



**Security and Access Control Upgrades  
Riverview Psychiatric Center  
Augusta, ME**

**Issued For Bid**

AEI 21-085

November 02, 2023



SECURITY AND ACCESS CONTROL SYSTEMS UPGRADES  
RIVERVIEW PSYCHIATRIC CENTER  
**ISSUED FOR BID**  
NOVEMBER 02, 2023

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SECURITY AND ACCESS CONTROL SYSTEMS UPGRADES  
RIVERVIEW PSYCHIATRIC CENTER  
**ISSUED FOR BID**  
NOVEMBER 02, 2023

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**00 11 13**  
**Notice to Contractors**

**Security and Access Control Systems Upgrades at Riverview Psychiatric Center**  
BGS Project Number: 3305

*Upgrades for the Security and Access Control Systems at the Riverview Psychiatric Center in Augusta, Maine.*

The cost of the work is approximately \$ 2,000,000. The contract shall designate the Substantial Completion Date on or before *23 May 2024*, and the Contract Final Completion Date on or before *30 May 2024*.

1. Submit bids on a completed Contractor Bid Form, plus bid security when required, all scanned and included as an attachment to an email with the subject line marked "**Bid for Security and Access Control Systems Upgrades at Riverview Psychiatric Cente**" and addressed to the Bid Administrator at: BGS.Architect@Maine.gov, so as to be received no later than **2:00:00 p.m.** on **November 28, 2023**.

Bid submissions will be opened and read aloud at the time and date noted above at the Bureau of General Services office, accessible as a video conference call. Those who wish to participate in the call must submit a request for access to BGS.Architect@Maine.gov.

Any bid received after the noted time will not be considered a valid bid and will remain unopened. Any bid submitted by any other means will not be considered a valid bid. The Bid Administrator may require the Bidder to surrender a valid paper copy of the bid form or the bid security document in certain circumstances.

Questions on the bid opening process shall be addressed to the Bid Administrator: Robert W. Gurney, Chief Engineer, Division of Planning, Design & Construction, Bureau of General Services, 77 State House Station, Augusta, Maine 04333-0077, BGS.Architect@Maine.gov.

2. The bid shall be submitted on the Contractor Bid Form (section 00 41 13) provided in the Bid Documents. The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.
3. Bid security *is required* on this project.  
If noted above as required, the Bidder shall include a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with the completed bid form submitted to the Owner. The Bid Bond form is available on the BGS website.
4. Performance and Payment Bonds *are required* on this project.  
If noted above as required, or if any combination of Base Bid and Alternate Bids amounts selected in the award of the contract exceeds \$125,000.00, the selected Contractor shall furnish a 100% contract Performance Bond (section 00 61 13.13) and a 100% contract Payment Bond (section 00 61 13.16) in the contract amount to cover the execution of the Work. Bond forms are available on the BGS website.
5. Filed Sub-bids *are not required* on this project.

**00 11 13**  
**Notice to Contractors**

6. There *are no* Pre-qualified General Contractors on this project.  
If Pre-qualified General Contractors are identified for this project, the name of each company, with their city and state, are listed below.
  
7. An on-site pre-bid conference *will* be conducted for this project.  
If a pre-bid conference is scheduled, it is *mandatory* for General Contractors and optional for Subcontractors and suppliers. Contractors who arrive late or leave early for a mandatory meeting may be prohibited from participating in this meeting and bidding. *The prebid meeting will be conducted at the project site at 10:00 AM on November 16, 2023. Contractors who wish to attend the mandatory pre-bid meeting shall notify Joseph Silva via email at joseph.silva@maine.gov by 2:00 PM on Friday, November 09, 2023 so that ample accommodations may be made based upon reported attendance. Attending contractors shall sign in at the main entrance .*
  
8. Bid Documents - full sets only - will be available on or about *November 03, 2023* and may be obtained *at no cost* from:  
*the Bureau of General Services contracts website address below:*  
*<https://www.maine.gov/dafs/bgs/business-opportunities#invitationforbid>*
  
9. Bid Documents may be examined at:  

<i>AGC Maine</i>	<i>Construction Summary</i>
<i>188 Whitten Road</i>	<i>734 Chestnut Street</i>
<i>Augusta, ME 04330</i>	<i>Manchester, NH 03104</i>
<i>Phone 207-622-4741 Fax 207-622-1625</i>	<i>Phone 603-627-8856 Fax 603-627-4524</i>

NOTICE TO CONTRACTORS  
INVITATION FOR BIDS

The Maine Department of Health and Human Services is conducting a competitive bid process for Security and Access Control Systems Upgrades at The Riverview Psychiatric Center in Augusta, Maine. E-mailed bids will be opened and read aloud by the Bureau of General Services at 2:00 p.m. on November 28, 2023.

The project scope will replace the existing security/surveillance, access control, and duress systems throughout the facility complete with all required hardware, software, electrical support, and architectural repair work to support the installations and removals.

The detailed *Notice to Contractors* is on the Bureau of General Services website: <https://www.maine.gov/dafs/bgs/business-opportunities> .





**00 21 13**  
**Instructions to Bidders**

**1. Bidder Requirements**

- 1.1 A bidder is a Contractor which is evidently qualified, or has been specifically pre-qualified by the Bureau of General Services, to bid on the proposed project described in the Bid Documents.
- 1.2 Contractors and Subcontractors bidding on projects that utilize Filed Sub-bids shall follow the requirements outlined in these Bid Documents for such projects. See Section 00 22 13 for additional information.
- 1.3 Contractors and Subcontractors are not eligible to bid on the project when their access to project design documents prior to the bid period distribution of documents creates an unfair bidding advantage. Prohibited access includes consultation with the Owner or with design professionals engaged by the Owner regarding cost estimating, constructability review, or project scheduling. This prohibition to bid applies to open, competitive bidding or pre-qualified contractor bidding or Filed Sub-bidding. The Bureau may require additional information to determine if the activities of a Contractor constitute an unfair bidding advantage.
- 1.4 Each bidder is responsible for becoming thoroughly familiar with the Bid Documents prior to submitting a bid. The failure of a bidder to review evident site conditions, to attend available pre-bid conferences, or to receive, examine, or act on addenda to the Bid Documents shall not relieve that bidder from any obligation with respect to their bid or the execution of the work as a Contractor.
- 1.5 Prior to the award of the contract, General Contractor bidders or Filed Sub-bidders may be required to provide documented evidence to the Owner or the Bureau showing compliance with the provisions of this section, their business experience, financial capability, or performance on previous projects.
- 1.6 The selected General Contractor bidder will be required to provide proof of insurance before a contract can be executed.
- 1.7 Contracts developed from this bid shall not be assigned, sublet or transferred without the written consent of the Owner.
- 1.8 By submitting a bid the Contractor attests that it has not been declared ineligible to bid on State of Maine projects. The Director of the Bureau of General Services may disallow award of this contract to any Contractor if there is evidence that the Contractor or any of its Subcontractors, through their own fault, have been terminated, suspended for cause, debarred from bidding, agreed to refrain from bidding as part of a settlement, have defaulted on a contract, or had a contract completed by another party.
- 1.9 The Contractor attests that it is not presently indicted for or otherwise criminally or civilly charged by a Federal, State or local government entity with commission of any of the following offenses and has not within a three-year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction, or contract under a public transaction, violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

**00 21 13**  
**Instructions to Bidders**

- 1.10 The Contractor shall not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs or State of Maine projects.
  
2. Authority of Owner
  - 2.1 The Owner reserves the right to accept or reject any or all bids as may best serve the interest of the Owner.
  
  - 2.2 Subject to the Owner's stated right to accept or reject any or all bids, the Contractor shall be selected on the basis of the lowest dollar value of an acceptable Base Bid, or any combination of Base Bid plus Alternate Bids, as well as other limited cost modifications the Owner determines may best serve the interests of the Owner. An acceptable bid is a duly submitted bid from a responsive and responsible bidder.
  
  - 2.3 The Owner reserves the right to require Bid Bonds or Performance and Payment Bonds for any project of any contract value.
  
3. Submitting Bids and Bid Requirements
  - 3.1 Each bid shall be submitted on the forms provided in the Bid Documents.
  
  - 3.2 Each bid shall be valid for a period of thirty calendar days following the Project bid closing date and time. The bid expiration date may be extended in unusual circumstances by mutual consent of the Bidder and the Owner. The bid amount shall not be modified due to the bid expiration date extension.
  
  - 3.3 Any provision contained in a bid which shows cost escalation, or any modification of schedule or other requirements shall not be accepted. Such a provision causes the bid to be invalid, or, at the discretion of the Owner and BGS, that element of the bid submission may be disregarded for the purpose of awarding the contract without that provision.
  
  - 3.4 Bidders shall include a Bid Bond or other approved bid security with the bid form submitted to the Owner when the bid form indicates such bid security is required. The bond value shall be 5% of the bid amount. The form of bond is shown in section 00 43 13.
  
  - 3.5 Bidders recognize that inclusion of contract bonds and the cost of those bonds is dependent on the awarded contract dollar value. Therefore, a Base Bid, or any combination of Base Bid plus Alternate Bids, as well as other limited cost modifications, resulting in a contract award shall include the cost of Performance and Payment Bonds in the submitted bid amount when the construction contract value is over \$125,000.00. Similarly, the cost of Performance and Payment Bonds is excluded in the submitted bid amount when the construction contract value is \$125,000.00 or less unless bonds are specifically required by the Bid Documents. When required for the project, the selected Contractor shall provide these bonds before a contract can be executed, pursuant to 14 M.R.S.A., Section 871, Public Works Contractors' Surety Bond Law of 1971, subsection 3. The form of bonds is shown in section 00 61 13.13 and 00 61 13.16.

**00 21 13**  
**Instructions to Bidders**

- 3.6 Bidders may modify bids in writing, by the same means as the original bid submission, prior to the bid closing time. Such written amendments shall not disclose the amount of the initial bid. If so disclosed, the entire bid is considered invalid.
- 3.7 Bidders implicitly acknowledge all Addenda issued when they submit the bid form. By usual practice the Consultant shall not issue Addenda less than 72 hours prior to the bid closing time, to allow ample time for bidders to incorporate the information. However, some information, such as extending the bid due date and time, may be issued with shorter notice. Addenda shall be issued to all companies who are registered holders of Bid Documents.
- 3.8 A bid may be withdrawn without penalty if a written request by the bidder is presented to the Owner prior to the bid closing time. Such written withdrawal requests are subject to verification as required by the Bureau.
- A bid may be withdrawn without penalty after the bid closing time if, in the determination of the Bureau, evidence provided by the Contractor shows an apparent unintended error such as a miscalculation, or an erroneous number on estimating documents, was the cause of an inaccurate bid. The Bureau may allow withdrawal in consideration of the bid bond or, without utilizing a bid bond, if the Bureau considers documented evidence provided by the Contractor shows factual errors had been made on the bid form.
- 3.9 In the event State of Maine Offices unexpectedly close on the published date of a public bid opening in the location of that bid opening, prior to the time of the scheduled deadline, the new deadline for the public bid opening will be the following business day at the originally scheduled hour of the day, at the original location. Official closings are posted on the State of Maine government website.
- 3.10 The Owner may require, in a Notice of Intent to Award letter to the apparent low bidder, a Schedule of Values, Project Schedule, and List of Subcontractors and Suppliers as both a demonstration of capability of the Bidder and as a condition of award.
- 3.11 Projects which require a State of Maine wage determination will include that schedule as part of the Bid Documents. See section 00 73 46, if such rates are required.
- 3.12 Projects which require compliance with the Davis-Bacon Act are subject to the regulations contained the Code for Federal Regulations and the federal wage determination which is made a part of the Bid Documents. See section 00 73 46, if such rates are required.
- 3.13 The Owner is exempt from the payment of Maine State sales and use taxes as provided in 36 M.R.S. §1760 (1). The Contractor and Subcontractors shall not include taxes on exempt items in the construction contract.



**00 41 13  
Contractor Bid Form**

**Security and Access Control Systems Upgrades at Riverview Psychiatric Center**  
BGS project number: 3305

Bid Form submitted by: *email only to email address below*

Bid Administrator:

*Robert W. Gurney*  
Bureau of General Services  
111 Sewall Street, Cross State Office Building, 4th floor  
77 State House Station  
Augusta, Maine 04333-0077

BGS.Architect@Maine.gov

Bidder:

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

Printed name and title: \_\_\_\_\_

Company name: \_\_\_\_\_

Mailing address: \_\_\_\_\_

City, state, zip code: \_\_\_\_\_

Phone number: \_\_\_\_\_

Email address: \_\_\_\_\_

State of incorporation, if a corporation: \_\_\_\_\_

List of all partners, if a partnership: \_\_\_\_\_

The Bidder agrees, if the Owner offers to award the contract, to provide any and all bonds and certificates of insurance, as well as Schedule of Values, Project Schedule, and List of Subcontractors and Suppliers if required by the Owner, and to sign the designated Construction Contract within twelve calendar days after the date of notification of such acceptance, except if the twelfth day falls on a State of Maine government holiday or other closure day, or a Saturday, or a Sunday, in which case the aforementioned documents must be received before 12:00 noon on the first available business day following the holiday, other closure day, Saturday, or Sunday.

As a guarantee thereof, the Bidder submits, together with this bid, a bid bond or other acceptable instrument as and if required by the Bid Documents.

