cable.
      2. Belden.
      3. West Penn Wire and Cable.
      4. Equivalent manufacturers.
   B. Approved vendor for access control/intrusion detection equipment is:
      1. Avigilon
      2. The district currently utilizes Avigilon as the
      3. Other manufacturers as approved PRIOR TO BID. Submit pre-bid RFI requests for
      other products.
         a. Systems submitted as part of the base bid that were not pre-approved in writing
            during bidding will not be reviewed.
   C. As part of the bid the contractor shall explicitly detail the software package that is provided
      and shall provide a document showing all software available from the manufacturer.
      1. The document shall explicitly state which software is provided as part of the bid and
         shall detail other software available but not provided as part of the bid.
      2. We require this to be able to determine the level of software available and will allow us
         to fully review the system as a whole.

2.02 DOOR HARDWARE

Hardware Set for Office Doors to Classroom Corridors:

   1 Magnetic Lock  M680E  SU
   1 Power Supply  - Provided by Security Contractor  OT
   1 Remote Push Button  - Provided by Security Contractor  00

Notes:

   Doors function as they normally do. Magnetic lock by remote push button at reception for Intruder
   Lockdown only. All existing hardware to remain.

2.03 DESCRIPTION OF PROJECT
   A. The access control/intrusion detection system shall be an all-encompassing system that is
      large enough to serve up to 500 employees, collect data and monitor doors and entrances at
      no less than 10 different buildings.
   B. The original installation will be for the building(s) noted on the drawings. The system installed
      shall not preclude the extension of the system to other buildings.
C. The system shall include all equipment, software, cabling, data collection points, raceways, card readers and hardware to monitor and control the specified buildings and provide reports to a security station as required by the owner.

D. If an Intrusion Detection system is specified, then the access control and intrusion detection system shall act as one system. They shall be integrated such that the presentation of a known access card will shunt all intrusion alarms for the door where the card was presented.

E. The system shall keep records of all access control card presentations.

F. The system shall connect to and interoperate with all the door hardware that which is existing and being added as part of this project.

G. The system shall be able to be connected to other buildings via the existing data network. Specify how the system will connect to other buildings as part of your bid response.

H. The Owner shall be able to change and monitor all settings for intrusion and access to all the buildings through the control PC.

2.04 MATERIALS
    A. All security and control cables shall be plenum rated.
        1. Contractor shall provide all appropriate cable from the door security hardware to the security system. All cabling shall be plenum rated.
        2. Some locations require outdoor rated cabling. The contractor shall provide the cabling to match the required area.
        3. There will be requirements for many different types of cabling and the contractor shall provide for each.
        4. Provide a coil of cable at each location for moves and maintenance.

B. The system shall be fully configurable and compartmentalized so that any user can be assigned and they will only see the status of doors at one building.
    1. Based on a user’s login, the system shall be configurable to restrict persons from seeing or controlling doors and lock schedules at building that they do not have permission to see or control.

2.05 SECURITY SYSTEM SERVER
    A. Management Server:
        1. Contractor shall supply a new server which will be located in the data center. The server shall hold all records and database information. The server shall be equipped with dual hard drives that are fully mirrored and shall work in hot/failover mode so that losing one would not impact the use of the security system. The PC/server shall be shipped new in the manufacturer’s box.
        2. Server shall be located in the data center and shall be a control point for the security system.
            a. The server shall allow no less than 10 separate other operator workstations to login to control/configure the security system.
            b. Access shall be via client software or via a web interface. The contractor shall install software and configure no less than 10 of the owner’s PC’s to act as remote control stations.
            c. Provide software licenses for no less than 10 complete operator workstations.
        3. Server shall have the following components at a minimum:
            a. Quad core processor with minimum of 3.1 Ghz or equal.
            b. Operating system compatible with security/access system.
            c. Dual, mirrored 250 Gigabit hard drives.
            d. Read/Write CD-ROM.
            e. 4 Gig RAM memory (Expandable)
            f. Dual on board 10/100/1000 Ethernet cards.
            g. Audio card with speakers.
            h. Minimum of a 19-inch LCD monitor. -Rack Mounted. Provide rack mount
            i. keyboard/monitor/mouse shelf
            j. Backup software.
k. Dual Power Supplies

4. Servers shall be capable of handling all software to manage and configure the security system.

5. Contractor shall connect the Server to the Ethernet in the building.

6. Provide all equipment required to mount the Server in the cabinet/rack

7. Server shall connect to the Network Intelligent controllers via the Ethernet network

2.06 ACCESS CONTROL SYSTEM SOFTWARE

A. The security system shall utilize a commercially available, Open Database Connectivity-compliant (ODBC) SQL open architecture relational database.

1. The software shall allow flexibility in design allowing the integration into other data structures.

2. This database shall handle the storage and retrieval of all card holder records information, images, system maps, reports, and screen designs.

3. The database shall operate in a truly multitasking environment without degradation of system operation and be of a design that will handle the transaction loading placed on the system.

4. The relational database shall support online backup, stored procedures with control logic, and server-based referential integrity.

5. Contractor shall install a Windows or windows like control system able to control and view all aspects of the security/access system.

a. This software shall be part of the system provided by the contractor.

6. Contractor shall provide any SQL database software required to make the system work.

B. System shall be an access control system with alarm monitoring and reporting and shall have three primary components:

1. The Security systems primary requirement is to provide access control. The system shall be able to make access granted or denied decisions, define access privileges, and to set schedules and holiday groups.

a. Through the use of application programming these inputs and outputs shall be capable of being linked at all field controllers for purposes of implementing system-wide control strategies.

b. The system shall provide for features such as:

   1) Remote login via internet

   2) “Double-tap” of a card to a card reader for timed unlocking of owner specified doors. This can be accomplished via the existing card reader at a door or a second card reader and special card. The idea is that a user can use a card to unlock a door or lock a door for an extended period of time without using the software through a PC.

c. Smartphone Application

   1) The system shall include a smartphone app for no less than 10 users that will allow remote locking and unlocking of a door or specific set of doors. Provide this software and apply onto the owners specified smartphones.

d. The access control system shall control operations at all controlled and monitored doors. The system shall be available to lock, unlock, alarm, disarm totally or temporarily. Silence alarms or pulse control points or groups of points as a standard feature.

e. Shall provide for a mapping function where the owner can view a map of the building and will be able to see door status based on different colors for the door icon.

   1) The doors shall also be able to be shown and “clicked” on to allow the user to see door status and lock or unlock a door or pulse the lock on a door for temporary unlocking.
2) A color graphic application shall allow a user to create or import customized color graphic maps of their facility and to attach alarm icons to those maps.

2. Card Holder Management and Enrollment
   a. Review card holder information through a quick search and display of images in the database.
   b. The security system shall include an employee management system integrated with the access control system.
   c. This employee management functionality shall allow the enrollment of card holders into the database, capturing of images, and import/export employee data.
      1) This functionality shall also allow the user to assign or modify access privileges of a card holder.
   d. The security system shall include a state-of-the-art credential creation and production system integrated with the card holder management system.
      1) This shall allow the creation of different badge types based on database fields and the use of security colors to allow security officers to quickly identify personnel access authority by the badge design.

C. The security system software and hardware shall provide a dynamic security environment and shall provide easy configuration and storage of cardholder records, access records, alarm records etc. All of these functions shall be viewable and controllable from the Server or attached PC’s that are provide correct Access to the system.
   1. At a minimum the system shall provide for the capability of the following:
      a. 5,000 cardholder records.
      b. 250 card readers.
      c. 10,000 alarm input points.
      d. 10,000 output relays.
      e. 20 client control workstations that are attached to the IP network.
      f. Interface with no less than 500 intelligent controllers.
      g. 100 time intervals.
      h. 50 different alarm priorities.
      i. Automatic seasonal time changes.
      j. Configurable automatic time controlled reports on status, security, and access.
      k. Configurable backup of information.
      l. Proximity card information generation and record keeping.
      m. Automatic system wide proximity card activation and deactivation.
      n. Upload and download ability from outside programs for large data input and output.
      o. Ability to make a telephone call, send e-mail and/or text notifications to selected users when security is breached. Security breech shall have different levels based on configured levels of security. Shall be owner configurable.
      p. Provide the dialer and software associated.
      q. Provide software levels of access for management, administrators and card makers.
      r. Provide up to 25 user defined fields for cardholder data.
   2. Software shall collect and store real time and statistical information on security access and other transactions.
      a. Data file shall store the last 500,000 transactions.
      b. All files shall be stored on hard disk and shall be able to be copied and stored on tape or other hard drive storage device.
      c. Contractor shall configure backup to the owner’s storage device.
         1) Provide any software required to backup the data on the server.
   3. The software shall be capable of generating the following reports with filters available for time, doors, buildings, and all other events.
      a. Cardholder access times and points.
b. Cardholder denials of access.
c. Muster or Who Is In report for those people who presented a card to enter the building.
d. Administrator audit trail reporting upon request.
e. Alarm History Log
f. Door Status Report
g. Alarm Point Status Report
h. Controller Status Report
i. Event History Log
j. Disabled Personnel Report
k. Personnel by Department Report
l. Personnel by Area Privileges Report
m. Lost Card Report
n. Input/Output Status Report
o. Schedules Report
p. Company Listing Report
q. Termination Report
r. Deadbeat Report
s. All Doors Report
t. All Events Sorted by Door
u. All Events Sorted by Person
v. Printing of all reports via direct e-mails or hard copy.

4. The software shall contain a report generator, featuring word processing tools for the creation of custom reports. These custom reports shall be able to be set up to automatically run or be generated on demand.

5. System shall integrate with the following systems:
   a. Fire Alarm system. Lock or unlock doors on integration of the fire alarm.
   b. Paging system. Send a contact closure to the paging system during a lockdown or secure status.
   c. Internet based remote diagnostic systems that allow a central station or offsite technician to configure and review the configuration of the system.
   d. The system shall be able to be monitored and fixed/repaired/changed through a remote client by the owner or by a third-party contractor who is given rights and permissions to make changes.
   e. This shall support remote technical assistance center to analyze and perform any system diagnostic function using a modem and PC anywhere or direct connection via the Internet.