**00 41 13  
Contractor Bid Form**

1. The Bidder, having carefully examined the *Security and Access Control Systems Upgrades* Project Manual dated November 02, 2023, prepared by Allied Engineering, Inc., as well as Specifications, Drawings, and any Addenda, the form of contract, and the premises and conditions relating to the work, proposes to furnish all labor, equipment and materials necessary for and reasonably incidental to the construction and completion of this project for the **Base Bid** amount of:

\$ \_\_\_\_\_ .00

2. Allowances *are not included* on this project.  
*No Allowances*

\$ 0.00

3. Alternate Bids *are not included* on this project.  
*No Alternate Bids*

Any dollar amount line below that is left blank by the Bidder shall be read as a bid of **\$0.00**.

*1 Not Used* \$ \_\_\_\_\_ .00

*2 Not Used* \$ \_\_\_\_\_ .00

*3 Not Used* \$ \_\_\_\_\_ .00

*4 Not Used* \$ \_\_\_\_\_ .00

4. Bid security *is required* on this project.  
If noted above as required, or if the Base Bid amount exceeds \$125,000.00, the Bidder shall include with this bid form a satisfactory Bid Bond (section 00 43 13) or a certified or cashier's check for 5% of the bid amount with this completed bid form submitted to the Owner.

5. Filed Sub-bids *are not required* on this project.  
If noted above as required, the Bidder shall include with this bid form a list of each Filed Sub-bidder selected by the Bidder on the form provided (section 00 41 13F).

**00 43 13  
Contractor Bid Bond**

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of five percent of the bid amount, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns, signed this insert date, i.e.: 8th day of select month, select year, which is the same date as that of the first specified bid due date, or subsequent bid due date revised by addendum.

The condition of the above obligation is such that whereas the principal has submitted to the Owner, or State of Maine, to a certain bid, attached hereto and hereby made a part hereof, to enter into a contract in writing, for the construction of insert name of project as designated in the contract documents

Now therefore:

If said bid shall be rejected, or, in the alternate,

If said bid shall be accepted and the principal shall execute and deliver a contract in the form of contract attached hereto, properly completed in accordance with said bid, and shall furnish a bond for the faithful performance of said contract, and for the payment of all persons performing labor or furnishing material in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time within which the Obligeo may accept such bid and said Surety does hereby waive notice of any such extension.

**00 43 13  
Contractor Bid Bond**

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this *insert date, i.e.: 8th* day of *select month, select year*, which is the first specified bid due date, or subsequent bid due date revised by addendum.

**Contractor**

\_\_\_\_\_  
*(Signature)*

*insert name and title*

*insert company name*

*insert address  
insert city state zip code*

**Surety**

\_\_\_\_\_  
*(Signature)*

*insert name and title*

*insert company name*

*insert address  
insert city state zip code*

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.



**State of Maine  
CONSTRUCTION CONTRACT**

**Large Construction Project**

*This form is used when the Contract value is \$50,000 or greater.  
The Project Manual, Specifications and Drawings, and any Addenda are considered part of this Contract.*

Agreement entered into by and between the contracting entity name hereinafter called the **Owner** and Contractor company name hereinafter called the **Contractor**.

BGS Project No.: number assigned by BGS Other Project No.: \_\_\_\_\_

For the following Project: title of project as shown on bid documents at facility or campus name, municipality, Maine.

The Specifications and the Drawings have been prepared by Consultant firm name, acting as Professional-of-Record and named in the documents as the Consultant Architect or Engineer.

The *Owner* and *Contractor* agree as follows:

**ARTICLE 1 COMPENSATION AND PAYMENTS**

1.1 The Owner shall pay the Contractor to furnish all labor, equipment, materials and incidentals necessary for the construction of the Work described in the Specifications and shown on the Drawings the Contract Amount as shown below.

Base Bid	\$0.00
<i>Alternate Bid number and name or "no Alternates"</i>	\$0.00
<i>Alternate Bid number and name or "no Alternates"</i>	\$0.00
<i>Alternate Bid number and name or "no Alternates"</i>	\$0.00
<i>Alternate Bid number and name or "no Alternates"</i>	\$0.00
<i>Alternate Bid number and name or "no Alternates"</i>	\$0.00
<b>Total Contract Amount</b>	<b>\$0.00</b>

1.2 The Contractor’s requisition shall contain sufficient detail and supporting information for the Owner to evaluate and support the payment requested.

1.2.1 Payments are due and payable twenty-five working days from the date of receipt of a Contractor requisition which is approved by the Owner.

1.2.2 Provisions for late payments are governed by 5 M.R.S. Chapter 144, *Payment of Invoices Received from Business Concerns*, and interest shall be calculated at 1% per month.

**ARTICLE 2 COMMENCEMENT AND COMPLETION DATES**

2.1 The Work of this Contract shall commence no sooner than the date this document is executed by the approval authority, or a subsequent date designated in the contract documents.

2.2 The Substantial Completion Date shall be \_\_\_\_\_.

2.3 The Work of this Contract shall be completed on or before the Contract Final Completion Date of \_\_\_\_\_.

2.4 The Contract Expiration Date shall be \_\_\_\_\_. (This date is the Owner's deadline for internal management of contract accounts. The Contract Expiration Date does not directly relate to any contract obligation of the Contractor.)

### ARTICLE 3 INELIGIBLE BIDDER

3.1 By signing this contract the Contractor attests that it has not been declared ineligible to bid on State of Maine projects. The Bureau of General Services may disallow award of this contract to any Contractor if there is evidence that the Contractor or any of its Subcontractors, through their own fault, have been terminated, suspended for cause, debarred from bidding, agreed to refrain from bidding as part of a settlement, have defaulted on a contract, or had a contract completed by another party.

3.2 By signing this contract the Contractor attests that it is not presently indicted for or otherwise criminally or civilly charged by a Federal, State or local government entity with commission of any of the following offenses and has not within a three-year period preceding this bid been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction, or contract under a public transaction, violation of Federal or State anti-trust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property.

3.3 The Contractor shall not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs or State of Maine projects.

### ARTICLE 4 CONTRACTOR'S RESPONSIBILITIES

4.1 On this project, the Contractor shall furnish the Owner the appropriate contract bonds in the amount of 100% of the Contract Sum. Contract bonds are mandated if the Contract Sum exceeds \$125,000, or if bonds are specifically required by the Contract Documents.

4.2 The Contractor shall comply with all laws, codes and regulations applicable to the Work.

4.3 The Contractor shall acquire all permits and third-party approvals applicable to the Work not specifically identified as provided by the Owner. Costs for Contractor-provided permits and third-party approvals shall be included in the Contract Sum identified in Section 1.1 above.

4.4 The Contractor shall remain an independent agent for the duration of this Contract, shall not become an employee of the State of Maine, and shall assure that no State employee will be compensated by, or otherwise benefit from, this Contract.

4.5 The Contractor shall be responsible for any design cost, construction cost, or other cost incurred on the Project to the extent caused by the negligent acts, errors or omissions of the Contractor or their Subcontractors in the performance of Work under this Contract.

## ARTICLE 5 OWNER'S RESPONSIBILITIES

5.1 The Owner shall provide full information about the objectives, schedule, constraints and existing conditions of the project. The Owner has established a budget with reasonable contingencies that meets the project requirements.

5.2 By signing this contract, the Owner attests that all State of Maine procurement requirements for this contract have been met, including the solicitation of competitive bids.

## ARTICLE 6 INSTRUMENTS OF SERVICE

6.1 The Contractor's use of the drawings, specifications and other documents known as the Consultant's Instruments of Service is limited to the execution of the Contractor's scope of work of this project unless the Contractor receives the written consent of the Owner and Consultant for use elsewhere.

## ARTICLE 7 MISCELLANEOUS PROVISIONS

7.1 This Contract shall be governed by the laws of the State of Maine.

7.2 The Owner and Contractor, respectively, bind themselves, their partners, successors, assigns and legal representatives to this Contract. Neither party to this Contract shall assign the Contract as a whole without written consent of the other party, which consent the Owner may withhold without cause.

7.3 Notwithstanding any other provision of this Agreement, if the Owner does not receive sufficient funds to fund this Agreement or funds are de-appropriated, or if the Owner does not receive legal authority from the Maine State Legislature or Maine Courts to expend funds intended for this Agreement, then the Owner is not obligated to make payment under this Agreement; provided, however, the Owner shall be obligated to pay for services satisfactorily performed prior to any such non-appropriation in accordance with the termination provisions of this Agreement. The Owner shall timely notify the Contractor of any non-appropriation and the effective date of the non-appropriation.

## ARTICLE 8 CONTRACT DOCUMENTS

8.1 The Project Manual, Specifications and Drawings, and any Addenda, together with this agreement, form the contract. Each element is as fully a part of the Contract as if hereto attached or herein repeated.

8.2 Specifications: **indicate date of issuance of project manual**

8.3 Drawings: **note here or attach each sheet number and title**

8.4 Addenda: **note each addenda number and date, or "none"**

BGS Project No.: \_\_\_\_\_

The Contract is effective as of the date executed by the approval authority.

**OWNER**

**CONTRACTOR**

\_\_\_\_\_  
*Signature*                      *Date*  
*name and title*

\_\_\_\_\_  
*Signature*                      *Date*  
*name and title*

*name of contracting entity*  
*address*

*name of contractor company*  
*address*

*telephone*  
*email address*

*telephone*  
*email address*  
*Vendor Number*

*Indicate the names of the review and approval individuals appropriate to the approval authority.*

<i>select proper approval authority</i>			
<b>Reviewed by:</b>		<b>Approved by:</b>	
_____ <i>Signature</i>	_____ <i>Date</i>	_____ <i>Signature</i>	_____ <i>Date</i>
<i>insert name</i>		<i>Joseph H. Ostwald</i>	
<i>Project Manager/ Contract Administrator</i>		<i>Director, Planning, Design &amp; Construction</i>	

**00 61 13.13**  
**Contractor Performance Bond**

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly and faithfully perform the contract entered into this insert date, i.e.: 8th day of select month, select year, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract, for the construction of insert name of project as designated in the contract documents, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

**00 61 13.13  
Contractor Performance Bond**

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this *insert date, i.e.: 8th* day of *select month, select year*, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract.

**Contractor**

\_\_\_\_\_  
(Signature)

*insert name and title*

*insert company name*

*insert address*

*insert city state zip code*

**Surety**

\_\_\_\_\_  
(Signature)

*insert name and title*

*insert company name*

*insert address*

*insert city state zip code*

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.

**00 61 13.16  
Contractor Payment Bond**

Bond No.: insert bond number

We, the undersigned, insert company name of Contractor, select type of entity of insert name of municipality in the State of insert name of state as principal, and insert name of surety as Surety, are hereby held and firmly bound unto select title of obligee in the penal sum of the Contract Price \$ insert the Contract Price in numbers for the use and benefit of claimants, defined as an entity having a contract with the principal or with a subcontractor of the principal for labor, materials, or both labor and materials, used or reasonably required for use in the performance of the contract, for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that if the principal shall promptly satisfy all claims and demands incurred for all labor and materials, used or required by the principal in connection with the work described in the contract entered into this insert date, i.e.: 8th day of select month, select year, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract, for the construction of insert name of project as designated in the contract documents, and shall fully reimburse the obligee for all outlay and expense with said obligee may incur in making good any default of said principal, then this obligation shall be null and void.

Otherwise, the same shall remain in force and effect- it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received hereby stipulates and agrees that the obligation of said Surety and its bonds shall be in no way impaired or affected by any extension of the time which the Obligee may accept during the performance of the contract and said Surety does hereby waive notice of any such extension.

**00 61 13.16  
Contractor Payment Bond**

In witness whereof, the principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set above.

Signed and sealed this *insert date, i.e.: 8th* day of *select month, select year*, which is the same date as that of the notice of intent to award letter, or in the absence of such a letter, not later than the date the Owner signs the construction contract.

**Contractor**

\_\_\_\_\_  
(Signature)

*insert name and title*

*insert company name*

*insert address*

*insert city state zip code*

**Surety**

\_\_\_\_\_  
(Signature)

*insert name and title*

*insert company name*

*insert address*

*insert city state zip code*

If Contractor is a partnership, all partners shall execute the bond. A power of attorney document indicating that it still is in full force and effect shall be provided by the person executing this bond.



State of Maine
CONSTRUCTION CONTRACT
Application for Payment

Security and Access Control Systems Upgrades
Riverview Psychiatric Center, Augusta, Maine

Application Number: 1

Contractor Company name
address
city state zip code

Period Start Date:
Period End Date:
BGS Project No.: 3305
Other Project No.: NA

Table with 9 rows and 3 columns: Line Item, Description, Amount. Includes items like Original Contract Amount, Net of Change Orders to Date, Contract Sum to Date, Total Completed and Stored to Date, 5% Retainage of Completed Work, 5% Retainage of Stored Materials, Total Retainage, Total Earned Less Retainage, Less Previous Approved Applications for Payment, Current Payment Due, and Balance to Finish, Including Retainage.

Change Order Summary table with 4 rows and 3 columns: Description, Additions, Deductions. Includes rows for Total Changes Approved in Previous Months, Total Changes Approved this Month, Subtotals, and Net of Change Orders to Date.

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information, and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which the previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

Contractor

Type company name here
Type person's name, title here

signature date

In accordance with the Contract Documents, based on on-site observations and the data comprising this Application, the Consultant certifies to the Owner that to the best of the Consultant's knowledge, information, and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the Amount Certified. Amount Certified:

Consultant (Architect or Engineer)

Allied Engineering, Inc.
Catherine Faucher, PE

signature date

Owner

Riverview Psychiatric Center
Joseph Silva

signature date

Owner's Rep / other

Not Used

signature date

Bureau of General Services

Robert W. Gurney, Chief Engineer

signature date











**State of Maine**  
**CONSTRUCTION CONTRACT**  
**Construction Change Directive**

**Security and Access Control Systems Upgrades**  
 Riverview Psychiatric Center

C. C. D. Number: **1**  
 CP (Change Proposal) Number: **1**  
 Issue Date of this Document:

**Contractor Company name**  
 address  
 city state zip code

BGS Project No.: **3305**  
 Other Project No.: **NA**

<b>CCD Item</b>	Type name of CCD item here		
<b>Description of Work</b>	Type brief description here of work scope here.		
<b>Reason or Necessity of Work</b>	Type brief justification for change here.		
<b>Method of Compensation</b>	Select from drop down box...	<b>Projected Total Cost</b>	\$0
<b>Supporting Documentation</b>	is attached	<b>Projected Calendar Days*</b>	0

\* Calendar Days refers to Contract Final Completion Date only.

Fully describe the scope of work of the CCD item in the table above and on attached drawings and specifications as necessary.

Indicate the reason for the work, and the estimated schedule and cost impacts.

This CCD records the order to do the work. The documented actual final time and cost changes are subject to approval in a subsequent Change Order process.

**Consultant**  
 (Architect or Engineer) Allied Engineering, Inc  
 Catherine Faucher, PE

-----  
 signature date

**Contractor**  
 Type company name here  
 Type person's name, title here

-----  
 signature date

**Owner**  
 Riverview Psychiatric Center  
 Joseph Silva

-----  
 signature date

**Owner's Rep**  
 Not Used  
 Not Used

-----  
 signature date

**Bureau of**  
**General Services** Division of Planning, Design & Construction  
 Robert W. Gurney, Chief Engineer

-----  
 signature date





**State of Maine  
CONSTRUCTION CONTRACT  
Change Order**

**Security and Access Control Systems Upgrades**  
Riverview Psychiatric Center

Change Order Number: **1**

Issue Date of this Document:

**Contractor Company name**  
address  
city state zip code

BGS Project No.: **3305**  
Other Project No.: **NA**

**Cost Change**

*Show Deduct as a negative number, e.g.: "-\$850".*

	<b>Add</b>	<b>Deduct</b>	<b>Total</b>
Net Amount of this Change Order	\$0	\$0	
Net Amount of Previous Change Orders	\$0	\$0	
Net of Change Orders to Date	\$0	\$0	\$0
Original Contract Amount			\$0
<b>Revised Contract Amount</b>			<b>\$0</b>

**Time Change**

*Show Deduct as a negative number, e.g.: "-8".*

	<b>Add</b>	<b>Deduct</b>	<b>Total</b>
Net Calendar Days Adjusted by this Change Order	0	0	
Net Calendar Days Adjusted by Previous Change Orders	0	0	
Net of Change Orders to Date	0	0	0
Original Contract Final Completion Date			30-May-2024
<b>Revised Contract Final Completion Date*</b>			<b>30-May-2024</b>

**Consultant (Architect or Engineer)**

Allied Engineering, Inc  
Catherine Faucher, PE

-----  
signature date

**Contractor**

Type company name here  
Type person's name, title here

-----  
signature date

**Owner**

Riverview Psychiatric Center  
Joseph Silva

-----  
signature date

**Type Entity, such as "Owner's Rep", or "not used"**

Not Used  
Not Used

-----  
signature date

**Bureau of General Services**

Division of Planning, Design & Construction  
Robert W. Gurney, Chief Engineer

-----  
signature date

Attach the "List of Change Order Items" sheet, plus all supporting documentation for each Change Order Item.

*Substantial Completion Date: the deadline for first beneficial use by Owner, as certified by Consultant.*

*\* **Contract Final Completion Date** : the Contractor's final completion deadline for contract work.*

*Contract Expiration Date: the Owner's deadline for internal management of contract accounts;*

*Contract Expiration Date does not directly relate to any contract obligation of the Contractor.*

23-May-2024
30-May-2024
30-Jun-2024



List of Change Order Items

Security and Access Control Systems Upgrades  
Contractor Company name

C. O. Number: 1

CO Item No.	CP No.	Item Name	Reason Code	Calendar Days*	Cost
1	1	Type brief name of Change Order Item here		0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
				0	\$0
<b>Totals</b>				<b>0</b>	<b>\$0</b>

Reason Codes

- EO Error or omission of Consultant
- UC Unforeseen job site condition
- OC Owner-generated change
- RC Regulatory authority-generated change
- CC Contractor-generated change

\* Calendar Days shows Contract Final Completion Date impact only.

Attach this sheet to the BGS "Change Order" cover sheet (with cost and time summaries, and signatures). Attach a "Details" sheet, and other supporting documentation, for each Change Order Item listed above.







**00 71 00**  
**Definitions**

1. Definitions
  - 1.1 *Addendum*: A document issued by the Consultant that amends the Bid Documents. Addenda shall not be issued less than seventy-two hours prior to the specified bid opening time.
  - 1.2 *Allowance*: A specified dollar amount for a particular scope of work or service included in the Work that is identified in the Bid Documents and included in each Bidder's Bid. The Contractor shall document expenditures for an Allowance during the Project. Any unused balance shall be credited to the Owner. The Contractor is responsible for notifying the Owner of anticipated expenses greater than the specified amount and the Owner is responsible for those additional expenses.
  - 1.3 *Alternate Bid*: The Contractor's written offer of a specified dollar amount, submitted on the Bid Form, for the performance of a particular scope of work described in the Bid Documents. The Owner determines the low bidder based on the sum of the base Bid and any combination of Alternate Bids that the Owner selects.
  - 1.4 *Architect*: A Consultant acting as, or supporting, the Professional-of-Record who is responsible for the design of the Project. Equivalent to "Consultant" in State of Maine contract forms.
  - 1.5 *Architectural Supplemental Instruction (ASI)*: A written instruction from the Architect for the purpose of clarification of the Contract Documents. An ASI does not alter the Contract Price or Contract Time. ASIs may be responses to RFIs and shall be issued by the Architect in a timely manner to avoid any negative impact on the Schedule of the Work.
  - 1.6 *Bid*: The Contractor's written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of the Work. A Bid may include bonds or other requirements. A base Bid is separate and distinct from Alternate Bids, being the only cost component necessary for the award of the contract, and representing the minimum amount of Work that is essential for the functioning of the Project.
  - 1.7 *Bid Bond*: The security designated in the Bid Documents, furnished by Bidders as a guaranty of good faith to enter into a contract with the Owner, should a contract be awarded to that Bidder.
  - 1.8 *Bidder*: Any business entity, individual or corporation that submits a bid for the performance of the work described in the Bid Documents, acting directly or through a duly authorized representative. See also *Responsive and Responsible Bidder*.
  - 1.9 *Bid Documents*: The drawings, procurement and contracting requirements, general requirements, and the written specifications -including all addenda, that a bidder is required to reference in the submission of a bid.
  - 1.10 *Bureau*: The State of Maine Bureau of General Services, or BGS, in the Department of Administrative and Financial Services.
  - 1.11 *Calendar days*: Consecutive days, as occurring on a calendar, taking into account each day of the week, month, year, and any religious, national or local holidays. Calendar days are used for changes in Contract Time.

**00 71 00**  
**Definitions**

- 1.12 *Certificate of Substantial Completion*: A document developed by the Consultant that describes the final status of the Work and establishes the date that the Owner may use the facility for its intended purpose. The Certificate of Substantial Completion may also include a provisional list of items - a "punch list" - remaining to be completed by the Contractor. The Certificate of Substantial Completion identifies the date from which the project warranty period commences.
- 1.13 *Certificate of Occupancy*: A document developed by a local jurisdiction such as the Code Enforcement Officer that grants permission to the Owner to occupy a building.
- 1.14 *Change Order (CO)*: A document that modifies the contract and establishes the basis of a specific adjustment to the Contract Price or the Contract Time, or both. Change Orders may address correction of omissions, errors, and document discrepancies, or additional requirements. Change Orders should include all labor, materials and incidentals required to complete the work described. A Change Order is not valid until signed by the Contractor, Owner and Consultant and approved by the Bureau.
- 1.15 *Change Order Proposal (COP) (see also Proposal)*: Contract change proposed by the Contractor regarding the contract amount, requirements, or time. The Contractor implements the work of a COP after it is accepted by all parties. Accepted COPs are incorporated into the contract by Change Order.
- 1.16 *Clerk of the Works*: The authorized representative of the Consultant on the job site. Clerk of the Works is sometimes called the Architect's representative.
- 1.17 *Construction Change Directive (CCD)*: A written order prepared by the Consultant and signed by the Owner and Consultant, directing a change in the Work prior to final agreement with the Contractor on adjustment, if any, in the Contract Price or Contract Time, or both.
- 1.18 *Contract*: A written agreement between the Owner and the successful bidder which obligates the Contractor to perform the work specified in the Contract Documents and obligates the Owner to compensate the Contractor at the mutually accepted sum, rates or prices.
- 1.19 *Contract Bonds (also known as Payment and Performance Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.20 *Contract Documents*: The drawings and written specifications (including all addenda), Standard General Conditions, and the contract (including all Change Orders subsequently incorporated in the documents).
- 1.21 *Contract Expiration Date*: Date determined by the Owner as a deadline for internal management of contract accounts. This allows time after the Contract Final Completion Date for processing the final Requisition for Payment. The Contract Expiration Date does not directly relate to any contract obligation of the Contractor.
- 1.22 *Contract Final Completion Date*: Point of time when the Work is fully completed in compliance with the Contract Documents, as certified by the Consultant. Final payment to the Contractor is due upon Final Completion of the Project.
- 1.23 *Contract Price*: The dollar amount of the construction contract, also called *Contract Sum*.



**00 71 00**  
**Definitions**

- 1.24 *Contract Time*: The designated duration of time to execute the Work of the contract, with a specific date for completion.
- 1.25 *Contractor*: Also called the "General Contractor" or "GC" the individual or entity undertaking the execution of the general contract work under the terms of the contract with the Owner, acting directly or through a duly authorized representative. The Contractor is responsible for the means, methods and materials utilized in the execution and completion of the Work.
- 1.26 *Consultant*: The Architect or Engineer acting as Professional-of-Record for the Project. The Consultant is responsible for the design of the Project.
- 1.27 *Drawings*: The graphic and pictorial portion of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.
- 1.28 *Engineer*: A Consultant acting as, or supporting, the Professional-of-Record who is responsible for the design of the Project. Equivalent to "Consultant" in State of Maine contract forms.
- 1.29 *Filed Sub-bid*: The designated major Subcontractor's (or, in some cases, Contractor's) written offer of a specified dollar amount or amounts, submitted on a form included in the Bid Documents, for the performance of a particular portion of the Work. A Filed Sub-bid may include bonds or other requirements.
- 1.30 *General Requirements*: The on-site overhead expense items the Contractor provides for the Project, typically including, but not limited to, building permits, construction supervision, Contract Bonds, insurance, field office, temporary utilities, rubbish removal, and site fencing. Overhead expenses of the Contractor's general operation are not included. Sometimes referred to as the Contractor's General Conditions.
- 1.31 *Owner*: The State agency which is represented by duly authorized individuals. The Owner is responsible for defining the scope of the Project and compensation to the Consultant and Contractor.
- 1.32 *Owner's Representative*: The individual or entity contracted by the Owner to be an advisor and information conduit regarding the Project.
- 1.33 *Overhead*: General and administrative expenses of the Contractor's principal and branch offices, including payroll costs and other compensation of Contractor employees, deductibles paid on any insurance policy, charges against the Contractor for delinquent payments, and costs related to the correction of defective work, and the Contractor's capital expenses, including interest on capital used for the work.
- 1.34 *Performance and Payment Bonds (also known as Contract Bonds)*: The approved forms of security, furnished by the Contractor and their surety, which guarantee the faithful performance of all the terms of the contract and the payment of all bills for labor, materials and equipment by the Contractor.
- 1.35 *Post-Bid Addendum*: Document issued by the Consultant that defines a potential Change Order prior to signing of the construction contract. The Post-Bid Addendum allows the Owner to negotiate

**00 71 00**  
**Definitions**

contract changes with the Bidder submitting the lowest valid bid, only if the negotiated changes to the Bid Documents result in no change or no increase in the bid price.

A Post-Bid Addendum may also be issued after a competitive construction Bid opening to those Bidders who submitted a Bid initially, for the purpose of rebidding the Project work without re-advertising.

- 1.36 *Project*: The construction project proposed by the Owner to be constructed according to the Contract Documents. The Project, a public improvement, may be tied logistically to other public improvements and other activities conducted by the Owner or other contractors.
- 1.37 *Proposal (see also Change Order Proposal)*: The Contractor's written offer submitted to the Owner for consideration containing a specified dollar amount or rate, for a specific scope of work, and including a schedule impact, if any. A proposal shall include all costs for overhead and profit. The Contractor implements the work of a Proposal after it is accepted by all parties. Accepted Proposals are incorporated into the contract by Change Order.
- 1.38 *Proposal Request (PR)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.39 *Punch List*: A document that identifies the items of work remaining to be done by the Contractor at the Close Out of a Project. The Punch List is created as a result of a final inspection of the work only after the Contractor attests that all of the Work is in its complete and permanent status.
- 1.40 *Request For Information (RFI)*: A Contractor's written request to the Consultant for clarification, definition or description of the Work. RFIs shall be presented by the Contractor in a timely manner to avoid any negative impact on the Schedule of the Work.
- 1.41 *Request For Proposal (RFP)*: An Owner's written request to the Contractor for a Change Order Proposal.
- 1.42 *Requisition for Payment*: The document in which the Contractor certifies that the Work described is, to the best of the Contractor's knowledge, information and belief, complete and that all previous payments have been paid by the Contractor to Subcontractors and suppliers, and that the current requested payment is now due. See *Schedule of Values*.
- 1.43 *Responsive and Responsible Bidder*: A bidder who complies, when submitting a bid on a given project, with the following *responsive* standards, as required by the Bid Documents:
- submits specific qualifications to bid the project, if required;
  - attends mandatory pre-bid conferences, if required;
  - submits a bid prior to the close of the bid period;
  - submits a complete bid form;
  - submits a bid without indications of intent contrary to the stated requirements;
  - submits other materials and information, such as bid security, as required;
- and, meets the following minimums regarding these *responsible* standards:
- sustains a satisfactory record of project performance;
  - maintains a permanent place of business in a known physical location;
  - possesses the financial means for short- and long-term operations;
  - possesses the appropriate technical experience and capabilities;
  - employs adequate personnel and subcontractor resources;

**00 71 00**  
**Definitions**

maintains the equipment needed to perform the work;  
complies with the proposed implementation schedule;  
complies with the insurance and bonding requirements;  
provides post-construction warranty coverage;  
and other criteria which can be considered relevant to the contract.