D. Locking and unlocking schedules. The system shall allow the owner to set locking and unlocking schedules to set the status of doors. This shall allow separate schedules for any of the buildings.
   1. Each building shall be able to have multiple schedules each day for locking and unlocking all doors.
   2. Override Groups Containing I/O’s:
      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 on the software or a specific prox card being shown to a specific card reader
      b. Icon on the system shall change automatically to show the live summary status of points in that group.
      c. Override group icon/card/card reader shall provide a method to manually control or lock/unlock a group of doors. See above regarding “Double-Tap” functionality.
   3. ScheduleOverrides 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.

E. The system will be monitored and controlled at a client PC 24 hours a day. The system shall allow complete control and monitoring through the client PC. This shall be a Windows like interface that provides lists, maps, groups, control and other input/output abilities to allow the security personnel to fully control and monitor the security system.

1. The system shall allow monitoring and control of all system and all input/output points connected to the system via color graphic maps. Control points are defined as any door contact or any other relay output or input point. The contractor shall generate and populate these maps for the entire system.
   a. The maps shall be populated with distinct door icons. The icons shall be able to show the door number.
   b. The map icons shall reflect the actual door status at any certain time. Each door shall show Green for closed, Red for open. This shall be based on the door contact position open/closed.

2. The System Administrator shall have the option to group these outputs to simplify common output command procedures.
   a. The system shall allow a one touch button to lock all controlled doors or unlock all doors based on a single input button.
   b. The contractor shall configure a LOCKDOWN icon on the plan that will trigger all doors to close. There shall also be a NORMAL icon that when clicked will set the entire system back onto a normal schedule.
   c. Clicking the LOCKDOWN or NORMAL button shall only affect the school that the person is viewing at that time. The system shall segment the controls based on school/site.

3. All system outputs shall be displayed upon command in a list window or graphic map. The list and commands shall be operational without interfering with alarm monitoring operations. If an output is ordered to a setting, and is also on time zone control, the last command shall always override.

4. All manual control commands shall record into the activity log for viewing by any user given proper privileges to do so.

5. Manual control for doors, or any relay output, shall allow the user to disable the door/output (to not accept any cards), unlock the door/output (leaving the door strike unlocked), pulse the door/output open, or reset the door/output to a pre-defined default setting.
   a. This capability shall be able to be accessed and controlled through the mapping function by clicking on the door. The click shall control the door directly or bring up a window or list where the door can be fully controlled.

6. The user shall have the ability to determine the current status (armed or disarmed) as well as the current state (alarm/normal/fault) of an input point from an input list view or map at any time.

7. The user shall have a “Status” item in the list view. Both the current status and state shall be reflected by the color of the respective columns in the list view.

8. Arm-Disarm shall be accomplished by a user through a simple click of the mouse on the individual point.

9. All input points shall be grouped for ease of operation into arm-disarm groups as requested by the owner.

10. If an alarm is noted, then the controller shall have the ability to
   a. Acknowledged
   b. Returned to normal
   c. Acknowledge and or returned to normal
   d. Acknowledged after returned to normal
11. The system shall be configurable to call-up any and all cardholder information based on cards being presented at chosen card readers.

12. The user shall have the ability to Soft Acknowledge (i.e., Silence, or Acknowledge the alarm. Each of these actions shall be logged and date/time stamped.

13. The system shall provide full user activity tracking of who accesses the administrative and monitoring functions of the system.
   a. The activity log shall be comprehensive, recording the date and time of the activity, the workstation where the activity was performed, and the user that performed the activity.
   b. The system shall record changes to the database made by any user. Users shall be prompted to enter a user name, password, and explanatory text before any change or command is made to the system. This function shall be able to be disabled by the head administrator.

14. The system shall allow the owner to configure the viewing of the system based on building. In example, the people at one school shall be able to fully control their schools independently of the doors at another school.
   a. The viewing of the system shall be controlled by user login.
   b. There shall be super users who can login to the system and view and control on a global basis.

F. Cardholder enrollment and photo badging:
1. Photo badging shall be an integral part of the system. It shall provide for Access Control cards and ID cards without access control.

2. The security system shall incorporate into a single, integrated system the latest in imaging technology and identification management.

3. The system shall include the ability to have no less than 10,000 cardholder records, and monitor badge/credential use throughout the facility. These credentials shall be based on data and images that are input and captured at the time of enrollment and fabricated at any of the photo imaging/badging workstations.

4. Credential images are to be digitized using industry standard JPEG image compression, and printed using a dye-sublimation/resin thermal transfer printing process that is high quality and environmentally safe.

5. The user shall be able to create personnel records either through the use of templates or direct input into the personnel record. Each personnel record shall allow for easy navigation through the fields. The user shall have the ability from the personnel record to easily:
   a. Enable or disable the cards.
   b. Define expiration date.
   c. Define the acceptable card type.
   d. Define the card number, site code and PIN.
   e. Mark the card as lost.
   f. Issue temporary or restore permanent card.
   g. Display the employee photo image and/or signature.
   h. Have the ability create or edit the image.
   i. Create, edit, or delete the card holder’s access privileges and additional personnel attributes.

6. The selection of card type shall be chosen from a drop-down list that shall include Wiegand formats, and custom Wiegand format to allow use of smart cards.

7. The user shall be able to mark the card as lost by selecting that control button. This shall disable the card and create a stored record with the associated card number and card holder.

8. In the event an attempted use of a cancelled or terminated card occurs, an invalid card event shall be logged and an associated alarm shall be generated to an operator workstation.

9. The owner shall be able to fully assign access levels and privileges to a card at the time of inception.
a. The owner shall be able to define default templates for given personnel types. If a user has proper authorization, access privileges can be overwritten.

b. When an individual's access privileges are modified, that change shall automatically be propagated to all required controllers immediately upon completion of the change.

c. Using personnel record configuration templates, the owner shall be capable of attaching previously defined privileges attached to the templates to new personnel requiring similar privileges.

d. It shall be possible for the System Administrator to individually access the newly created personnel record to modify the privileges in the event the person does not exactly comply with the template.

G. Elevator Controls

1. The system shall integrate with new elevators and the elevator control systems. It shall provide elevator control software that will permit the restriction of card holder access to floors while also allowing general access to other floors.

   a. The elevator control software shall allow the use of any card reader and all reader modes used on any other reader in the system. The reader mode shall be schedule controlled to allow visitor access during business hours, and create higher security levels after business hours.

   b. An elevator card reader shall may be located in the elevator cab or outside the elevator door on each floor.

      1) Where the card reader is in the cab. The card reader shall be integrated to the elevator control panel. Provide all cabling required for connection of the card reader through the traveling cable and back to the security controller panel.

   c. The system shall be capable of monitoring all floor buttons. After the passenger swipes a card, they shall be required to press the desired floor button. The system shall then validate this card holder as having privileges to travel to the floor, or not.

   d. Upon a successful validation of the card the elevator controller shall illuminate the floor button and energize the relay to enable the elevator cab to travel to that floor. If the card holder is not valid or does not have access to the floor selected, the system shall not illuminate the floor button nor energize any relay.

   e. The system shall be able to generate reports that date/time stamp these access transactions. Each personnel record shall provide an easy to use form to specify to which floors a person has access.

2.07 BADGING HARDWARE

A. Contractor shall provide a card holder enrollment PC, Camera and Printer.

1. The enrollment/photo badging station shall be a separate PC provided by the contractor that connects to a camera and badge printer which are all to be provided and configured as part of the contract.

2. Each photo badging station shall include all equipment required to capture a high-quality portrait image, with flash lighting and a high quality digital video camera.

   a. The photo imaging workstation shall allow the camera user to view a live video image of the subject on the screen. The user shall view the subject in an upright position as they are captured.

3. While capturing subjects, the user shall have the option of capturing a new image of any subject without affecting the subject's record.

   a. The photo imaging workstation shall provide a digitizer color control window in order to adjust the contrast and brightness of images. For convenience, default settings shall be provided.

4. The badging station shall include the ability, upon command, to preview, online and in full color, the badge as it will appear when printed.
5. The badge format, including background color, layout, location of photo image, applicable graphics or company logos, text, etc., shall be completely and automatically determined by the system based on employee record information.
   a. Where choices are available to the user, choices are to be made via pre-defined list boxes to avoid user errors in spelling and badge assignment errors.
6. The owner shall be able to choose multiple badge formats and layouts.
   a. The contractor shall create all chosen badge layouts as part of the contract.
7. The Color Credential/Badge Printer shall be
   a. High-density dye-sublimation type printer offering, a minimum of 300 dots per inch resolution with a clear overlay option for high durability.
   b. The credential media used shall be compatible with the credential printer.
   c. The credential printer shall be able to print one-sided or two-sided credentials in credit card sizes and in portrait or landscape orientations.
   d. Badge shall be able to print barcodes on either side of the card.
   e. The user shall be able to print the badge as soon as it is created or to send the badge to a print queue for later batch printing. Within the print queue the user may print all badges, print a selected badge, and delete a selected badge or preview without printing.
   f. Printer shall be Evolis # Primacy or equal.
8. Camera for taking image shall be provided by the Contractor
   a. Provide a webcam type camera and tripod for taking pictures of users
   b. Camera shall be compatible with Windows and MAC operating systems.
   c. Shall connect to a PC through USB cable that is provided
   d. Minimum of 720p resolution. 1280x720 pixels
   e. Low light correction
   f. Mounting on a third-party tripod.
   g. Tripod shall support camera and shall mount at head height when mounted on a tabletop.
9. Enrollment Laptop shall meet the following specifications:
   a. Quad Core 3.1 MHz
   b. 64 Bit
   c. 8 Gig RAM
   d. 250 Gig Hard drive 7200 RPM SATA
   e. Windows 10
   f. HDMI output video card
   g. USB connectivity
   h. 13” screen and associated cables.

2.08 NETWORKED INTELLIGENT CONTROLLER (SECURITY PANEL)
A. The existing system is a Lenel OnGuard system.
   1. Contractor shall re-use existing panels or replace panels with new ones based on the software proposed.
   2. Identify the existing panel types and replace if necessary
   3. Add panels where required to connect new devices.
B. The Contractor shall provide intelligent controller panels and cards for the security system that utilize a true distributed processing technology with local processing at each controller.
C. In the event system communications is lost or the file server fails, all networked intelligent controller, (controllers or security panels, terms will be used interchangeably) shall provide complete control, operation, and supervision of all monitoring and control points based on the latest database information.
D. The controller shall be configured to avoid system failure. In the event of a server or system failure, transactions are to be stored at the controller until the server and connection is back online. Once it is online then the information shall be downloaded to the server.
1. The controller shall be utilized as the “brains” of the security and access system. All door contacts, card readers, request to exit contacts, assisted openers, door controllers, electric latch devices and other devices shall connect to the controller.  
   a. Controllers shall be microprocessor-based, multi-tasking, multi-user, and use real-time, digital control processors.  
   b. Each control panel shall consist of modular hardware including power supply, CPU board, and various input/output modules.  
   c. Memory at the controller shall be large enough to store 10,000 card holder information points.  
   d. Controllers shall be able to be updated via remote connectivity or direct connectivity. Updates shall be for new firmware or software updates.