- 1.44 *Retainage*: The amount, calculated at five percent (5%) of the contract value or a scheduled value, that the Owner shall withhold from the Contractor until the work or portion of work is declared substantially complete or otherwise accepted by the Owner. The Owner may, if requested, reduce the amount withheld if the Owner deems it desirable and prudent to do so. (See Title 5 M.R.S.A., Section 1746.)
- 1.45 *Sample*: A physical example provided by the Contractor which illustrates materials, equipment or workmanship and establishes standards by which the Work will be judged.
- 1.46 *Schedule of the Work*: The document prepared by the Contractor and approved by the Owner that specifies the dates on which the Contractor plans to begin and complete various parts of the Work, including dates on which information and approvals are required from the Owner.
- 1.47 *Schedule of Values*: The document prepared by the Contractor and approved by the Owner before the commencement of the Work that specifies the dollar values of discrete portions of the Work equal in sum to the contract amount. The Schedule of Values is used to document progress payments of the Work in regular (usually monthly) requisitions for payment. See *Requisition for Payment*.
- 1.48 *Shop Drawings*: The drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.
- 1.49 *Specifications*: The portion of the Contract Documents consisting of the written requirements of the Work for materials, equipment, systems, standards, workmanship, and performance of related services.
- 1.50 *Subcontractor*: An individual or entity undertaking the execution of any part of the Work by virtue of a written agreement with the Contractor or any other Subcontractor. Also, an individual or entity retained by the Contractor or any other Subcontractor as an independent contractor to provide the labor, materials, equipment or services necessary to complete a specific portion of the Work.
- 1.51 *Substantial Completion Date*: Point of time when the Work or a designated portion of the Work is sufficiently complete in compliance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended purpose without unscheduled disruption. Substantial Completion is documented by the date of the Certificate of Substantial Completion signed by the Owner and the Contractor.
- 1.52 *Superintendent*: The representative of the Contractor on the job site, authorized by the Contractor to receive and fulfill instructions from the Consultant.
- 1.53 *Surety*: The individual or entity that is legally bound with the Contractor and Subcontractor to insure the faithful performance of the contract and for the payment of the bills for labor, materials and equipment by the Contractor and Subcontractors.

**00 71 00**  
**Definitions**

- 1.54 *Work*: The construction and services, whether completed or partially completed, including all labor, materials, equipment and services provided or to be provided by the Contractor and Subcontractors to fulfill the requirements of the Project as described in the Contract Documents.

**00 72 13**  
**General Conditions**

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**00 72 13**  
**General Conditions**

1. Preconstruction Conference

- 1.1 The Contractor shall, upon acceptance of a contract and prior to commencing work, schedule a preconstruction conference with the Owner and Consultant. The purpose of this conference is as follows.
- 1.1.1 Introduce all parties who have a significant role in the Project, including:  
Owner (State agency or other contracting entity)  
    Owner's Representative  
Consultant (Architect or Engineer)  
    Subconsultants  
    Clerk-of-the-works  
Contractor (GC)  
    Superintendent  
    Subcontractors  
Other State agencies  
Construction testing company  
Commissioning agent  
Special Inspections agent  
Bureau of General Services (BGS);
- 1.1.2 Review the responsibilities of each party;
- 1.1.3 Review any previously-identified special provisions of the Project;
- 1.1.4 Review the Schedule of the Work calendar submitted by the Contractor to be approved by the Owner and Consultant;
- 1.1.5 Review the Schedule of Values form submitted by the Contractor to be approved by the Owner and Consultant;
- 1.1.6 Establish routines for Shop Drawing approval, contract changes, requisitions, et cetera;
- 1.1.7 discuss jobsite issues;
- 1.1.8 Discuss Project close-out procedures;
- 1.1.9 Provide an opportunity for clarification of Contract Documents before work begins; and
- 1.1.10 Schedule regular meetings at appropriate intervals for the review of the progress of the Work.

2. Intent and Correlation of Contract Documents

- 2.1 The intent of the Contract Documents is to describe the complete Project. The Contract Documents consist of various components; each component complements the others. What is shown as a requirement by any one component shall be inferred as a requirement on all corresponding components.
- 2.2 The Contractor shall furnish all labor, equipment and materials, tools, transportation, insurance, services, supplies, operations and methods necessary for, and reasonably incidental to, the construction and completion of the Project. Any work that deviates from the Contract Documents which appears to be required by the exigencies of construction or by inconsistencies in the Contract Documents, will be determined by the Consultant and authorized in writing by the Consultant, Owner and the Bureau prior to execution. The Contractor shall be responsible for requesting clarifying information where the intent of the Contract Documents is uncertain.
- 2.3 The Contractor shall not utilize any apparent error or omission in the Contract Documents to the disadvantage of the Owner. The Contractor shall promptly notify the Consultant in writing of such errors or omissions. The Consultant shall make any corrections or clarifications necessary in such a situation to document the true intent of the Contract Documents.

**00 72 13**  
**General Conditions**

3. Additional Drawings and Specifications

- 3.1 Upon the written request of the Contractor, the Owner shall provide, at no expense to the Contractor, up to five sets of printed Drawings and Specifications for the execution of the Work.
- 3.2 The Consultant shall promptly furnish to the Contractor revised Drawings and Specifications, for the area of the documents where those revisions apply, when corrections or clarifications are made by the Consultant. All such information shall be consistent with, and reasonably inferred from, the Contract Documents. The Contractor shall do no work without the proper Drawings and Specifications.

4. Ownership of Contract Documents

- 4.1 The designs represented on the Contract Documents are the property of the Consultant. The Drawings and Specifications shall not be used on other work without consent of the Consultant.

5. Permits, Laws, and Regulations

- 5.1 The Owner is responsible for obtaining any zoning approvals or other similar local project approvals necessary to complete the Work, unless otherwise specified in the Contract Documents.
- 5.2 The Owner is responsible for obtaining Maine Department of Environmental Protection, Maine Department of Transportation, or other similar state government project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 5.3 The Owner is responsible for obtaining any federal agency project approvals necessary to complete the Work, unless otherwise indicated in the Contract Documents.
- 5.4 The Owner is responsible for obtaining all easements for permanent structures or permanent changes in existing facilities.
- 5.5 The Contractor is responsible for obtaining and paying for all permits and licenses necessary for the implementation of the Work. The Contractor shall notify the Owner of any delays, variance or restrictions that may result from the issuing of permits and licenses.
- 5.6 The Contractor shall comply with all ordinances, laws, rules and regulations and make all required notices bearing on the implementation of the Work. In the event the Contractor observes disagreement between the Drawings and Specifications and any ordinances, laws, rules and regulations, the Contractor shall promptly notify the Consultant in writing. Any necessary changes shall be made as provided in the contract for changes in the work. The Contractor shall not perform any work knowing it to be contrary to such ordinances, laws, rules and regulations.
- 5.7 The Contractor shall comply with local, state and federal regulations regarding construction safety and all other aspects of the Work.
- 5.8 The Contractor shall comply with the Maine Code of Fair Practices and Affirmative Action, 5 M.R.S. §784 (2).

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6. Taxes

- 6.1 The Owner is exempt from the payment of Maine State sales and use taxes as provided in 36 M.R.S. §1760 (1). The Contractor and Subcontractors shall not include taxes on exempt items in the construction contract.
- 6.2 Section 1760 further provides in subsection 61 that sales to a construction contractor or its subcontractor of tangible personal property that is to be physically incorporated in, and become a permanent part of, real property for sale to or owned by the Owner, are exempt from Maine State sales and use taxes. Tangible personal property is defined in 36 M.R.S. §1752 (17).
- 6.3 The Contractor may contact Maine Revenue Services, 24 State House Station, Augusta, Maine 04333 for guidance on tax exempt regulations authorized by 36 M.R.S. §1760 and detailed in Rule 302 (18-125 CMR 302).

7. Labor and Wages

- 7.1 The Contractor shall conform to the labor laws of the State of Maine, and all other laws, ordinances, and legal requirements affecting the work in Maine.
- 7.2 The Consultant shall include a wage determination document prepared by the Maine Department of Labor in the Contract Documents for state-funded contracts in excess of \$50,000. The document shows the minimum wages required to be paid to each category of labor employed on the project.
- 7.3 On projects requiring a Maine wage determination, the Contractor shall submit monthly payroll records to the Owner ("the contracting agency") showing the name and occupation of all workers and all independent contractors employed on the project. The monthly submission must also include the Contractor's company name, the title of the project, hours worked, hourly rate or other method of remuneration, and the actual wages or other compensation paid to each person.
- 7.4 The Contractor shall not reveal, in the payroll records submitted to the Owner, personal information regarding workers and independent contractors, other than the information described above. Such information shall not include Social Security number, employee identification number, or employee address or phone number, for example.
- 7.5 The Contractor shall conform to Maine statute (39-A M.R.S. §105-A (6)) by providing to the Workers' Compensation Board a list of all subcontractors and independent contractors on the job site and a record of the entity to whom that subcontractor or independent contractor is directly contracted and by whom that subcontractor or independent contractor is insured for workers' compensation purposes.
- 7.6 The Contractor shall enforce strict discipline and good order among their employees at all times, and shall not employ any person unfit or unskilled to do the work assigned to them.
- 7.7 The Contractor shall promptly pay all employees when their compensation is due, shall promptly pay all others who have billed and are due for materials, supplies and services used in the Work, and shall promptly pay all others who have billed and are due for insurance, workers compensation coverage, federal and state unemployment compensation, and Social Security



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charges pertaining to this Project. Before final payments are made, the Contractor shall furnish to the Owner affidavits that all such payments described above have been made.

- 7.8 The Contractor may contact the Maine Department of Labor, 54 State House Station, Augusta, Maine 04333 for guidance on labor issues.
- 7.9 The Contractor may contact the Maine Workers' Compensation Board, 27 State House Station, Augusta, Maine 04333 for guidance on workers' compensation issues.

**8. Indemnification**

- 8.1 The Contractor shall indemnify and hold harmless the Owner and its officers and employees from and against any and all damages, liabilities, and costs, including reasonable attorney's fees, and defense costs, for any and all injuries to persons or property, including claims for violation of intellectual property rights, to the extent caused by the negligent acts or omissions of the Contractor, its employees, agents, officers or subcontractors in the performance of work under this Agreement. The Contractor shall not be liable for claims to the extent caused by the negligent acts or omissions of the Owner or for actions taken in reasonable reliance on written instructions of the Owner.
- 8.2 The Contractor shall notify the Owner promptly of all claims arising out of the performance of work under this Agreement by the Contractor, its employees or agents, officers or subcontractors.
- 8.3 This indemnity provision shall survive the termination of the Agreement, completion of the project or the expiration of the term of the Agreement.

**9. Insurance Requirements**

- 9.1 The Contractor shall provide, with each original of the signed Contract, an insurance certificate or certificates acceptable to the Owner and BGS. The Contractor shall submit insurance certificates to the Owner and BGS at the commencement of this Contract and at policy renewal or revision dates. The certificates shall identify the project name and BGS project number, and shall name the Owner as certificate holder and as additional insured for general liability and automobile liability coverages. The submitted forms shall contain a provision that coverage afforded under the insurance policies will not be canceled or materially changed unless at least ten days prior written notice by registered letter has been given to the Owner and BGS.
- 9.2 The Owner does not warrant or represent that the insurance required herein constitutes an insurance portfolio which adequately addresses all risks faced by the Contractor or its Subcontractors. The Contractor is responsible for the existence, extent and adequacy of insurance prior to commencement of work. The Contractor shall not allow any Subcontractor to commence work until all similar insurance required of the Subcontractor has been confirmed by the Contractor.
- 9.3 The Contractor shall procure and maintain primary insurance for the duration of the Project and, if written on a Claims-Made basis, shall also procure and maintain Extended Reporting Period (ERP) insurance for the period of time that any claims could be brought. The Contractor shall ensure that all Subcontractors they engage or employ will procure and maintain similar insurance

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in form and amount acceptable to the Owner and BGS. At a minimum, the insurance shall be of the types and limits set forth herein protecting the Contractor from claims which may result from the Contractor’s execution of the Work, whether such execution be by the Contractor or by those employed by the Contractor or by those for whose acts they may be liable. All required insurance coverages shall be placed with carriers authorized to conduct business in the State of Maine by the Maine Bureau of Insurance.