2. Controller shall be fully configurable by the Owner via a Microsoft Windows type interface through the operator workstation or through offsite connectivity through the IP network.

3. Controller shall connect to the fire alarm system. In an alarm condition, the controller shall unlock doors as required to allow people to enter and exit the building. The Contractor shall provide all cabling, software and hardware required to interface with the fire alarm system as well as the video security system.

4. Controllers shall mount in cabinets on the wall of the communications room.  
   a. Extend power to the panels from existing power outlets. All power to the panels shall be hardwired. Contractor shall make all final power connections. Provide all raceway required.  
   b. Contractor shall be responsible for power from the local receptacle to the panels.

5. Provide the quantity of controllers required for all security and access points in the building.  
   a. Each controller shall have onboard LED’s for self-diagnosis.

6. Input/Output boards for all access and security points shall pop in and pop out. Replacing a board for a certain point shall not require shutting the entire controller down.

7. Each controller shall support IP communications. Additional communications shall be via RS-232 and or RS-485.  
   a. RS-232 and RS-485 shall only be used to connect panels in a comm room. Not between comm rooms.

8. Controller shall provide 32-bit processing and shall meet UL 294 requirements.

9. Real-time on board clock synchronized with Server.

10. Power Supply on-board or remote shall be provided for each controller or cabinet.

11. Cabinet shall be fully enclosed and shall mount on the wall of the communications room.  
   a. Shall be equipped with a lock and key.

12. Where the door hardware installer provides a door interface or door controller card that works with the electric latch/strike and request to exit button, the communications contractor shall provide the correct interface to read data and send data to the door controller.

13. The link to other systems shall take place at the controller as well as through the I/O system so that in the event of failure or an alarm, the rest of the system shall continue to function correctly.

14. Battery Backup  
   a. The controller shall have battery backup UPS circuit with built-in battery charger shall provide automatic battery backup UPS power in event of AC line failure.  
   b. Each controller panel shall have a battery for power failure. Battery shall be fully enclosed in a metal cabinet.  
   c. The battery shall provide for full UPS operation for a minimum of 30 minutes.

E. I/O Cards/Modules shall be installed in the Controllers to allow input and output to the field devices throughout the building.
1. Modules shall be installed to connect to the all field devices, including but not limited to:
   a. Card Reader/ Card reader with Keypad
   b. Door contacts,
   c. Request to exit devices,
   d. Push buttons/Panic buttons
   e. Security cameras,
   f. Assisted door opener devices and door opener buttons
   g. Motion sensors.
   h. Lockdown buttons with Lockdown Status Light
   i. Other field devices noted
   j. All other security devices required and shown on the drawings.

2. Modules shall translate information from the field devices to the controller and thus the server for records and access control.

3. The Access Control Module shall provide the interface for one to four card reader/keypad-controlled doors. Each access controller shall include card reader input(s), and various other inputs such as door contact, request to exit, momentary open button, door opener etc.

4. The maximum time for door opening from the proper presentation of a card shall be less than one second.

5. I/O Card shall be provided that serve access control devices such as door contacts and garage contacts. These cards shall provide alarms when the contact is “open”. The time before alarm shall be fully configurable by the owner.

6. The card reader inputs shall accept both standard and “Smart Card” information.

7. Output types shall be digital for control of doors. In addition to the door output, the control module shall contain auxiliary outputs for ON/OFF control of other devices.

8. Intrusion detection and digital control modules shall provide inputs and outputs to monitor and control non-reader-based system points, such as door contacts, motion sensors, gate actuators, etc.

F. Extra Cabinet for Controller:
   1. Provide extra cabinets for extra cards/modules as required for specified control points.
   2. Provide growth capabilities for installation of additional cabinets and control points.

G. ADA assisted Openers
   1. At some doors, there are assisted openers. At these doors, the access control system shall completely work with the opener. Include equipment and programming to allow the doors to function as per below:
      a. When approaching from the exterior and doors are locked:
         1) Present a card and then door shall be unlocked. Push the auto opener and the door shall open.
      b. When approaching from the exterior and doors are unlocked:
         1) Push the auto opener button and the door opens.
      c. When approaching from the interior and doors are locked:
         1) Push the auto opener button and the door shall unlock and open.
      d. When approaching from the interior and doors are unlocked:
         1) Push the button and the door opens.

H. Power Supplies for security system.
   1. Provide power supplies to power the security panels, Electric Strikes, Electric Locks, Latch Retraction bolts, Magnetic Locks and other security devices that are connected to the access control Power supplies shall be in the comm room
   2. Power Supplies shall be able to support 12 volt or 24-volt devices.
      a. Mount these in the communications room next to security panels.
      b. Install cables from the power supply to the door hardware.
   3. Coordinate power supplies with the door hardware supplier.
   4. All power supplies shall be connected to 120VAC power with a hardwired connection. Install cable and connect to power.
   5. The power supplies shall match the security device to which they are connecting.
6. Size the power supplies to lock or unlock all the doors at once based on scheduled unlocking.
7. Install cabling from the power supply to the door lock based on the table below.

<table>
<thead>
<tr>
<th>Distance from lock to Power Supply</th>
<th>Wire Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>200'</td>
<td>18 AWG</td>
</tr>
<tr>
<td>320'</td>
<td>16 AWG</td>
</tr>
<tr>
<td>500'</td>
<td>14 AWG</td>
</tr>
<tr>
<td>800'</td>
<td>12 AWG</td>
</tr>
</tbody>
</table>

2.09 FIELD DEVICES
A. Proximity Cards/Keyring Fobs:
1. Contractor shall provide 100 proximity cards that work with the security/access system installed in the building.
   a. The owner wishes to use their existing ID cards for the new system.
   b. Existing cards are HID 05556 11101234591-1A
   c. New cards shall meet the existing standard
2. Proximity cards shall be industry standard size and compatible.
3. Proximity cards shall have a hole for connection to a lanyard.
4. When a card is being supplied, the Contractor shall work with the Owner on designing the information that will be printed onto the cards since they will also be used for identification. The card shall be able to be printed on and shall be able to contain a picture of the person it is issued to as well as their name, other information that may be required and a barcode that is compatible with standard bar-code reading systems.
5. The Contractor shall print, label, mark and otherwise make ready all the access cards that they provide as part of the system.
6. Cards shall be able to be printed by the new printers the contractor provides. Provide new ink cartridges after all badges are printed
7. Contractor shall take the picture of each employee and shall enter the data into the system for each person including their card number, picture, personal information and access level.

B. Card Readers: “CR” on drawings
1. Refer to the drawings for locations where card readers “CR” are required.
2. Card readers shall be combo readers that read standard 125 kHz readers for standard prox and 13.56 MHz “smart” cards.
3. Card readers shall be completely compatible with the security/access system.
4. Card readers shall be mountable in a single gang box or in the frame of a door. Refer to drawings for locations.
5. Readers shall be sealed to allow outdoor installation.
6. Power requirements for the card shall be between 5-16 volts DC.
7. Reader must be capable of providing a read range up to 4" without modification.
8. Reader shall operate in a temperature range of minus 22 degrees (-22°) to one hundred fifty-one (151°) degrees Fahrenheit.
9. Reader shall be designed for both surface mounting and mounting on a single-gang electrical box.
10. Reader shall have a tri-color light emitting diode (LED. and audible tone for noting of accepted read or rejected card read.
11. Reader shall flash the LED green momentarily and emit a short beep to indicate that a card was read.
12. Card readers on single-gang boxes shall be HID MultiClass SE #RP40 or equal.
13. Card readers on the frame of a door shall be HID MultiClass SE #RP15 or equal.
14. Card readers on the intercom shall be HID MultiClass SE #RP10 or equal.

C. Door Contacts; “DC” on drawings
1. Contractor shall install magnetic door contacts in the top of each door required to be monitored. See drawings for door contact “DC” locations.
2. Install industry standard magnetic door contacts into the top of the door and the matching contact into the header of the door.
3. Contacts shall be compatible with the security/access system provided. Each contact point shall be defined in the software and shall be given an alphanumeric designation.
4. Contacts shall connect back to the controller via wire installed by the Contractor.
5. In locations where there are double doors, two contacts shall be installed and the connections shall be made so that the opening of each door is detected.
6. When the contact is installed in the recessed part of a metal doorframe, an appropriate, solidly attached metal support shall be used. The tolerance “gap” shall be adjusted to the frame and the door.
7. Wire door contacts back directly to an I/O card in the controller panel. DC’s shall not be wired through Request to Exit devices.
8. Door contacts shall be 1” diameter.
9. Door Contacts shall be GRI 184/12 or equal

D. Electric Strike. “ES” on drawings
1. The door hardware contractor shall install the Electric Strikes.
2. The contractor shall wire from the ES to the security panel. Provide cabling to control the ES and power the ES.
3. Provide power supply in the comm room to power the ES.

E. Security Contacts/Contact Closures: “SC”
1. Contractor shall provide an interface in the controller for connections to dry contact closures of other systems.
2. Dry contact shall cause an alarm on open or closed state depending on Owner required configuration of the controller.
3. Contractor shall provide all cabling and configuration required interfacing the security/access system with all security contacts.
4. Contacts shall be provided as per the drawings and shall interface with the other systems as shown.

F. Assisted Opener “AO” on drawings
1. The contractor shall wire to the assisted door openers where shown on the drawings.
2. The wiring shall allow integration of the working of the door locks, card readers and the push to open buttons. The push to open buttons shall be installed by others.
3. The work shall include wiring and integration at the doors and at the controller panel to allow the Assisted Openers to work as required by the owner. See specs and drawings for additional information.

G. Assisted Opener Buttons. “AB” on drawings
1. Assisted opener button is provided by others.
2. Wire from the “AB” device to the Assisted openers for triggering of the door to open
3. Wire from the “AB” devices inside the vestibule and inside the building to unlock the door and then trigger the door when exiting the building.
4. Provide all cabling to connect the AB devices to the AO device.
5. Configure the security system to unlock doors as people exit the building and push the opener buttons to exit.

H. Release Button “RB” on drawings
1. Release Button shall be a button to push prior to entering a door.
2. This button shall be attached to the security panel and through discussion with the owner, determine and configure what this button shall trigger.
3. Wire from this device to the security system to inform the system to the status of a button
4. Configure so that in a lockdown the door button will be shunted and will not unlock the door.
5. Alarm Controls #TS-9 or equal. Equip with a backbox, Alarm Controls SMB-3 or equal
6. Provide custom lettering on the button that says “PUSH TO ENTER”
2.10 DEVICES AT THE OPERATOR DESK

A. Pushbutton Release: “PB” on drawings
1. The drawings show a “PB” where required. This shall function to facilitate the immediate or direct deactivation of an electro-magnetic lock or electric latch or electric strike or other programmed series of events when depressed.
2. The push button shall allow the temporary deactivation of the supervisory systems of a controlled door to permit access without generating an alarm (authorized access).
3. Push buttons shall be below the desk or as noted by the owner.
4. Wire back to the IO panel in the networked controller.
5. PB shall be Alarm Controls #TS-18 or equal.

B. Lockdown Button; “LD” on drawings
1. The drawings show a “LD” where required. This shall function to facilitate the immediate locking of all electronically controlled doors in the building.
2. The button shall also be able to start the piezo and beacon strobe light for a set duration of time (if system is so equipped). This duration shall be able to be set by the owner.
3. The button shall have a dual purpose. When pressed, the switch shall put the building into a lockdown situation. When pulled (or pushed again) out the building shall revert to its schedule locking status.
4. The lockdown button when switched shall allow multiple outputs such as
   a. Locking/ unlocking of doors
   b. Engaging light on faceplate to note that the system is in lockdown
   c. Engage any beacon strobes or Piezo screamers if shown on floorplans.
   d. Initiate pre-recorded messages via the paging system (if shown on floorplans)
   e. Set levels for access thru card readers. Some users may not be able to use their cards to enter the building during a lockdown.
   f. All this shall be configurable in the security system.
      1) Work with the owner and determine what steps are to occur when the lockdown button is pushed. Configure the system to meet those need.
5. The lockdown button shall be mounted in a standard single-gang backbox and shall be equipped with a cover for safety.
6. Include a status light on the illuminated button
   a. The light shall be a red light that is on only when the system is in lockdown.
   b. When the system is taken out of lockdown the light shall turn off.
7. Faceplate shall be custom screen printed to say "LOCKDOWN"
8. Lockdown Button shall be Safety Technology International #SS2429LD-EN or equal.
   a. Provide all cables required to connect this button and power the light

2.11 INTERCOM –IP BASED AUDIO AND VIDEO
A. Intercom (Audio/Video) at doors; “IC” on drawings
   1. At locations shown on the drawings, the Contractor shall install audio/video (IC) Intercom devices to allow visitors to contact the office to announce themselves and to gain entry into the building.
      a. Connectivity of the components shall be via manufacturer CAT-6 cables to the data network. This shall be from the exterior interfaces, throughout the system and to the Ethernet network inside the building.
      b. Shall connect to standard SIP devices for audio and video connectivity.
      c. Shall interface with standard video security software to allow recording of camera on each intercom.
      d. Power and data shall be via the Ethernet network and CAT-6 cabling.
   2. Audio/video intercoms “IC” at the door shall have the following characteristics:
      a. Device shall have a single, 1-touch, push-button for calling into the interior base station. This shall open a 2-way communications path between devices.
      b. Shall have a color camera inside the intercom that is viewable at the interior base station.
      c. Include the backbox for custom mounting. Provide weather proof equipment outdoors.
   3. Outdoor, Surface mounted audio/video intercom, IP based,
      a. Surface mounted with Stainless Steel panel shall be Aiphone #IX-DVF or equal.
         1) Equip with Surface box, Aiphone #SBX-IDVF
      b. Install backbox at appropriate height and notify electrical contractor to install conduits.
      c. Equip with auxiliary pushbutton at ADA approved height.
         1) Wire to intercom to allow user call initiation from button or actual intercom device.
         2) Pushbutton shall say "Push to Call"
         3) Provide raceway between intercom and pushbutton and backbox for pushbutton if none is provided by electrical contractor
         4) Pushbutton shall be Alarm Controls #SPN-5568 or equal
   B. Base Station (BS) There shall be an audio/video intercom station at the noted offices.
1. The audio/video intercom shall be connected to the IP network and logically attached to all intercoms at the doors.
2. The audio portion of the station shall have a volume control.
3. The video portion of the station shall control camera view.
4. There shall be a door release button that interfaces with the access control system and unlocks the door that is calling.
5. Shall include:
   a. SIP 2.0 Compliant allowing integration with Cisco Unified Call Manager®.
   b. ONVIF® Profile S Compliant
   c. 802.3af PoE, Class 0
   d. 7" TFT LCD touchscreen
   e. Hands-free or push-to-talk communication
   f. 8 customizable speed dial buttons
   g. 2 contact outputs, 4 trigger inputs
   h. 8Ω 1/2 watt speaker output provides better coverage for announcements
   i. 600Ω audio input.
6. The interior audio/video intercom shall be Aiphone #IX-MV7-HB or equal

C. IP Adapter for control of doors
1. Provide an adapter in the comm room near the access control panel to interface between the intercom system and the intercom
2. Provide a 4 contact inputs and 10 relay outputs. Provide quantity required for control of all doors equipped with an intercom (IC)
3. Relay adapter shall be Aiphone #IXW-MA Programmable Relay Adaptor:

D. Cabling for the audio/video interfaces at the doors and other components shall be plenum rated.
1. Provide the type and quantity of cables required for connectivity. Review manufacturer’s requirements and provide adequate cabling.
2. Install a wrap-around cable at each termination point of the interconnection cables. The label shall detail which device the cable connects to.
3. Install cabling to allow the office device to release the lock on the door where the exterior intercom is located.
4. Install cabling and configure the system to support integration between the intercom and the push button that is installed at ADA height.

2.12 RACEWAYS
A. Raceways to support access control devices at existing doors shall be installed. See details for routing and extent of the devices.
1. Install metal backboxes where required for mounting of card readers.
2. Install metal backboxes on doors when transitioning from raceway to the frame of the door.
3. Raceways shall be metal and shall be wiremold V700 or equal for interior doors and devices. Size as required.
4. Raceways shall be metal conduit for exterior doors and devices. Size as required.
5. All raceway shall be mechanically attached to the wall.
6. Paint all interior raceways to match the frame/mullion when the raceway is mounted on the door frame or mullion.
7. Where raceway is required from the door frame to the pushbar, external to the door assembly, the contractor shall provide metal, flexible conduit.
   a. All exposed metal conduit between doors and pushbar assemblies shall be Flexible metal conduit with Sealing Cord Packing. Delikon #AT-FI-004 (interlocked) or equal.
   b. Provide manufacturer approved connectors at each end to anchor the conduit to the pushbar assembly and door frame. Provide custom transitions at the doorframe or at surface raceway where required.

2.13 WIRES AND CABLES
A. The contractor shall be responsible for supplying and installing all cabling to make the system operational.
   1. All cabling shall be Plenum rated
   2. All cabling shall be installed in raceways and in accessible ceiling spaces through cable supports.
   3. Provide manufacturer specified cabling based on use and length of signal transmission from panel to device.
   4. Generate drawings showing the cables required and get those reviewed by the designer prior to installation.

B. PVC-Jacketed, RS-232 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, polypropylene insulation, and individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage; PVC jacket. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
   1. NFPA 70, Type CM.
   2. Flame Resistance: UL 1581 Vertical Tray.

C. Plenum-Type, RS-232 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, plastic insulation, and individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage; plastic jacket. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
   1. NFPA 70, Type CMP.

D. RS-485 communications require 2 twisted pairs, with a distance limitation of 4000 feet (1220 m).

E. PVC-Jacketed, RS-485 Cable: Paired, 2 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, PVC insulation, unshielded, PVC jacket, and NFPA 70, Type CMG.

F. Plenum-Type, RS-485 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and fluorinated-ethylene-propylene jacket.
   1. NFPA 70, Type CMP.

G. Multi-conductor, Readers and Wiegand Keypads Cables: No. 22 AWG, paired and twisted multiple conductors, stranded (7x30) tinned copper conductors, semirigid PVC insulation, overall aluminum foil-polyester tape shield with 100 percent shield coverage, plus tinned copper braid shield with 65 percent shield coverage, and PVC jacket.
   1. NFPA 70, Type CMG.
   2. Flame Resistance: UL 1581 Vertical Tray.
   3. For TIA/EIA-RS-232 applications.

H. Paired Readers and Wiegand Keypads Cables: Paired, 3 pairs, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, polypropylene insulation, individual aluminum foil-polyester tape shielded pairs each with No. 22 AWG, stranded tinned copper drain wire, 100 percent shield coverage, and PVC jacket.
   1. NFPA 70, Type CM.
   2. Flame Resistance: UL 1581 Vertical Tray.

I. Paired Readers and Wiegand Keypads Cable: Paired, 3 pairs, twisted, No. 20 AWG, stranded (7x28) tinned copper conductors, polyethylene (polyolefin) insulation, individual aluminum foil-polyester tape shielded pairs each with No. 22 AWG, stranded (19x34) tinned copper drain wire, 100 percent shield coverage, and PVC jacket.
   1. NFPA 70, Type CM.
   2. Flame Resistance: UL 1581 Vertical Tray.

J. Plenum-Type, Paired, Readers and Wiegand Keypads Cable: Paired, 3 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, plastic insulation, individual aluminum foil-polypropylene tape shielded pairs each with No. 22 AWG, stranded tinned copper drain wire, 100 percent shield coverage, and fluorinated-ethylene-propylene jacket.
   1. NFPA 70, Type CMP.
K. Plenum-Type, Multiconductor, Readers and Keypads Cable: 6 conductors, No. 20 AWG, stranded (7x28) tinned copper conductors, fluorinated-ethylene-propylene insulation, overall aluminum foil-polyester tape shield with 100 percent shield coverage plus tinned copper braid shield with 85 percent shield coverage, and fluorinated-ethylene-propylene jacket.
   1. NFPA 70, Type CMP.