9.3.1 The Contractor shall have Workers’ Compensation insurance for all employees on the Project site in accordance with the requirements of the Workers’ Compensation law of the State of Maine. Minimum acceptable limits for Employer’s Liability are:

Bodily Injury by Accident.....	\$500,000
Bodily Injury by Disease.....	\$500,000 Each Employee
Bodily Injury by Disease.....	\$500,000 Policy Limit

9.3.2 The Contractor shall have Commercial General Liability insurance providing coverage for bodily injury and property damage liability for all hazards of the Project including premise and operations, products and completed operations, contractual, and personal injury liabilities. The policy shall include collapse and underground coverage as well as explosion coverage if explosion hazards exist. Aggregate limits shall apply on a location or project basis. Minimum acceptable limits are:

General aggregate limit.....	\$2,000,000
Products and completed operations aggregate .....	\$1,000,000
Each occurrence limit.....	\$1,000,000
Personal injury aggregate.....	\$1,000,000

9.3.3 The Contractor shall have Automobile Liability insurance against claims for bodily injury, death or property damage resulting from the maintenance, ownership or use of all owned, non-owned and hired automobiles, trucks and trailers. Minimum acceptable limit is:

Any one accident or loss .....	\$500,000
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9.3.4 For the portion of a project which is new construction, the Contractor shall procure and maintain Builder’s Risk insurance naming the Owner, Contractor, and any Subcontractor as insureds as their interest may appear. Covered causes of loss form shall be all Risks of Direct Physical Loss, endorsed to include flood, earthquake, transit and sprinkler leakage where sprinkler coverage is applicable. Unless specifically authorized in writing by the Owner, the limit of insurance shall not be less than the initial contract amount, for the portion of the project which is new construction, and coverage shall apply during the entire contract period and until the work is accepted by the Owner.

9.3.5 The Contractor shall have Owner’s Protective Liability insurance for contract values \$50,000 and above, naming the Owner as the Named Insured. Minimum acceptable limits are:

General aggregate limit.....	\$2,000,000
Each occurrence limit.....	\$1,000,000

**10. Contract Bonds**

10.1 When noted as required in the Bid Documents, the Contractor shall provide to the Owner a Performance Bond and a Payment Bond, or "contract bonds", upon execution of the contract. Each bond value shall be for the full amount of the contract and issued by a surety company authorized to do business in the State of Maine as approved by the Owner. The bonds shall be

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executed on the forms furnished in the Bid Documents. The bonds shall allow for any subsequent additions or deductions of the contract.

- 10.2 The contract bonds shall continue in effect for one year after final acceptance of the contract to protect the Owner's interest in connection with the one year guarantee of workmanship and materials and to assure settlement of claims for the payment of all bills for labor, materials and equipment by the Contractor.

**11. Patents and Royalties**

- 11.1 The Contractor shall, for all time, secure for the Owner the free and undisputed right to the use of any patented articles or methods used in the Work. The expense of defending any suits for infringement or alleged infringement of such patents shall be borne by the Contractor. Awards made regarding patent suits shall be paid by the Contractor. The Contractor shall hold the Owner harmless regarding patent suits that may arise due to installations made by the Contractor, and to any awards made as a result of such suits.
- 11.2 Any royalty payments related to the work done by the Contractor for the Project shall be borne by the Contractor. The Contractor shall hold the Owner harmless regarding any royalty payments that may arise due to installations made by the Contractor.

**12. Surveys, Layout of Work**

- 12.1 The Owner shall furnish all property surveys unless otherwise specified.
- 12.2 The Contractor is responsible for correctly staking out the Work on the site. The Contractor shall employ a competent surveyor to position all construction on the site. The surveyor shall run the axis lines, establish correct datum points and check each line and point on the site to insure their accuracy. All such lines and points shall be carefully preserved throughout the construction.
- 12.3 The Contractor shall lay out all work from dimensions given on the Drawings. The Contractor shall take measurements and verify dimensions of any existing work that affects the Work or to which the Work is to be fitted. The Contractor is solely responsible for the accuracy of all measurements. The Contractor shall verify all grades, lines, levels, elevations and dimensions shown on the Drawings and report any errors or inconsistencies to the Consultant prior to commencing work.

**13. Record of Documents**

- 13.1 The Contractor shall maintain one complete set of Contract Documents on the jobsite, in good order and current status, for access by the Owner and Consultant.
- 13.2 The Contractor shall maintain, continuously updated, complete records of Requests for Information, Architectural Supplemental Instructions (or equivalent), Information Bulletins, supplemental sketches, Change Order Proposals, Change Orders, Shop Drawings, testing reports, et cetera, for access by the Owner and Consultant.

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14. Allowances

- 14.1 The Contract Price shall include all allowances described in the Contract Documents. The Contractor shall include all overhead and profit necessary to implement each allowance in their Contract Price.
- 14.2 The Contractor shall not be required to employ parties for allowance work against whom the Contractor has a reasonable objection. In such a case, the Contractor shall notify the Owner in writing of their position and shall propose an alternative party to complete the work of the allowance.

15. Shop Drawings

- 15.1 The Contractor shall administer Shop Drawings prepared by the Contractor, Subcontractors, suppliers or others to conform to the approved Schedule of the Work. The Contractor shall verify all field measurements, check and authorize all Shop Drawings and schedules required by the Work. The Contractor is the responsible party and contact for the Contractor's work as well as that of Subcontractors, suppliers or others who provide Shop Drawings.
- 15.2 The Consultant shall review and acknowledge Shop Drawings, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents.
- 15.3 The Contractor shall provide monthly updated logs containing: requests for information, information bulletins, supplemental instructions, supplemental sketches, change order proposals, change orders, submittals, testing and deficiencies.
- 15.4 The Contractor shall make any corrections required by the Consultant, and shall submit a quantity of corrected copies as may be needed. The acceptance of Shop Drawings or schedules by the Consultant shall not relieve the Contractor from responsibility for deviations from Drawings and Specifications, unless the Contractor has called such deviations to the attention of the Consultant at the time of submission and secured the Consultant's written approval. The acceptance of Shop Drawings or schedules by the Consultant does not relieve the Contractor from responsibility for errors in Shop Drawings or schedules.

16. Samples

- 16.1 The Contractor shall furnish for approval, with reasonable promptness, all samples as directed by the Consultant. The Consultant shall review and approve such samples, with reasonable promptness, for general conformity with the design concept of the project and compliance with the information provided in the Contract Documents. The subsequent work shall be in accord with the approved samples.

17. Substitutions

- 17.1 The Contractor shall furnish items and materials described in the Contract Documents. If the item or material specified describes a proprietary product, or uses the name of a manufacturer, the term "or approved equal" shall be implied, if it is not included in the text. The specific item or material specified establishes a minimum standard for the general design, level of quality, type, function, durability, efficiency, reliability, compatibility, warranty coverage, installation factors

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and required maintenance. The Drawing or written Specification shall not be construed to exclude other manufacturers products of comparable design, quality, and efficiency.

- 17.2 The Contractor may submit detailed information about a proposed substitution to the Consultant for consideration. Particular models of items and particular materials which the Contractor asserts to be equal to the items and materials identified in the Contract Documents shall be allowed only with written approval by the Consultant. The request for substitution shall include a cost comparison and a reason or reasons for the substitution.
- 17.3 The Consultant may request additional information about the proposed substitution. The approval or rejection of a proposed substitution may be based on timeliness of the request, source of the information, the considerations of minimum standards described above, or other considerations. The Consultant should briefly state the rationale for the decision. The decision shall be considered final.
- 17.4 The duration of a substitution review process can not be the basis for a claim for delay in the Schedule of the Work.

18. Assignment of Contract

- 18.1 The Contractor shall not assign or sublet the contract as a whole without the written consent of the Owner. The Contractor shall not assign any money due to the Contractor without the written consent of the Owner.

19. Separate Contracts

- 19.1 The Owner reserves the right to create other contracts in connection with this Project using similar General Conditions. The Contractor shall allow the Owner's other contractors reasonable opportunity for the delivery and storage of materials and the execution of their work. The Contractor shall coordinate and properly connect the Work of all contractors.
- 19.2 The Contractor shall promptly report to the Consultant and Owner any apparent deficiencies in work of the Owner's other contractors that impacts the proper execution or results of the Contractor. The Contractor's failure to observe or report any deficiencies constitutes an acceptance of the Owner's other contractors work as suitable for the interface of the Contractor's work, except for latent deficiencies in the Owner's other contractors work.
- 19.3 Similarly, the Contractor shall promptly report to the Consultant and Owner any apparent deficiencies in their own work that would impact the proper execution or results of the Owner's other contractors.
- 19.4 The Contractor shall report to the Consultant and Owner any conflicts or claims for damages with the Owner's other contractors and settle such conflicts or claims for damages by mutual agreement or arbitration, if necessary, at no expense to the Owner.
- 19.5 In the event the Owner's other contractors sue the Owner regarding any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor, who shall defend such proceedings at the Contractor's expense. The Contractor shall pay or satisfy any judgment that may arise against the Owner, and pay all other costs incurred.

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**20. Subcontracts**

- 20.1 The Contractor shall not subcontract any part of this contract without the written permission of the Owner.
- 20.2 The Contractor shall submit a complete list of named Subcontractors and material suppliers to the Consultant and Owner for approval by the Owner prior to commencing work. The Subcontractors named shall be reputable companies of recognized standing with a record of satisfactory work.
- 20.3 The Contractor shall not employ any Subcontractor or use any material until they have been approved, or where there is reason to believe the resulting work will not comply with the Contract Documents.
- 20.4 The Contractor, not the Owner, is as fully responsible for the acts and omissions of Subcontractors and of persons employed by them, as the Contractor is for the acts and omissions of persons directly or indirectly employed by the Contractor.
- 20.5 Neither the Contract Documents nor any Contractor-Subcontractor contract shall indicate, infer or create any direct contractual relationship between any Subcontractor and the Owner.

**21. Contractor-Subcontractor Relationship**

- 21.1 The Contractor shall be bound to the Subcontractor by all the obligations in the Contract Documents that bind the Contractor to the Owner.
- 21.2 The Contractor shall pay the Subcontractor, in proportion to the dollar value of the work completed and requisitioned by the Subcontractor, the approved dollar amount allowed to the Contractor no more than seven days after receipt of payment from the Owner.
- 21.3 The Contractor shall pay the Subcontractor accordingly if the Contract Documents or the subcontract provide for earlier or larger payments than described in the provision above.
- 21.4 The Contractor shall pay the Subcontractor for completed and requisitioned subcontract work, less retainage, no more than seven days after receipt of payment from the Owner for the Contractor's approved Requisition for Payment, even if the Consultant fails to certify a portion of the Requisition for Payment for a cause not the fault of the Subcontractor.
- 21.5 The Contractor shall not make a claim for liquidated damages or penalty for delay in any amount in excess of amounts that are specified by the subcontract.
- 21.6 The Contractor shall not make a claim for services rendered or materials furnished by the Subcontractor unless written notice is given by the Contractor to the Subcontractor within ten calendar days of the day in which the claim originated.
- 21.7 The Contractor shall give the Subcontractor an opportunity to present and to submit evidence in any progress conference or disputes involving subcontract work.

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- 21.8 The Contractor shall pay the Subcontractor a just share of any fire insurance payment received by the Contractor.
- 21.9 The Subcontractor shall be bound to the Contractor by the terms of the Contract Documents and assumes toward the Contractor all the obligations and responsibilities that the Contractor, by those documents, assumes toward the Owner.
- 21.10 The Subcontractor shall submit applications for payment to the Contractor in such reasonable time as to enable the Contractor to apply for payment as specified.
- 21.11 The Subcontractor shall make any claims for extra cost, extensions of time or damages, to the Contractor in the manner provided in these General Conditions for like claims by the Contractor to the Owner, except that the time for the Subcontractor to make claims for extra cost is seven calendar days after the receipt of Consultant's instructions.

**22. Supervision of the Work**

- 22.1 During all stages of the Work the Contractor shall have a competent superintendent, with any necessary assistant superintendents, overseeing the project. The superintendent shall not be reassigned without the consent of the Owner unless a superintendent ceases to be employed by the Contractor due to unsatisfactory performance.
- 22.2 The superintendent represents the Contractor on the jobsite. Directives given by the Consultant or Owner to the superintendent shall be as binding as if given directly to the Contractor's main office. All important directives shall be confirmed in writing to the Contractor. The Consultant and Owner are not responsible for the acts or omissions of the superintendent or assistant superintendents.
- 22.3 The Contractor shall provide supervision of the Work equal to the industry's highest standard of care. The superintendent shall carefully study and compare all Contract Documents and promptly report any error, inconsistency or omission discovered to the Consultant. The Contractor may not necessarily be held liable for damages resulting directly from any error, inconsistency or omission in the Contract Documents or other instructions by the Consultant that was not revealed by the superintendent in a timely way.

**23. Observation of the Work**

- 23.1 The Contractor shall allow the Owner, the Consultant and the Bureau continuous access to the site for the purpose of observation of the progress of the work. All necessary safeguards and accommodations for such observations shall be provided by the Contractor.
- 23.2 The Contractor shall coordinate all required testing, approval or demonstration of the Work. The Contractor shall give sufficient notice to the appropriate parties of readiness for testing, inspection or examination.
- 23.3 The Contractor shall schedule inspections and obtain all required certificates of inspection for inspections by a party other than the Consultant.

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- 23.4 The Consultant shall make all scheduled observations promptly, prior to the work being concealed or buried by the Contractor. If approval of the Work is required of the Consultant, the Contractor shall notify the Consultant of the construction schedule in this regard. Work concealed or buried prior to the Consultant's approval may need to be uncovered at the Contractor's expense.
- 23.5 The Consultant may order reexamination of questioned work, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to conform to the Contract Documents, the Owner shall pay the expense of the reexamination and remedial work. If the work is found to not conform to the Contract Documents, the Contractor shall pay the expense, unless the defect in the work was caused by the Owner's Contractor, whose responsibility the reexamination expense becomes.
- 23.6 The Bureau shall periodically observe the Work during the course of construction and make recommendations to the Contractor or Consultant as necessary. Such recommendations shall be considered and implemented through the usual means for changes to the Work.
24. Consultant's Status
- 24.1 The Consultant represents the Owner during the construction period, and observes the work in progress on behalf of the Owner. The Consultant has authority to act on behalf of the Owner only to the extent expressly provided by the Contract Documents or otherwise demonstrated to the Contractor. The Consultant has authority to stop the work whenever such an action is necessary, in the Consultant's reasonable opinion, to ensure the proper execution of the contract.
- 24.2 The Consultant is the interpreter of the conditions of the contract and the judge of its performance. The Consultant shall favor neither the Owner nor the Contractor, but shall use the Consultant's powers under the contract to enforce faithful performance by both parties.
- 24.3 In the event of the termination of the Consultant's employment on the project prior to completion of the work, the Owner shall appoint a capable and reputable replacement. The status of the new Consultant relative to this contract shall be that of the former Consultant.
25. Management of the Premises
- 25.1 The Contractor shall place equipment and materials, and conduct activities on the premises in a manner that does not unreasonably hinder site circulation, environmental stability, or any long term effect. Likewise, the Consultant's directions shall not cause the use of premises to be impeded for the Contractor or Owner.
- 25.2 The Contractor shall not use the premises for any purpose other than that which is directly related to the scope of work. The Owner shall not use the premises for any purpose incompatible with the proposed work simultaneous to the work of the Contractor.
- 25.3 The Contractor shall enforce the Consultant's instructions regarding information posted on the premises such as signage and advertisements, as well as activities conducted on the premises such as fires, and smoking.



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- 25.4 The Owner may occupy any part of the Project that is completed with the written consent of the Contractor, and without prejudice to any of the rights of the Owner or Contractor. Such use or occupancy shall not, in and of itself, be construed as a final acceptance of any work or materials.
26. Safety and Security of the Premises
- 26.1 The Contractor shall designate, and make known to the Consultant and the Owner, a safety officer whose duty is the prevention of accidents on the site.
- 26.2 The Contractor shall continuously maintain security on the premises and protect from unreasonable occasion of injury all people authorized to be on the job site. The Contractor shall also effectively protect the property and adjacent properties from damage or loss.
- 26.3 The Contractor shall take all necessary precautions to ensure the safety of workers and others on and adjacent to the site, abiding by applicable local, state and federal safety regulations. The Contractor shall erect and continuously maintain safeguards for the protection of workers and others, and shall post signs and other warnings regarding hazards associated with the construction process, such as protruding fasteners, moving equipment, trenches and holes, scaffolding, window, door or stair openings, and falling materials.
- 26.4 The Contractor shall restore the premises to conditions that existed prior to the start of the project at areas not intended to be altered according to the Contract Documents.
- 26.5 The Contractor shall protect existing utilities and exercise care working in the vicinity of utilities shown in the Drawings and Specifications or otherwise located by the Contractor.
- 26.6 The Contractor shall protect from damage existing trees and other significant plantings and landscape features of the site which will remain a permanent part of the site. If necessary or indicated in the Contract Documents, tree trunks shall be boxed and barriers erected to prevent damage to tree branches or roots.
- 26.7 The Contractor shall repair or replace damage to the Work caused by the Contractor's or Subcontractor's forces, including that which is reasonably protected, at the expense of the responsible party.
- 26.8 The Contractor shall not load, or allow to be loaded, any part of the Project with a force which imperils personal or structural safety. The Consultant may consult with the Contractor on such means and methods of construction, however, the ultimate responsibility lies with the Contractor.
- 26.9 The Contractor shall not jeopardize any work in place with subsequent construction activities such as blasting, drilling, excavating, cutting, patching or altering work. The Consultant must approve altering any structural components of the project. The Contractor shall supervise all construction activities carried out by others on site to ensure that the work is neatly done and in a manner that will not endanger the structure or the component parts.
- 26.10 The Contractor may act with their sole discretion in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Contractor may negotiate with the Owner for compensation for expenses due to such emergency work.

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- 26.11 The Contractor and Subcontractors shall have no responsibility for the identification, discovery, presence, handling, removal or disposal of, or exposure of persons to, hazardous materials in any form at the project site. The Contractor shall avoid disruption of any hazardous materials or toxic substances at the project site and promptly notify the Owner in writing on the occasion of such a discovery.
- 26.12 The Contractor shall keep the premises free of any unsafe accumulation of waste materials caused by the work. The Contractor shall regularly keep the spaces "broom clean". See the Close-out of the Work provisions of this section regarding cleaning at the completion of the project.
27. Changes in the Work
- 27.1 The Contractor shall not proceed with extra work without an approved Change Order or Construction Change Directive. A Change Order which has been properly signed by all parties shall become a part of the contract.
- 27.2 A Change Order is the usual document for directing changes in the Work. In certain circumstances, however, the Owner may utilize a Construction Change Directive to direct the Contractor to perform changes in the Work that are generally consistent with the scope of the project. The Owner shall use a Construction Change Directive only when the normal process for approving changes to the Work has failed to the detriment of the Project, or when agreement on the terms of a Change Order cannot be met, or when an urgent situation requires, in the Owner's judgment, prompt action by the Contractor.
- 27.3 The Consultant shall prepare the Construction Change Directive representing a complete scope of work, with proposed Contract Price and Contract Time revisions, if any, clearly stated.
- 27.4 The Contractor shall promptly carry out a Construction Change Directive which has been signed by the Owner and the Consultant. Work thus completed by the Contractor constitutes the basis for a Change Order. Changes in the Contract Price and Contract Time shall be as defined in the Construction Change Directive unless subsequently negotiated with some other terms.
- 27.5 The method of determining the dollar value of extra work shall be by:
- .1 an estimate of the Contractor accepted by Owner as a lump sum, or
  - .2 unit prices named in the contract or subsequently agreed upon, or
  - .3 cost plus a designated percentage, or
  - .4 cost plus a fixed fee.
- 27.6 The Contractor shall determine the dollar value of the extra work for both the lump sum and cost plus designated percentage methods so as not to exceed the following rates. The rates include all overhead and profit expenses.
- .1 Contractor - for any work performed by the Contractor's own forces, up to 20% of the cost;
  - .2 Subcontractor - for work performed by Subcontractor's own forces, up to 20% of the cost;
  - .3 Contractor - for work performed by Contractor's Subcontractor, up to 10% of the amount due the Subcontractor.
- 27.7 The Contractor shall keep and provide records as needed or directed for the cost plus designated percentage method. The Consultant shall review and certify the appropriate amount which

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- includes the Contractor's overhead and profit. The Owner shall make payments based on the Consultant's certificate.
- 27.8 Cost reflected in Change Orders shall be limited to the following: cost of materials, cost of delivery, cost of labor (including Social Security, pension, Workers' Compensation insurance, and unemployment insurance), and cost of rental of power tools and equipment. Labor cost may include a pro-ratio share of a foreman's time only in the case of an extension of contract time granted due to the Change Order.
- 27.9 Overhead reflected in Change Orders shall be limited to the following: bond premium, supervision, wages of clerks, time keepers, and watchmen, small tools, incidental expenses, general office expenses, and all other overhead expenses directly related to the Change Order.
- 27.10 The Contractor shall provide credit to the Owner for labor, materials, equipment and other costs but not overhead and profit expenses for those Change Order items that result in a net value of credit to the contract.
- 27.11 The Owner may change the scope of work of the Project without invalidating the contract. The Owner shall notify the Contractor of a change of the scope of work for the Owner's Contractors, which may affect the work of this Contractor, without invalidating the contract. Change Orders for extension of the time caused by such changes shall be developed at the time of directing the change in scope of work.
- 27.12 The Consultant may order minor changes in the Work, not involving extra cost, which is consistent with the intent of the design or project.
- 27.13 The Contractor shall immediately give written notification to the Consultant of latent conditions discovered at the site which materially differ from those represented in the Drawings or Specifications, and which may eventually result in a change in the scope of work. The Contractor shall suspend work until receiving direction from the Consultant. The Consultant shall promptly investigate the conditions and respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Consultant shall determine if the discovered conditions warrant a Change Order.
- 27.14 The Contractor shall, within ten calendar days of receipt of the information, give written notification to the Consultant if the Contractor claims that instructions by the Consultant will constitute extra cost not accounted for by Change Order or otherwise under the contract. The Consultant shall promptly respond to the Contractor's notice with direction that avoids any unnecessary delay of the Work. The Consultant shall determine if the Contractor's claim warrants a Change Order.
28. Correction of the Work
- 28.1 The Contractor shall promptly remove from the premises all work the Consultant declares is non-conforming to the contract. The Contractor shall replace the work properly at no expense to the Owner. The Contractor is also responsible for the expenses of others whose work was damaged or destroyed by such remedial work.

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- 28.2 The Owner may elect to remove non-conforming work if it is not removed by the Contractor within a reasonable time, that time defined in a written notice from the Consultant. The Owner may elect to store removed non-conforming work not removed by the Contractor at the Contractor's expense. The Owner may, with ten days written notice, dispose of materials which the Contractor does not remove. The Owner may sell the materials and apply the net proceeds, after deducting all expenses, to the costs that should have been borne by the Contractor.
- 28.3 The Contractor shall remedy any defects due to faulty materials or workmanship and pay for any related damage to other work which appears within a period of one year from the date of substantial completion, and in accord with the terms of any guarantees provided in the contract. The Owner shall promptly give notice of observed defects to the Contractor and Consultant. The Consultant shall determine the status of all claimed defects. The Contractor shall perform all remedial work without unjustifiable delay in either the initial response or the corrective action.
- 28.4 The Consultant may authorize, after a reasonable notification to the Contractor, an equitable deduction from the contract amount in lieu of the Contractor correcting non-conforming or defective work.
29. Owner's Right to do Work
- 29.1 The Owner may, using other contractors, correct deficiencies attributable to the Contractor, or complete unfinished work. Such action shall take place only after giving the Contractor three days written notice, and provided the Consultant approves of the proposed course of action as an appropriate remedy. The Owner may then deduct the cost of the remedial work from the amount due the Contractor.
- 29.2 The Owner may act with their sole discretion when the Contractor is unable to take action in emergency situations that potentially effect health, life or serious damage to the premises or adjacent properties, to prevent such potential loss or injury. The Owner shall inform the Contractor of the emergency work performed, particularly where it may affect the work of the Contractor.
30. Termination of Contract and Stop Work Action
- 30.1 The Owner may, owing to a certificate of the Consultant indicating that sufficient cause exists to justify such action, without prejudice to any other right or remedy and after giving the Contractor and the Contractor's surety seven days written notice, terminate the employment of the Contractor. At that time the Owner may take possession of the premises and of all materials,

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**General Conditions**

tools and appliances on the premises and finish the work by whatever method the Owner may deem expedient. Cause for such action by the Owner includes:

- .1 the contractor is adjudged bankrupt, or makes a general assignment for the benefit of its creditors, or
- .2 a receiver is appointed due to the Contractor's insolvency, or
- .3 the Contractor persistently or repeatedly refuses or fails to provide enough properly skilled workers or proper materials, or
- .4 the Contractor fails to make prompt payment to Subcontractors or suppliers of materials or labor, or
- .5 the Contractor persistently disregards laws, ordinances or the instructions of the Consultant, or is otherwise found guilty of a substantial violation of a provision of the Contract Documents.

- 30.2 The Contractor is not entitled, as a consequence of the termination of the employment of the Contractor as described above, to receive any further payment until the Work is finished. If the unpaid balance of the contract amount exceeds the expense of finishing the Work, including compensation for additional architectural, managerial and administrative services, such balance shall be paid to the Contractor. If the expense of finishing the Work exceeds the unpaid balance, the Contractor shall pay the difference to the Owner. The Consultant shall certify the expense incurred by the Contractor's default. This obligation for payment shall continue to exist after termination of the contract.
- 30.3 The Contractor may, if the Work is stopped by order of any court or other public authority for a period of thirty consecutive days, and through no act or fault of the Contractor or of anyone employed by the Contractor, with seven days written notice to the Owner and the Consultant, terminate this contract. The Contractor may then recover from the Owner payment for all work executed, any proven loss and reasonable profit and damage.
- 30.4 The Contractor may, if the Consultant fails to issue a certificate for payment within seven days after the Contractor's formal request for payment, through no fault of the Contractor, or if the Owner fails to pay to the Contractor within 30 days after submission of any sum certified by the Consultant, with seven days written notice to the Owner and the Consultant, stop the Work or terminate this Contract.

### 31. Delays and Extension of Time

- 31.1 The completion date of the contract shall be extended if the work is delayed by changes ordered in the work which have approved time extensions, or by an act or neglect of the Owner, the Consultant, or the Owner's Contractor, or by strikes, lockouts, fire, flooding, unusual delay in transportation, unavoidable casualties, or by other causes beyond the Contractor's control. The Consultant shall determine the status of all claimed causes.
- 31.2 The contract shall not be extended for delay occurring more than seven calendar days before the Contractor's claim made in writing to the Consultant. In case of a continuing cause of delay, only one claim is necessary.
- 31.3 The contract shall not be extended due to failure of the Consultant to furnish drawings if no schedule or agreement is made between the Contractor and the Consultant indicating the dates

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**General Conditions**

which drawings shall be furnished and fourteen calendar days has passed after said date for such drawings.

31.4 This article does not exclude the recovery of damages for delay by either party under other provisions in the Contract Document.