L. Paired Lock Cable: 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.
   1. NFPA 70, Type CMG.
   2. Flame Resistance: UL 1581 Vertical Tray.

M. Plenum-Type, Paired Lock Cable: 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.
   1. NFPA 70, Type CMP.

N. Paired Lock Cable: 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.
   1. NFPA 70, Type CMG.
   2. Flame Resistance: UL 1581 Vertical Tray.

O. Plenum-Type, Paired Lock Cable: 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and plastic jacket.
   1. NFPA 70, Type CMP.

P. Paired Input Cable: 1 pair, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, polypropylene insulation, overall aluminum foil-polyester tape shield with No. 22 AWG, stranded (7x30) tinned copper drain wire, 100 percent shield coverage, and PVC jacket.
   1. NFPA 70, Type CMR.

Q. 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.
   1. NFPA 70, Type CMP.

R. Paired AC Transformer Cable: 1 pair, twisted, No. 18 AWG, stranded (7x26) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.
   1. NFPA 70, Type CMG.

S. Plenum-Type, Paired AC Transformer Cable: 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and plastic jacket.
   1. NFPA 70, Type CMP.

T. Elevator Travel Cable: Steel center core, with shielded, twisted pairs, No. 20 AWG conductor size.
   1. Steel Center Core Support: Preformed, flexible, low-torsion, zinc-coated, steel wire rope; insulated with 60 deg C flame-resistant PVC and covered with a nylon or cotton braid.
      Shielded Pairs: Insulated copper conductors; color-coded, insulated with 60 deg C flame-resistant PVC; each pair shielded with bare copper braid for 85 percent coverage.
      c. Braid: Rayon or cotton braid applied with 95 percent coverage.
      d. Jacket: 60 deg C PVC specifically compounded for flexibility and abrasion resistance. UL VW-1 and CSA FT1 flame rated.
PART 3 - EXECUTION

3.01 EXAMINATION
   A. Examine all pathways prior to installation of all cables and raceways.
   B. Install all conduits, pass-thru’s, raceways and surface mounted raceways prior to installing
      the security system devices and cabling.

3.02 PREPARATION
   A. Locate main path for all cables and install J-hooks where cable tray is not provided.
   B. Coordinate with other trades to install a clear, straight path down major corridors for the
      routing of security/access cables back to the communications closet.
   C. Plan installation of cables along wallfield in communications room. Provide finger-duct and
      D-rings for support of cables. See drawings

3.03 INSTALLATION-GENERAL
   A. Security/access cable shall be installed per industry standards.
      1. Care shall be taken to avoid crimping or bending the cable past the manufacturer’s
         recommended bend radius.
      2. During installation, the cables shall not be pulled across the ceiling tiles or the structure
         of the building. This may cause damage to the cable jacket.
      3. Adhere to all pulling tensions and bend radii during installation.
      4. All cables shall route neatly in the ceiling. Whether they route in cable tray or J-hooks,
         the cables shall be neat and orderly.
      5. Support cables at a minimum of every 5 feet.
      6. When routing security/access cables parallel to electrical conduits and lighting ballasts,
         the cable shall maintain a clearance of at least 12 inches. When running perpendicular
         to electrical conduits and lighting ballasts the cable shall maintain 6 inches of
         clearance.
      7. Provide a short coil of extra cable where the cable enters the vertical conduit. The coil
         shall consist of no less than 1-1/2 feet.
      8. When installing cables in the communications room, all cable shall route neatly through
         the cable tray and cable ladder.
      9. Provide a service loop of the cables on the wallfield.
     10. Each cable shall have a self adhesive, self laminating, laser printed label at each end.
         The label shall show the location identifier of that cable. Labels shall be installed no
         more than 4 inches from the termination point of the cable.
   B. Firestopping is required at all riser conduits, and all pass thru’s.
      1. Each cable tray penetration of a wall shall be firestopped after cable installation. Use
         pillow type firestop to allow additional cables to be installed in the future.
      2. Where riser conduits pass through floors, the area between the concrete and the
         conduit shall be firestopped. This shall be completed with a putty or liquid firestop
         product. Fill in the space with mineral wool, and then install the firestop on top. All
         firestop shall be of sufficient thickness to secure the rating required by code.
      3. After final cable installation, install a putty firestop around all cables where they enter
         and exit conduit pass thru’s and conduit risers.
   C. Cabling at the Panel.
      1. Contractor shall coil all spare cable from the door devices outside the security panel
         and shall neatly coil the cable on the wall.
      2. Cables shall route into the panels through a grommeted hole that is sized for the cables
         entering.
      3. All cables shall be installed in a neat and workmanlike manner.
      4. Cables shall be terminated and shall allow for removal of a card without un-terminating
         the cables.
      5. All cables shall be neatly distributed to the card in the panel.
6. All labels shall be visible inside the panel near the termination point. Label cables equidistant from their termination point.

7. If existing panels are to be re-used with the new software system:
   a. Identify all devices and door numbers and label those panels with that information
   b. Expand with new panels and new boards in existing panels to support the existing devices and new devices

8. If the new proposed access control system requires new access control panels:
   a. Remove existing panels
   b. Identify all cables and the devices to which they connect
   c. Provide additional cabling and splicing of cables to extend the existing cabling to the new panel
   d. Label all existing cables if not already labeled.
   e. Connect existing cables to the new panels
   f. Connect power to the new panels.
   g. Dispose of the old panels offsite.

D. Proper support of cables is of paramount importance when installing a cable infrastructure. All cables not in conduit or cable tray shall be supported via J-hooks a minimum of every 5 feet.
   1. Routes of cables shall be parallel or perpendicular to the walls of the building.
   2. Install the J-hooks to minimize changes in the level of the cables as they route through the J-hooks.
   3. All communications shall route as high in the ceiling as possible while still being accessible and staying away from other utilities.
   4. When installing the cable through the J-hooks, they shall all have relatively the same droop between hooks. All cables shall be installed neatly and squarely.
   5. Secure the J-hooks to the building structure with beam clamps and threaded rod as required to support the cables.
   6. J-hooks shall never be attached to drop ceiling support wires. Cables shall never be supported by drop ceiling wires.

E. Raceways.
   1. Shall be mechanically attached to the wall or door.
   2. Paint to match door frame/mullion.

3.04 SERVER AND SOFTWARE INSTALLATION

A. Management Server:
   1. Install and configure the server. Attach to the network.
   2. Install the server in the MDF on the data rack. Provide shelves as required for keyboard, PC, mouse, and monitor.
   3. Connect Server into the Ethernet network to allow remote monitoring and remote control of the system from other locations also attached to the Ethernet network or IP network.
   4. Contractor shall provide and install software that allows remote monitoring and control of the entire security/access system through the Ethernet.
      a. Configure backup of the system to the owner’s storage device.

B. Control Software:
   1. Contractor shall provide all software required for a fully functional security/access system.
   2. Software shall be installed and fully configured by the Contractor.
   3. Contractor shall schedule meetings with the Owner prior to installation to determine the working of the security/access system.
   4. Install control software on the management PC in the communications room.
   5. Install software on up to 10 other PC’s attached to the IP network to allow remote monitoring and control of the entire security/access system. Work with Owner on determining location of PC’s.
   6. Configuration of the security software shall include but not be limited to the following:
a. Installation of all user information into the security software. This shall include all staff. This shall include no less than 400 staff members.
   1) Configure the personnel information field prior to beginning the staff information input. Meet with the owner to determine the information that they wish to be in the system.
   2) Take all personnel pictures as they are enrolled into the system.
   3) Enter the person’s information into the fields required by the owner.
   4) Meet with the owner prior to installing data to determine custom data fields and to layout the card requirements.
   5) Print all cards with a card printer. Provide the ink for each card.
b. Number each door input and associate it with a standard door name for easy review.
c. Meet with the owner to determine how they will use the system. Take information from them that will allow all custom settings of the software system. This shall include but not be limited to:
   1) User groups based on building and administrative group
   2) Access levels based on groups and times.
   3) Building locking and unlocking schedules for each building
   4) Administrative levels and super administrators
   5) Building arming and disarming schedules of door contacts
   6) Alarm level setting for different doors based on time of day and day of week.
   7) Lockdown and Normal locking schedules. Configure the system to lock all doors upon going into lockdown mode through the button or through the software system.
   8) Setup all user logins to allow specific viewing of portions of the system based on login ID.
d. Generate customized maps for each building.
   1) Create maps from the owner that have multiple levels such as entire building and then subdivided into different areas.
   2) The maps shall show icons for each door. The icons shall be green or red based on open or closed door.
   3) Setup all icons to allow the owner to click on a door and then have direct access to lock or unlock or pulse the lock on a door.
e. Setup all user accounts and install the user software on the owner’s pc’s.
   1) Setup the user accounts based on the doors or buildings they will be allowed to control.
   2) Work with the owner to determine which panels, doors, maps or buildings the user will be able to see and control.

3.05 CONTROL PANEL INSTALLATION

A. Networked Controller:
   1. Controller(s). shall be mounted to the wallfield in the communications room.
   2. Controller shall be sized for all security, access, control, and monitoring points existing on the drawings and shall be expandable.
   3. Controller shall be able to be linked to additional controllers in other communications rooms via the Ethernet network.
   4. Each port in the controller that is connected to a security point shall be labeled inside the controller box.
   5. Install power to the battery backup power supply that supports the controller. Power shall be hardwired from the local power circuit.
   6. Label the outside of the panel with the door numbers that are connected in that panel. Shall be laser printed adhesive labels.
   7. Label the inside of the panel door with the layout of the panel and which cards attach to which devices. Include door numbers on the diagram.
8. Hardwire power to the panel or panel supply. Extend the 120 volt circuit to the panel. Do not plug into the circuit. Provide an electrician for connection of the power supplies.

9. Depending on the type of panel the contractor shall provide cable routing hardware and equipment to neatly install cabling.
   a. Route cable to allow easy change and replacement of the individual control cards in the panel.
   b. Mount the controller on the wall
   c. Cabling shall be neatly bundled. See example below of adequate cabling being routed into a panel.

3.06 FIELD DEVICE INSTALLATION

A. Door Contacts:
   1. Install door contacts where shown on the drawings.
   2. Work with door provider and installer on timing of door contact installation.
   3. Install raceways to allow installation of the door contacts.
   4. Drill into the door frame and door to allow installation of the door contact and the associated cable. No cable shall be visible after installation.
   5. Where door frames are filled, they shall be drilled out to allow installation of the door contact. Surface mount contacts are not allowed at any student accessible doors.