**32. Payments to the Contractor**

32.1 As noted under *Preconstruction Conference* in this section, the Contractor shall submit a Schedule of Values form, before the first application for payment, for approval by the Owner and Consultant. The Consultant may direct the Contractor to provide evidence that supports the correctness of the form. The approved Schedule of Values shall be used as a basis for payments.

32.2 The Contractor shall submit an application for each payment (“Requisition for Payment”) on a form approved by the Owner and Consultant. The Consultant may require receipts or other documents showing the Contractor's payments for materials and labor, including payments to Subcontractors.

32.3 The Contractor shall submit Requisitions for Payment as the work progresses not more frequently than once each month, unless the Owner approves a more frequent interval due to unusual circumstances. The Requisition for Payment is based on the proportionate quantities of the various classes of work completed or incorporated in the Work, in agreement with the actual progress of the Work and the dollar value indicated in the Schedule of Values.

32.4 The Consultant shall verify and certify each Requisition for Payment which appears to be complete and correct prior to payment being made by the Owner. The Consultant may certify an appropriate amount for materials not incorporated in the Work which have been delivered and suitably stored at the site. The Contractor shall submit bills of sale, insurance certificates, or other such documents that will adequately protect the Owner’s interests prior to payments being certified.

32.5 In the event any materials delivered but not yet incorporated in the Work have been included in a certified Requisition for Payment with payment made, and said materials thereafter are damaged, deteriorated or destroyed, or for any reason whatsoever become unsuitable or unavailable for use in the Work, the full amount previously allowed shall be deducted from subsequent payments unless the Contractor satisfactorily replaces said material.

32.6 The Contractor may request certification of an appropriate dollar amount for materials not incorporated in the Work which have been delivered and suitably stored away from the site. The Contractor shall submit bills of sale, insurance certificates, right-of-entry documents or other such documents that will adequately protect the Owner’s interests. The Consultant shall determine if the Contractor's documentation for the materials is complete and specifically designated for the Project. The Owner may allow certification of such payments.

32.7 Subcontractors may request, and shall receive from the Consultant, copies of approved Requisitions for Payment showing the amounts certified in the Schedule of Values.

32.8 Certified Requisitions for Payment, payments made to the Contractor, or partial or entire occupancy of the project by the Owner shall not constitute an acceptance of any work that does

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not conform to the Contract Documents. The making and acceptance of the final payment constitutes a waiver of all claims by the Owner, other than those arising from unsettled liens, from faulty work or materials appearing within one year from final payment or from requirements of the Drawings and Specifications, and of all claims by the Contractor, except those previously made and still unsettled.

### 33. Payments Withheld

- 33.1 The Owner shall retain five percent of each payment due the Contractor as part security for the fulfillment of the contract by the Contractor. The Owner may make payment of a portion of this “retainage” to the Contractor temporarily or permanently during the progress of the Work. The Owner may thereafter withhold further payments until the full amount of the five percent is reestablished. The Contractor may deposit with the Maine State Treasurer certain securities in place of retainage amounts due according to Maine Statute (5 M.R.S. §1746).
- 33.2 The Consultant may withhold or nullify the whole or a portion of any Requisitions for Payment submitted by the Contractor in the amount that may be necessary, in his reasonable opinion, to protect the Owner from loss due to any of the following:
- .1 defective work not remedied;
  - .2 claims filed or reasonable evidence indicating probable filing of claims;
  - .3 failure to make payments properly to Subcontractors or suppliers;
  - .4 a reasonable doubt that the contract can be completed for the balance then unpaid;
  - .5 liability for damage to another contractor.

The Owner shall make payment to the Contractor, in the amount withheld, when the above circumstances are removed.

### 34. Liens

- 34.1 The Contractor shall deliver to the Owner a complete release of all liens arising out of this contract before the final payment or any part of the retainage payment is released. The Contractor shall provide with the release of liens an affidavit asserting each release includes all labor and materials for which a lien could be filed. Alternately, the Contractor, in the event any Subcontractor or supplier refuses to furnish a release of lien in full, may furnish a bond satisfactory to the Owner, to indemnify the Owner against any lien.
- 34.2 In the event any lien remains unsatisfied after all payments to the Contractor are made by the Owner, the Contractor shall refund to the Owner all money that the latter may be compelled to pay in discharging such lien, including all cost and reasonable attorney’s fees.

### 35. Workmanship

- 35.1 The Contractor shall provide materials, equipment, and installed work equal to or better than the quality specified in the Contract Documents and approved in submittal and sample. The installation methods shall be of the highest standards, and the best obtainable from the respective trades. The Consultant’s decision on the quality of work shall be final.

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**General Conditions**

- 35.2 The Contractor shall know local labor conditions for skilled and unskilled labor in order to apply the labor appropriately to the Work. All labor shall be performed by individuals well skilled in their respective trades.
- 35.3 The Contractor shall perform all cutting, fitting, patching and placing of work in such a manner to allow subsequent work to fit properly, whether that be by the Contractor, the Owner's Contractors or others. The Owner and Consultant may advise the Contractor regarding such subsequent work. Notwithstanding the notification or knowledge of such subsequent work, the Contractor may be directed to comply with this standard of compatible construction by the Consultant at the Contractor's expense.
- 35.4 The Contractor shall request clarification or revision of any design work by the Consultant, prior to commencing that work, in a circumstance where the Contractor believes the work cannot feasibly be completed at the highest quality, or as indicated in the Contract Documents. The Consultant shall respond to such requests in a timely way, providing clarifying information, a feasible revision, or instruction allowing a reduced quality of work. The Contractor shall follow the direction of the Consultant regarding the required request for information.
- 35.5 The Contractor shall guarantee the Work against any defects in workmanship and materials for a period of one year commencing with the date of the Certificate of Substantial Completion, unless specified otherwise for specific elements of the project. The Work may also be subdivided in mutually agreed upon components, each defined by a separate Certificate of Substantial Completion.
36. Close-out of the Work
- 36.1 The Contractor shall remove from the premises all waste materials caused by the work. The Contractor shall make the spaces "broom clean" unless a more thorough cleaning is specified. The Contractor shall clean all windows and glass immediately prior to the final inspection, unless otherwise directed.
- 36.2 The Owner may conduct the cleaning of the premises where the Contractor, duly notified by the Consultant, fails to adequately complete the task. The expense of this cleaning may be deducted from the sum due to the Contractor.
- 36.3 The Contractor shall participate in all final inspections and acknowledge the documentation of unsatisfactory work, customarily called the "punch list", to be corrected by the Contractor. The Consultant shall document the successful completion of the Work in a dated Certificate of Substantial Completion, to be signed by Owner, Consultant, and Contractor.
- 36.4 The Contractor shall not call for final inspection of any portion of the Work that is not completely and permanently installed. The Contractor may be found liable for the expenses of individuals called to final inspection meetings prematurely.
- 36.5 The Contractor and all major Subcontractors shall participate in the end-of-warranty-period conference, typically scheduled close to one year after the Substantial Completion date.



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**General Conditions**

**37. Date of Completion and Liquidated Damages**

- 37.1 The Contractor may make a written request to the Owner for an extension or reduction of time, if necessary. The request shall include the reasons the Contractor believes justifies the proposed completion date. The Owner may grant the revision of the contract completion date if the Work was delayed due to conditions beyond the control and the responsibility of the Contractor. The Contractor shall not conduct unauthorized accelerated work or file delay claims to recover alleged damages for unauthorized early completion.
  
- 37.2 The Contractor shall vigorously pursue the completion of the Work and notify the Owner of any factors that have, may, or will affect the approved Schedule of the Work. The Contractor may be found responsible for expenses of the Owner or Consultant if the Contractor fails to make notification of project delays.
  
- 37.3 The Project is planned to be done in an orderly fashion which allows for an iterative submittal review process, construction administration including minor changes in the Work and some bad weather. The Contractor shall not file delay claims to recover alleged damages on work the Consultant determines has followed the expected rate of progress.
  
- 37.4 The Consultant shall prepare the Certificate of Substantial Completion which, when signed by the Owner and the Contractor, documents the date of Substantial Completion of the Work or a designated portion of the Work. The Owner shall not consider the issuance of a Certificate of Occupancy by an outside authority a prerequisite for Substantial Completion if the Certificate of Occupancy cannot be obtained due to factors beyond the Contractor’s control.
  
- 37.5 Liquidated Damages may be deducted from the sum due to the Contractor for each calendar day that the Work remains uncompleted after the completion date specified in the Contract or an approved amended completion date. The dollar amount per day shall be calculated using the Schedule of Liquidated Damages table shown below.

If the original contract amount is:	The per day Liquidated Damages shall be:
Less than \$100,000	\$250
\$100,000 to less than \$2,000,000	\$750
\$2,000,000 to less than \$10,000,000	\$1,500
\$10,000,000 and greater	\$1,500 plus \$250 for each \$2,000,000 over \$10,000,000

**38. Dispute Resolution**

**38.1 Mediation**

- 38.1.1 A dispute between the parties which arises under this Contract which cannot be resolved through informal negotiation, shall be submitted to a neutral mediator jointly selected by the parties.
  
- 38.1.2 Either party may file suit before or during mediation if the party, in good faith, deems it to be necessary to avoid losing the right to sue due to a statute of limitations. If suit is filed before good faith mediation efforts are completed, the party filing suit shall agree to stay all proceedings in the lawsuit pending completion of the mediation process, provided such stay is without prejudice.

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**General Conditions**

38.1.3 In any mediation between the Owner and the Consultant, the Owner has the right to consolidate related claims between Owner and Contractor.

38.2 Arbitration

38.2.1 If the dispute is not resolved through mediation, the dispute shall be settled by arbitration. The arbitration shall be conducted before a panel of three arbitrators. Each party shall select one arbitrator; the third arbitrator shall be appointed by the arbitrators selected by the parties. The arbitration shall be conducted in accordance with the Maine Uniform Arbitration Act (MUAA), except as otherwise provided in this section.

38.2.2 The decision of the arbitrators shall be final and binding upon all parties. The decision may be entered in court as provided in the MUAA.

38.2.3 The costs of the arbitration, including the arbitrators' fees shall be borne equally by the parties to the arbitration, unless the arbitrator orders otherwise.

38.2.4 In any arbitration between the Owner and the Consultant, the Owner has the right to consolidate related claims between Owner and Contractor.

**00 73 46**  
**Wage Determination Schedule**

**PART 1- GENERAL**

**1.1 Related Documents**

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

**1.2 Summary**

- A. This Section includes the wage determination requirements for Contractors as issued by the State of Maine Department of Labor Bureau of Labor Standards or the United States Department of Labor.

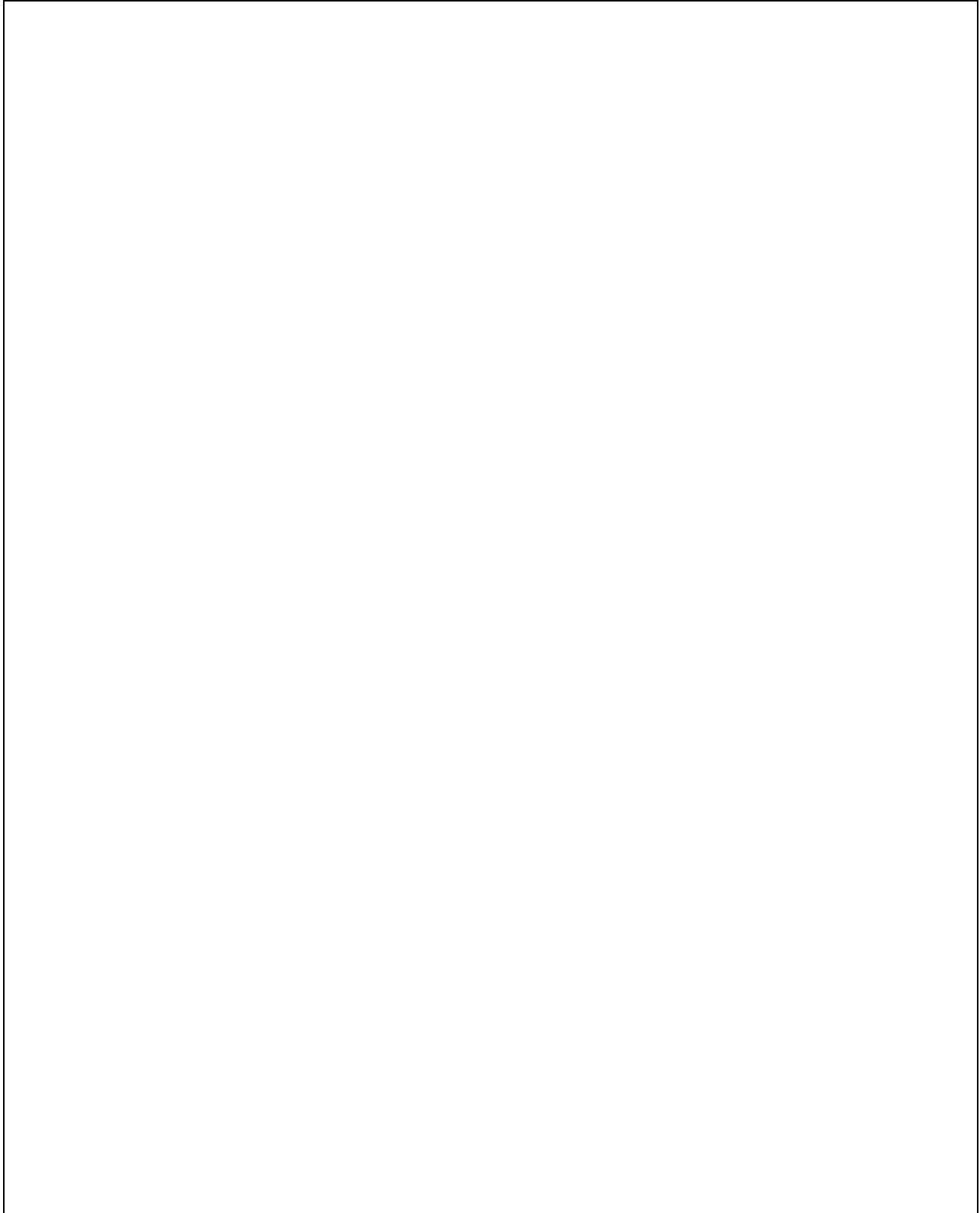
**1.3 Requirements**

- A. Conform to the wage determination schedule for this project which is shown on the following page.