B. Card Readers "CR" on drawings
   1. Card readers shall be installed at locations shown on the drawings.
   2. Review site and drawings and coordinate the wall mounted readers and frame mounted readers. Order the correct reader for each location.
   3. Coordinate installation of all card readers with the doors and walls.
   4. Where the reader is mounted on the door, coordinate the installation with the installation of the door to allow all cable for security/access.
5. Locate all card readers at ADA compliant heights and locations.

C. Electric Latch and Electric Strike “EL and “ES” on drawings
   1. The Electric Latch and Electric Strike devices shall be installed by the door hardware contractor.
   2. Power supplies shall be located in the comm room. Provide and install power supplies. Connect power supplies to the access control panel and 120Volt AC.
   3. Install all cables required to be connect this device to the security system
   4. Review door hardware specifications to determine if a wiring harness is being provide by the door hardware supplier.
      a. Install cables from the controller panel and power supply in the comm room to the wiring harness. Connect to harness
      b. For EL devices, install harness from door hardware EL to the hinge, through the hinge and to the connection point for cables from the controller.
      c. For ES devices, install cabling rom security panel do the Electric strike in the latch side of the frame.
      d. Wire from device, through frame and back to controller/power supply in the comm room.

3.07 DESKTOP DEVICE INSTALLATION
A. Toggle Switch: “TS”, Push Button “PB, Panic Device “PD” and Desktop Console “CO”
   1. Wire each device back to the access control system panel.
   2. Wire each button and each light if so equipped
   3. Provide the correct cable to support full use of the button or switch or control of the LED light
   4. Install the toggle switch on the desk or under the desk. Provide a cover on the switch.
      a. Mount to a backbox with blanks stainless steel plate
   5. Mount each device to the furniture at location identified by owner.
   6. Wire back to system. Configure system to have two or more states. One for each switch position. Talk to owner to identify the states required.
   7. Meet with owner to discuss how buttons shall be configured.

3.08 ASSISTED OPENER FOR ADA
A. Assisted Opener: “AO” and assisted button “AB” on drawings
   1. Where an assisted opener is shown the contractor shall wire to this opener to work:
   2. Operation sequence when the doors are locked entering from outside -valid id card
      a. If the person presents a valid card then the latch shall retract inside the exterior door.
      b. The latch bolt monitor shall note that the latch is retracted and shall communicate that information to the control board in the auto opener.
      c. The control board shall allow the exterior push button to be energized. Once the push button is energized then the exterior door shall be opened of the button is pushed.
      d. The exterior auto opener control board shall communicate to the control board of the interior door and that door shall open.
   3. Operation sequence when the doors are unlocked entering from outside
      a. The latch bolt monitor shall note that the latch is retracted and shall communicate that information to the control board in the auto opener.
      b. The control board shall allow the exterior push button to be energized. Once the push button is energized then the exterior door shall be opened of the button is pushed.
      c. The exterior auto opener control board shall communicate to the control board of the interior door and that door shall open.
   4. Operation sequence when the doors are locked entering from outside -no card or invalid card
      a. If the person pushes the exterior opener button, then the auto opener shall not engage because the opener button is not energized.
b. The exterior opener button is not energized unless the latch bolt monitor notes that the latch is retracted.

5. Operation sequence when the doors are locked, exiting from interior
   a. When a person pushes the interior opener button then that shall communicate with the interior auto opener and open that door.
   b. The control board of the interior auto opener shall communicate with the control board of the exterior auto opener and note that the interior opener button has been pressed.
   c. The control board of the exterior auto opener shall communicate with the access control system and instruct it to retract the latch on the exterior door.
   d. The exterior control board shall wait a set number of seconds and then it shall engage the exterior auto opener to open the exterior door.

6. Operation sequence when the doors are locked, exiting from vestibule
   a. When a person pushes the vestibule opener button then that shall communicate with the interior auto opener and open that door. It shall also communicate with the control board of the exterior auto opener.
   b. The control board of the exterior auto opener shall communicate with the access control system and instruct it to retract the latch on the exterior door.
   c. The exterior control board shall wait a set number of seconds and then it shall engage the exterior auto opener to open the exterior door.

3.09 INTERCOMS AT THE DOORS
   A. IP Intercoms
      1. Intercom at the door shall be installed based on the type chosen and specified in specs and drawings.
      2. Where the Intercom is surface mounted.
         a. Surface mounted units shall be connected to the interior of the building with a conduit and steel backbox.
         b. Where possible route the cables through the door or wall framing and extend to the intercom.
         c. Install raceway from bottom of intercom to lower pushbutton.
         d. Ensure installation of lower button to meet ADA requirements
      3. Flush-mounted intercoms
         a. Provide and install the custom backbox at the intercom location.
         b. Provide notice to electrician to allow them to install conduits to accessible ceiling.
         c. Review and ensure raceway from bottom of intercom to lower pushbutton is installed.
         d. Ensure installation of lower button to meet ADA requirements
      4. Wire the lower pushbutton to the intercom to support initiation of an intercom call
      5. The intercom device shall be located at a place where it is accessible and where it can be mounted to see the person calling.
         a. Camera shall be positioned to cover the maximum area possible.
         b. Install a connection cable from the exterior interface to the interior unit and door lock.
         c. Install any baluns, adapters, or other devices required to send the signal from the exterior intercom to the network.
         d. Provide CAT-6 patch cables
      6. IP Programmable Relay.
         a. This device shall be mounted in the main communications room.
         b. Connect to the Ethernet network with appropriate CAT-6 cabling
         c. Connect to the controllers to allow the base station to unlock the associated door.
         d. Integrate so that the base station only controls the door that the call was initiated from.
7. Base stations shall be located as shown on the drawings.
   a. The devices shall be configured to allow the Owner to unlock the door when a person calls in and is determined to be acceptable for entry.
   b. The master control devices shall interface with the access control system through the IP Programmable relay to interrupt any alarms and momentarily unlock the door.
   c. Configure the device to allow the user to determine which door the call is coming from and then unlock only that door.
   d. Provide all cabling and other equipment required to connect the base station to the Ethernet network. CAT-6 cable, Plenum Rated.

END OF SECTION 28 3500
SECTION 28 7200 – TECHNOLOGY SUBMITTALS

PART 1 - GENERAL

1.01 SECTION INCLUDES
   A. This section provides the Contractor with requirements regarding Product Data Sheets, Shop Drawings and Product Samples collectively referred to as “Submittals”.
   B. This section provides the Contractor requirements regarding As-Built Documentation after installation and prior to Final Completion and Final Payment.
   C. The requirements of this section deal only with those submittals that are required to be provided by the chosen contractor after bid award. No submittals in this section are required to be provided with the Bid Response.
   D. The requirements contained herein should be considered bound and apply to all technology and security specification sections per this contract.

1.02 PRE-INSTALLATION SUBMITTALS
   A. The contractor shall provide material submittals to the Construction Manager or directly to the designer, whichever is managing the project.
   B. Prior to beginning work, the chosen Contractor shall provide PDF files of all material submittals.
      1. Highlight the part number of each item specifically. Submittals that are not highlighted will be rejected and sent back immediately.
      2. Include an Excel spreadsheet in .xls format to the designer for use in reviewing the submittals. Shall include all part numbers and manufacturers. Match camera submittals with the camera type on the drawings.
      3. Provide an Excel Spreadsheet listing the following:

<table>
<thead>
<tr>
<th>Description</th>
<th>Manufacturer</th>
<th>Part Number</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enet Switch</td>
<td>Rainbos</td>
<td>XR-243T</td>
<td>Cam type “CA”</td>
</tr>
</tbody>
</table>

4. Provide the PDF with the following file names
   a. Site - Spec Section - Description
   b. In Example: Kent City 28 1600: Data Cabling submittal

1.03 AS-BUILT DOCUMENTATION
   A. The contractor shall provide As-Built documentation to the Construction Manager or directly to the designer, whichever is managing the project.
   B. Provide the As-Buils in hard and soft copy
      1. Hard Copy shall include one or more three-ring binders that include all documents listed below. Include a cover page on the front of the binder(s) detailing the client, the project, date of submission and project name/number
      2. Soft copy on USB Drives (PDF or Microsoft Word or Excel) shall include all documents provided in the hard copy plus any configuration or data files. Include XLS files for all spreadsheets.

PART 2 - PRE-INSTALLATION SUBMITTALS

2.01 PRODUCT DATA SHEETS
   A. Product data sheets shall consist of the manufacturers detailed specification sheets or “cut-sheets” for each product that is to be installed by the contractor or any subcontractors.
   B. Product data sheets shall minimally include, but shall not be limited to:
      1. Part Number
      2. Manufacturer
      3. Description of the product
4. Physical dimensions and characteristics of the product
5. Picture or manufacturers drawing of the item, where applicable
6. Electrical characteristics of the product including heat-load for active electronics.
7. Optical characteristics of the product for Fiber-Optic equipment and cable.
C. Provide product data sheets for all equipment and cabling that is to be installed by the contractor.

2.02 SHOP DRAWINGS
A. Shop Drawings shall consist of detailed drawings showing actual connectivity and cable types for the systems noted below:
   1. Access Control system connectivity
B. Shop drawings shall also be provided for systems that the contractor intends to connect differently than what is shown on the contract drawings or where no connectivity is shown.

2.03 PRODUCT SAMPLES
A. Product Samples shall consist of a sample of the actual product that is to be installed.
B. Samples shall be tagged with the part number and specification section to which it pertains.
C. Product Samples shall be provided for the following:
   1. None at this time.

2.04 SUBMITTAL DOCUMENTS
A. The Contractor shall provide all Submittals to the Construction Manager or the designer
B. The Contractor shall provide PDF and Excel Files for all Product Data Sheets.
   1. All Product Data sheets shall be PDF files grouped via specification section or drawings number
   2. The data sheets in the file shall be segmented to match the specification section and page number they pertain.
   3. The Contractor shall highlight the actual part number on the sheet of the component that they are submitting.
   4. If no part number is highlighted or marked with an arrow, then the entire submittal package will be rejected and sent back for re-submission.
   5. Contractor shall submit an electronic copy of the Excel spreadsheet with their data sheets that details the manufacturer, part number and common name of the products that they are submitting.
C. The Contractor shall provide 1 set of PDF and one hard copy set of Shop Drawings.
   1. Shop drawings shall be marked for the specification section of the bid documents to which they pertain.
   2. All shop drawings that are required to be drawn on the building background shall be provided on full-size drawings the same scale as those in the bid documents.
   3. All lines on the shop drawings shall be highlighted or completed in ink that is not the same color as that provided in the bid documents.
   4. The contractor shall provide a drawing legend detailing all symbols used in creation of the shop drawings.
D. The Contractor shall provide one of each product sample required to be submitted.
   1. Provide a cutsheet with each product sample detailing the specifics of the product and what it is proposed to be used for.

2.05 SUBMITTAL REQUIREMENTS
A. Submittals shall be provided for approval prior to installation of the work.
B. Any equipment installed that does not have an approved submittal associated with it can and will be removed from the project and replaced with other equipment as defined by the Designer. All replacement costs shall be the responsibility of the Contractor.
C. It shall be the responsibility of the Contractor to provide the submittals for review in sufficient time to not delay the installation. Work with the Construction manager on the schedule.
D. It shall be the responsibility of the contractor to ensure they have provided and have on hand “Reviewed” or “Furnish as Corrected” submittals for all equipment they install.

PART 3 - AS-BUILT DOCUMENTATION

3.01 MATERIALS
A. The Contractor shall provide the following to the Designer prior to the issuance of the final payment.
   1. Approved submittals and equipment user manuals.
   2. As-Built Documentation as detailed below.
   3. All spare parts and cover plates for all components of the systems
   4. Manufacturer warranty cards for all components.
   5. (2) spare of each kind of audio and video patch cable installed as part of the project.

3.02 AS-BUILT PROCESS
A. The Contractor shall provide all project as-builts to the designer at substantial completion.
   1. Provide them to the designer for review
   2. Make any required changes the designer requests
   3. Re-submit at the time of Final Completion / final payment. Final Payment is not possible without a complete post installation deliverable package

3.03 PREPARATION
A. All binders for As-Builts and test results shall be neat and clearly labeled with listing of the project and documents included in each binder.
B. Quantity:
   1. Submit one (1) set of three-ring binder(s) with hard paper copies of project closeout submittals.
      a. Provide a clear label or cover sheet with the following information:
         A) Client name.
         B) Project name.
         C) Manual title (e.g., “Project Close-out Manual for security system upgrade”).
         D) Date; date format: <month> <day>, <year> (e.g., “January 1, 20xx”).
         E) Installer and General Contractor names and contact information
   2. Submit (2) USB Drives with all As-Built documentation and software configurations.
      a. Software configurations shall be provided for:
         A) Access control system configuration and database

3.04 PROJECT DELIVERABLES
A. Provide a copy of all submittals and manuals and pamphlets. Shall be separated by equipment type with dividers in the binders.
B. All spare parts shall be provided in a box. The Contractor shall detail which component each spare part is for.
C. The contractor shall provide one set of full sized as-built prints. Provide a PDF of the as-built prints on the USB drives.
   1. Provide a clean set of the latest drawings with red lines marked for all field changes or bulletins.
D. The As-Built drawings shall include:
   1. Changes to be reflected on the drawings for Access Control/Alarm Systems shall include:
      a. Changes to hardware installed at each door. Update each door for all devices installed and connected
      b. Changes to the panel locations
      c. Door numbers
d. Changes to the schematic connectivity of any system shown on the drawings.

E. Documentation for the specific systems shall include. Provide the following for each system:
   1. Contractor warranty dates based on Substantial completion date and contact information for warranty work.
   2. Access Control
      a. Part list/diagram for each access control panel. To include
         A) Panel name and IP address (if applicable)
         B) Doors which are connected to this panel
         C) Panel location. Building and room number
      b. Diagram showing which devices and doors that are attached to each panel
      c. Training “Cheat Sheet”
      d. Server Warranty
      e. Software Upgrade Protection (SUP) warranty including end date
      f. Warranty certificate for all PC’s
   
F. Training sign-in sheets detailing what was trained, who was trained and their time in training.

END OF SECTION 28 7200
SECTION 28 7600 – TECHNOLOGY LABELING

PART 1 - GENERAL

1.01 WORK INCLUDED
A. This section provides direction on labeling of cables and devices.

PART 2 - PRODUCTS

2.01 CABLE LABELING PRODUCTS INTERIOR
A. Access control cabling
1. Laser-printed, self-adhesive wrap around shall be Brady LAT-18-361 or equivalent.
2. Label shall be 1.00-inch width x 1.33 inch high.
3. Labels shall come on a sheet with 7 labels per row with a white and transparent matte finish.
4. Sheet size shall be 8-1/2 inch x 11 inch.
5. Printable area shall be a minimum of 1.00-inch width x 0.50 inch high.
6. All labels shall be printed through a laser printer using labeling software.
7. The Contractor shall submit a proposal for the labeling scheme for all audio and video wiring. The Engineer shall approve of the scheme prior to all labeling.

2.02 ACCESS CONTROL PANEL LABELING
A. Label the front of each access control panel to detail the doors that are connected to the panel.
1. Label the front panel and detail each door number
2. Label shall include the panel name and IP address
3. Text shall be a minimum of 3/8 inch tall
4. White label with black numbers

PART 3 - EXECUTION

3.01 PREPARATION
A. Terminate all cables in proper color code sequence.
B. Clean any surfaces where an adhesive label is to be installed.
C. Prior to beginning the work, the contractor shall submit to the engineer a plan for labeling all the cables. This shall take into account to what components each cable is connected.

3.02 GENERAL LABELING
A. Everything shall be labeled as per the specs and drawings.
B. All labels shall be installed to more easily identify the cables and ports on all panels. If there are any questions regarding labeling, contact the Engineer prior to installation.
C. Engraved lamacoid labels shall be provided and installed whenever there is no location for paper inserts on faceplates, power poles, poke thru’s, floor boxes, modular furniture and surface raceway.
1. Engraved lamacoid labels shall provide the same labeling as the paper inserts, but they shall be self-adhesive.
2. These labels shall be adhered to the location closest to the modular jack.
3. Individual letters shall be provided for each cable. An overall location identifier can be provided for all the cables at that faceplate or floor box.
4. Engraved labels for rack shall be at least 1-1/2 inch high with letters 1 inch high.
5. These labels shall be affixed to the top and front of each rack or cabinet. Verify that the label will fit the rack or cabinet prior to purchasing.

3.03 ACCESS CONTROL SECURITY LABELING

A. Security Panels shall be labeled on the outside to indicate panel number and communications room number

<table>
<thead>
<tr>
<th>Security panel</th>
<th>IP address 111.111.10.112</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel 04</td>
<td>Comm room XXX</td>
</tr>
</tbody>
</table>

1. Install a label on the inside of the panel that details:
   a. Door numbers that are connected to this panel
   b. Diagram of panel showing where each door is connected to the panel.
   c. Panel name as shown in the access control system
   d. IP address of the panel

B. Access Control cables shall be labeled.

1. The cables at the door devices shall be labeled where they connect to the device at the door
2. The cables at the panels in the communications rooms shall be labeled with the door number
3. Cable labels shall be installed within 3 inches of the end of the cable sheath.
   a. The cable label shall be similar to the label below:

<table>
<thead>
<tr>
<th>125A-DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>125A-DC</td>
</tr>
<tr>
<td>125A-DC</td>
</tr>
</tbody>
</table>

b. Provide a sample label to the Engineer for approval prior to installation of all labels.

125A-DC

The 125A stands for the Door Number. The DC stands for Door Contact. This could be any of the field devices: RX, ES, EL, MX, KP etc.

END OF SECTION 28 7600
SECTION 28 7700 – TECHNOLOGY TESTING

PART 1 - GENERAL

1.01 WORK INCLUDED
   A. This section provides direction on
      1. Testing of copper and fiber cable,
      2. Testing and commissioning of the technology systems

PART 2 - PRODUCTS

2.01 PUNCHLIST PROCESS
   A. The contractor shall be required to go through a punchlist process prior to substantial completion and final completion/payment of each project
   B. Contractor shall be responsible for reviewing their own work and checking to ensure it has met the project requirements.
   C. The contractor shall:
      1. Review your work in each room
      2. Review the specifications and drawing and review their work to ensure it meets requirements
      3. Create a punchlist document showing what work is not yet done and what as-builts are yet to be completed. Send document to designer.
         a. Provide a date when contractor punchlist work will be completed.
      4. Schedule a punchlist and substantial completion meeting with designer.
      5. Present updated punchlist document to the owner
      6. Walk the site with the contractor and demonstrate all systems and review the work completed. Demonstrate how all work is completed
   D. Designer will create an “Owner Punchlist” document
      1. This will be provided to the contractor
      2. Contractor shall review the list, fix/upgrade/replace all equipment and cabling and finish work on the punchlist
      3. Return punchlist to the designer showing when the work was fixed/completed and a signature on the sheet showing that the contractor has reviewed each item.
   E. Meet onsite with the designer to review the finished work.

PART 3 - EXECUTION

3.01 EXAMINATION
   A. Testing shall be completed after fiber is installed inside the fiber patch panel and the fiber panel has been put together.
   B. All cables and panels where cables terminate shall be labeled with the cable label or name of each individual cable. Identify how each cable and panel will be labeled.

3.02 SECURITY SYSTEM COMMISSIONING
   A. After all Work is completed, and prior to requesting the Acceptance test, Contractor shall conduct a final inspection, and pre-test all equipment and system features. Contractor shall correct any deficiencies discovered as the result of the inspection and pre-test.
   B. Contractor shall submit a request for the Acceptance test in writing to the owner no less than fourteen days prior to the requested test date. The request for Acceptance test shall be
accompanied by a certification from Contractor that all Work is complete and has been pre-tested, and that all corrections have been made.

C. During Acceptance test, Contractor shall demonstrate all equipment and system features to the owner. Contractor shall remove covers, open wiring connections, operate equipment, and perform other reasonable work as requested by the owner.

D. If the contractor has submitted all necessary paperwork and the system seems to be in working order according to the engineer then the system can be considered Substantially Complete after the engineer puts that in writing.

E. Security System Substantial Completion.

1. The access control system shall be considered substantially complete as soon as:
   a. All doors are connected, configured in the system and are working as required.
   b. All security devices are connected and have been tested and shown to be fully functional. All cables are labeled at each end.
   c. Intercoms are functioning and able to release lock on a door.
   d. All users are entered into the system and all cards/fobs have been distributed.
   e. All locking and unlocking schedules are defined and are working.
   f. User accounts are setup
   g. As-built drawings have been updated to reflect any changes in the connectivity.
   h. All manufacturer literature has been turned over to the Owner.
   i. Maps are setup and populated in the system.
   j. Training has been completed.
   k. Copy of the system configuration has been provided to the owner via a CD or thumb drive.

2. The contractor shall schedule a substantial completion meeting where all security systems shall be demonstrated and shown to be in working order and configured as per the specs and the owner’s requirements.
   a. If the system is deemed to be in working order then the engineer shall sign a letter stating that the systems are Substantially Complete. The system is not Substantially Complete until a letter is provided to the contractor and owner.

3. After substantial completion the systems shall be in good working order for a period of 30 days.
   a. In the event that the system or systems should fail or not work as required during the 30-day period, the Contractor shall be on site the same day to fix and configure the system to make it work as designed.
   b. A new 30-day period will begin as soon as the system has been demonstrated to be in good working order and the engineer acknowledges in writing that the system has been fixed and is again considered substantially complete.

4. Once the system has been considered Substantially Complete and has been working for 30 consecutive days with no interruption in service, the system shall be thought of as “Finally Complete.”

5. Warranty shall begin immediately after the system is deemed Finally Complete.

END OF SECTION 28 7700
SECTION 28 7750 – TECHNOLOGY TRAINING

PART 1 - GENERAL

1.01 SECTION INCLUDES
   A. This section includes directions for the Contractor regarding training for technology and security systems.

1.02 SYSTEM DESCRIPTION
   A. The Contractor shall provide training on all the installed systems.

PART 2 - PRODUCTS

   Not used.

PART 3 - EXECUTION

3.01 GENERAL TRAINING REQUIREMENTS
   A. The Contractor shall provide training on all systems installed or upgraded as part of the contract.
      1. The Contractor shall involve the personnel from the Owner's office in the implementation and configuration of the systems.
      2. Prior to the cutover of the system, the Contractor shall work with the Owner on the training that will be provided. The Owner and the Contractor shall schedule the training at a time beneficial to both.
      3. Each system is to have training provided as part of the installation.
      4. Each training session shall include.
         a. This training will give an overview of the capabilities of each system, and the methods to be employed in utilizing the system.
         b. The Contractor shall provide a syllabus detailing what will be discussed at the training, and notes for the Owner to refer to during the life of the system. The notes shall list directions for general use of the system and possible fixes to general issues that could occur.
         c. Training shall include as-built diagrams of the connectivity, a walk-thru of the system, a demonstration of actual user interface with the system, and directions on its general use.
         d. This training is only meant to give an overview of each system. In depth training shall be provided for an in-depth analysis of certain systems as described below.
      5. For all training, the Contractor shall pay all expenses.
   B. Create cheat sheets for all systems that the users can keep after the training.
      1. Cheat sheet shall include details on how to use the system.
      2. A copy of the cheat sheet shall be laminated and installed at the system location.
      3. For individual training the contractor shall provide a cheat sheet for each person being trained.

3.02 ACCESS CONTROL TRAINING
   A. The Contractor shall provide training as part of this contract
      1. The Contractor shall involve the personnel from the Owner’s office in the implementation and configuration of the security systems.
2. Prior to the cutover of the systems, the Contractor shall work with the Owner on the training that will be provided. The Owner and the Contractor shall schedule the training at a time beneficial to both.

3. Each system is to have training provided as part of the installation. The training shall include 2 distinct training tracks. The first is Configuration Training of the security systems and the second is Remote User Training.

4. Contractor shall be at each site four (4) separate times to train and updated users at each building. These will be scheduled as detailed below:

5. Training class shall be on-site utilizing the actual equipment installed as part of the system and a PC connected to the existing data network. Coordinate with the Owner’s IT department on setting up the user interfaces.

6. Training shall include all travel and other expenses.

B. Configuration Training: Access Control

1. A minimum of 20 hours of training shall be provided on the configuration of the Access control and video security system to minimum of 4 of the Owner’s representatives. (10 hours for video security and 10 hours for access control)

   a. This training will give an overview of the capabilities of the systems, and the methods to be employed in utilizing the systems.

   b. The Contractor shall provide a syllabus detailing what will be discussed at the training, and notes for the Owner to refer to during the life of the systems. The notes shall list directions for general use of the system and possible fixes to general issues that could occur.

   c. Access Control Training shall include but not limited to:

      A) As-built diagrams of the connectivity.

      B) A demonstration of actual user interface with the system, and directions on its general use.

      C) Setting locking and unlocking schedules for each building.

      D) Adding users and removing users as administrators and as employees.

      E) Setting alarms and time schedules for buildings to be alarmed.

      F) Responding to alarms and clearing the system of faults.

      G) Identifying the physical location of a control card in a security panel.

      H) Adding and changing parameters and icons on the maps.

      I) Setting integration of the video security and access control.

      J) Use and management of the snow day button and lockdown button.

   d. The training shall be provided on the schedule below.

      A) Training 1. Shall occur during configuration and installation prior to substantial completion. This shall be a formal training class that will detail the system and how it works.

      B) Training 2. To take place approximately 3 weeks after substantial completion. This shall be a formal class to review how the system works and allow the owner to ask questions and the contractor shall be available to make changes and discuss implementation questions.

      C) Training 3. Training one month after Final Completion. This shall be an update to the training and shall review the owners list of questions and concerns. Work with the owner prior to the class to identify specific items that should be included in the training.

      D) Training 4. Training shall occur three months after Final Completion. This shall be an opportunity for the contractor to update any software and shall include training on any procedures the owner feels they need more information on.

      E) The owner shall be able to specify what is to be covered at each training session. This may require that the contractor review current settings or change settings on the system while demonstrating how this can be done.

C. Remote User training:
1. This training shall be for users of the system such as principals, secretary’s and administrators.
2. The goal of the training is to allow the users to become familiar on the user software. They shall be able to set up their own interface screen and shall be able to view live and stored video and control the locking/unlocking of doors.
3. A minimum of 6 hours per building shall be provided for training. This shall be open to no less than four users at each building. This training is designed to allow the owner and their staff to fully review and print video and configure the access control system.
   a. Access Control Training shall include but not limited to:
      A) As-built diagrams of the connectivity.
      B) A demonstration of actual user interface with the system, and directions on its general use.
      C) Setting locking and unlocking schedules for each building.
      D) Responding to alarms and clearing the system of faults.
      E) Use and management of the snow day button and lockdown button.
   b. Thoroughly review the use of the remote viewing software and how each user can individually set up their screen to review the cameras they want to view.
      A) Training 1. Shall occur during configuration and installation prior to substantial completion. This shall be a formal training class that will detail the system and how it works.
      B) Training 2. To take place approximately 3 weeks after substantial completion. This shall be a training class that will allow the owner to ask questions about the system and have the contractor fix/implement items that were not understood or yet used.
      C) Training 3. Training one month after Final Completion. This shall be an update to the training and shall review the owners list of questions and concerns. Be prepared to make changes to schedules and camera views during this training session.
      D) The owner shall be able to specify what is to be covered at each training session. This may require that the contractor review current settings or change settings on the system while demonstrating how this can be done.

END OF SECTION 28 7750
SECTION 28 7800 – TECHNOLOGY WARRANTY

PART 1 - GENERAL

1.01 SECTION INCLUDES
A. This section includes directions for the Contractor regarding system and equipment warranties.

1.02 SYSTEM DESCRIPTION
A. The project is not complete until all paperwork has been provided.
B. The Contractor shall warranty his work and all the products installed for a minimum of 1 year from day of Substantial Completion.

1.03 COORDINATION
A. Coordinate as-built drawings and records with the Engineer and Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS
A. Provide manufacturers warranty for all equipment installed
B. Provide contractor warranty for workmanship and equipment
C. Provide software upgrade protection (SUP) warranty as detailed in the specifications.

2.02 MATERIALS
A. The Contractor shall provide the following to the designer at Substantial Completion and any updates prior to the issuance of the final payment
   1. Manuals and pamphlets on all electronic equipment.
   2. All spare parts and cover plates for all components of the network.
   3. Red lined set of as-built drawings for the entire project.
B. Updated hard copy and soft copy of the As-Built Documentation. See associated spec section.

PART 3 - EXECUTION

3.01 EXAMINATION
A. Contractor shall fully examine all components of the system to make sure that all manuals and paperwork are included in the final submittal.

3.02 GENERAL WARRANTY
A. The Contractor shall warranty the installation and all the parts contained therein for a period of not less than 1 year after receipt of a completely signed copy of the Notice of Substantial Completion.
B. This shall include each and every part, cable or software system provided as part of this project. This includes cabling, Networking, Wireless, Audio/Video systems and Access Control and Video Security systems.
   1. If any part is broken due to a manufacturing defect or installation defect, the Contractor shall fix and/or replace the broken item at their own expense.
   2. If any equipment loses connectivity or fails for any reason the contractor shall be onsite to diagnose and fix or replace equipment and upgrades software.
3. The Contractor shall also supply all configuration and programming necessary to keep all electronic equipment to the latest revision of software during the year.
4. If the “system” goes down, and needs configuration to be brought back up, the Contractor shall be liable for any programming or reconfiguration.
5. During the year, the Contractor shall make the Owner aware of any software upgrades that are available.
6. Contractor shall install all software upgrades for that year or as detailed below for specific systems.
7. If the system does not run well during the year the contractor shall be onsite to diagnose and fix the system.

C. The contractor shall be onsite within 24 hours after a call from the owner or designer regarding system or equipment issues.

3.03 SERVER WARRANTY
A. Each Server and or NVR shall be provided with a three-year next day replacement warranty.
1. The warranty shall include that the contractor be onsite and replace the server and any software required.
2. Coordinate with the manufacturer to facilitate the server replacement.
3. Re-install the server and connect to the network.
4. Re-implement the existing owner’s software and configure based on the final initial implementation.
5. Keep a copy of the original configuration of the system to allow easy implementation of the new server.

3.04 ACCESS CONTROL SOFTWARE WARRANTY
A. As part of the project the contractor shall provide a three-year (3) access control system software warranty that provides for all software updates during the three years after Substantial Completion.
1. Contractor shall be required to install all software and firmware updates during the three years.

END OF SECTION 28 7800