**PART 2 - PRODUCTS (not used)**

**PART 3 - EXECUTION (not used)**

**00 73 46**  
**Wage Determination Schedule**



End of Section 00 73 46

State of Maine  
 Department of Labor  
 Bureau of Labor Standards  
 Augusta, Maine 04333-0045  
 Telephone (207) 623-7906

**Wage Determination - In accordance with 26 MRS §1301 et. seq., this is a determination by the Bureau of Labor Standards, of the fair minimum wage rate to be paid to laborers and workers employed on the below titled project.**

**2023 Fair Minimum Wage Rates  
 Building 2 Kennebec County  
 (other than 1 or 2 family homes)**

Occupational Title	Minimum Wage	Minimum Benefit	Total
Brickmasons And Blockmasons	\$33.00	\$4.54	\$37.54
Bulldozer Operator	\$30.00	\$7.29	\$37.29
Carpenter	\$32.59	\$12.38	\$44.97
Cement Masons And Concrete Finisher	\$24.00	\$4.70	\$28.70
Construction And Maintenance Painters	\$22.25	\$0.85	\$23.10
Construction Laborer	\$21.00	\$2.87	\$23.87
Control And Valve Installers And Repairers - Except Mechanical Door	\$31.00	\$9.86	\$40.86
Crane And Tower Operators	\$33.00	\$11.05	\$44.05
Drywall And Ceiling Tile Installers	\$26.50	\$3.91	\$30.41
Earth Drillers - Except Oil And Gas	\$28.25	\$4.94	\$33.19
Electrical Power - Line Installer And Repairers	\$52.21	\$25.81	\$78.02
Electricians	\$33.90	\$0.00	\$33.90
Elevator Installers And Repairers	\$65.62	\$44.18	\$109.80
Excavating And Loading Machine And Dragline Operators	\$24.75	\$0.00	\$24.75
Excavator Operator	\$28.00	\$3.80	\$31.80
Fence Erectors	\$24.00	\$4.59	\$28.59
Floor Layers - Except Carpet/Wood/Hard Tiles	\$24.00	\$6.32	\$30.32
Glaziers	\$40.00	\$0.00	\$40.00
Grader/Scraper Operator	\$24.76	\$3.96	\$28.72
Hazardous Materials Removal Workers	\$20.00	\$1.26	\$21.26
Heating And Air Conditioning And Refrigeration Mechanics And Installers	\$30.00	\$4.58	\$34.58
Heavy And Tractor - Trailer Truck Drivers	\$22.00	\$1.02	\$23.02
Industrial Machinery Mechanics	\$33.43	\$2.38	\$35.81
Insulation Worker - Mechanical	\$24.00	\$3.63	\$27.63
Ironworker - Ornamental	\$27.22	\$5.55	\$32.77
Light Truck Or Delivery Services Drivers	\$22.00	\$3.17	\$25.17
Millwrights	\$33.90	\$10.37	\$44.27
Mobile Heavy Equipment Mechanics - Except Engines	\$25.00	\$4.32	\$29.32
Operating Engineers And Other Equipment Operators	\$26.63	\$7.17	\$33.80
Pipelayers	\$25.50	\$3.54	\$29.04
Plasterers And Stucco Masons	\$42.18	\$19.67	\$61.85
Plumbers Pipe Fitters And Steamfitters	\$28.00	\$5.81	\$33.81
Reinforcing Iron And Rebar Workers	\$24.00	\$5.94	\$29.94
Riggers	\$28.00	\$9.74	\$37.74
Roofers	\$24.00	\$2.47	\$26.47
Sheet Metal Workers	\$26.01	\$3.87	\$29.88
Structural Iron And Steel Workers	\$32.02	\$24.67	\$56.69
Tapers	\$31.16	\$4.18	\$35.34
Telecommunications Equipment Installers And Repairers - Except Line Installers	\$28.00	\$14.01	\$42.01
Telecommunications Line Installers And Repairers	\$24.00	\$4.13	\$28.13
Tile And Marble Setters	\$25.00	\$5.07	\$30.07

**Welders are classified as the trade to which welding is incidental (e.g. welding structural steel is Structural Iron and Steel Worker)**

**Apprentices – The minimum wage rates for registered apprentices are the rates recognized in the sponsorship agreement for registered apprentices working in the pertinent classification.**

**For any other specific trade on this project not listed above, contact the Bureau of Labor Standards for further clarification.**

**Title 26 §1310 requires that a clearly legible statement of all fair minimum wage and benefits rates to be paid the several classes of laborers, workers and mechanics employed on the construction on the public work must be kept posted in a prominent and easily accessible place at the site by each contractor and subcontractor subject to sections 1304 to 1313.**

**Appeal – Any person affected by the determination of these rates may appeal to the Commissioner of Labor by filing a written notice with the Commissioner stating the specific grounds of the objection within ten (10) days from the filing of these rates.**

A true copy

Attest:   
 Scott R. Cotnoir  
 Wage & Hour Director  
 Bureau of Labor Standards

Expiration Date: 12-31-2023



SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Coordination with occupants.
5. Work restrictions.
6. Specification and Drawing conventions.
7. Miscellaneous provisions.

B. Related Requirements:

1. Section 01 50 00 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: Upgrades for the Security and Access Control Systems at the Riverview Psychiatric Center in Augusta, Maine.

1. Project Location: Riverview Psychiatric Center, Augusta, Maine.

- B. Owner: Riverview Psychiatric Center.

- C. Owner's Representative: Joseph Silva  
Riverview Psychiatric Center  
Augusta, ME

- D. BGS Representative: Robert Gurney, Chief Engineer  
111 Sewall Street, 77 State House Station  
Burton M. Cross Building, 4th Floor  
Augusta, ME 04333-0077

SECURITY AND ACCESS CONTROL SYSTEMS UPGRADES  
RIVERVIEW PSYCHIATRIC CENTER  
**ISSUED FOR BID**  
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E. Engineer: Allied Engineering, Inc, 160 Veranda Street, Portland, Maine 04103.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Replace the existing security/surveillance, access control and duress systems throughout the facility complete with all required hardware, software, electrical support, and architectural repair work to support the installations and removals.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
2. In the event that the contractor wish to shut down any portion of the public street or in any way impede access to adjacent facilities to facilitate rigging of equipment to the roof, the contractor shall strictly schedule this work with the City, the Owner, and Authorities Having Jurisdiction. It is preferable that such work, if required, be performed outside of normal working hours.
3. For access to facility parking areas for the purpose of rigging, coordinate these activities strictly with the owner.

B. On-Site Work Hours: It is the intent that work in most areas of the project may be conducted during normal business hours, of 8:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated.

C. Strict coordination with Riverview Psychiatric will be required for work in secure areas.

D. General Phasing and Execution Requirements:

1. The project shall be phased in a manner which minimizes, to the extent possible, disruption to the existing security, surveillance, and duress systems throughout the facility.
2. At no time shall door controls be left off line overnight. Downtime for any and all systems replaced under this project scope shall be minimized and strictly scheduled with Riverview Psychiatric Center (RPC).
3. Phasing shall be arranged, to the extent possible, in a manner which executes the replacement for all three systems within phased areas of the building, such that the entire facility is not impacted at once. It shall be the intent that the Administrative areas (Area



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- D – First and Second Floors) be upgraded in the initial phase, Area E be completed in Phase 2, and each individual housing wing (A, B, and C) be completed as Phases 3, 4, and 5.
4. Installation for the new control equipment in the central control room shall be done in parallel to operation of the existing systems such that the existing system remains completely operational until the new system is operational. As such, it shall be the intent that both the new and existing systems operate simultaneously. Similarly, the application controllers and all required wiring, hardware, and software at each of the phased areas for each of the three new systems shall be installed in a manner that maintains operation for the existing systems while the new systems are commissioned and made fully operational. It shall be the contractor's responsibility to "float" existing panels to the extent required to install and commission the new systems at each area.
  5. Generally, each phased area incorporates an equipment closet which houses the equipment serving that area. However, there are exceptions. The contractor shall be responsible for identifying which specific rooms in a given phased area are served by each of the equipment closets and shall execute the project scope accordingly, minimizing cross traffic between phased areas to the extent practical.
  6. During construction, the contractor shall be required to provide a two hour operational response time during nights, holidays, and weekends to correct deficiencies which result in any of the three systems going off-line or non-functional.
- E. An escort will always be required for contractors working in the building.
- F. Contractor vehicles shall remain secured at all times while on the facility premises.
- G. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
  2. Obtain Owner's written permission before proceeding with utility interruptions.
- H. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than two days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.
  3. Schedule such activities to occur outside of normal working hours.
- I. Dust Control: Erect temporary partitions and plastic sheeting as required to prevent the migration of dust and construction debris to occupied areas of the facility during construction.
- J. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.6 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
  3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 10 00

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Owner will pay sewer-service use charges for sewer usage by all entities for construction operations.
- C. Water Service: Owner will pay water-service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Owner will pay electric-power-service use charges for electricity used by all entities for construction operations.
- E. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- F. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

SECURITY AND ACCESS CONTROL SYSTEMS UPGRADES  
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**ISSUED FOR BID**  
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1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Polyethylene Sheet: Reinforced, fire-resistive sheet, **10-mil (0.25-mm)** minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- B. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats minimum **36 by 60 inches (914 by 1524 mm)**.
- C. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

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1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

### 3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
  1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### 3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
  1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
  1. Prior to commencing work, isolate the HVAC system in area where work is to be performed.
    - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

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2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
  3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- E. Electric Power Service: Connect to Owner's existing electric power service. Maintain equipment in a condition acceptable to Owner.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

### 3.4 SUPPORT FACILITIES INSTALLATION

- A. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- B. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
1. Do not load elevators beyond their rated weight capacity.
  2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- C. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

### 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

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1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Section 01 10 00 "Summary."
- C. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
  2. Construct dustproof partitions with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
    - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
  3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
  4. Insulate partitions to control noise transmission to occupied areas.
  5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  6. Protect air-handling equipment.
  7. Provide walk-off mats at each entrance through temporary partition.
- D. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
  4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

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3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

END OF SECTION 01 50 00



SECTION 01 78 23 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory manuals.
  - 2. Emergency manuals.
  - 3. Systems and equipment operation manuals.
  - 4. Systems and equipment maintenance manuals.
  - 5. Product maintenance manuals.
- B. Related Requirements:
  - 1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

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- B. Format: Submit operation and maintenance manuals in the following format:
  - 1. Submit by uploading to web-based project software site. Enable reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- E. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.5 **FORMAT OF OPERATION AND MAINTENANCE MANUALS**

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.6 **SYSTEMS AND EQUIPMENT OPERATION MANUALS**

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.

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2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.

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5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
- J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of maintenance manuals.
- 1.8 PRODUCT MAINTENANCE MANUALS
- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

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- D. Product Information: Include the following, as applicable:
1. Product name and model number.
  2. Manufacturer's name.
  3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 78 23

SECTION 01 79 00 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.4 CLOSEOUT SUBMITTALS

- 1. Transcript: Prepared and bound in format matching operation and maintenance manuals. Mark appropriate identification on front and spine of each binder. Include a cover sheet with same label information as the corresponding video recording. Include name of Project and date of video recording on each page.
- 2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.

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3. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

1.6 COORDINATION

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

1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - h. Performance curves.



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2. Documentation: Review the following items in detail:
  - a. Emergency manuals.
  - b. Systems and equipment operation manuals.
  - c. Systems and equipment maintenance manuals.
  - d. Product maintenance manuals.
  - e. Project Record Documents.
  - f. Identification systems.
  - g. Warranties and bonds.
  - h. Maintenance service agreements and similar continuing commitments.
  
3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
  
4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
  
5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
  
6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.

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

1.8 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

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

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- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 01 79 00



SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.

B. Related Requirements:

1. Section 01 10 00 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
  1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
1. Inspect and discuss condition of construction to be selectively demolished.
  2. Review structural load limitations of existing structure.
  3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
  4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
  5. Review areas where existing construction is to remain and requires protection.

1.5 INFORMATIONAL SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  2. Interruption of utility services. Indicate how long utility services will be interrupted.
  3. Coordination for shutoff, capping, and continuation of utility services.
  4. Use of elevator and stairs.
  5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- B. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations.
- C. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
1. Before selective demolition, Owner will remove the following items:

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- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
  - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.9 COORDINATION

- A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

#### 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.

#### 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
  - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
- B. Remove temporary barricades and protections where hazards no longer exist.

#### 3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:



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1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
  5. Maintain adequate ventilation when using cutting torches.
  6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
  8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  9. Dispose of demolished items and materials promptly.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to Owner.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
  2. Pack or crate items after cleaning and repairing. Identify contents of containers.
  3. Protect items from damage during transport and storage.
  4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
  - 4. Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.7 SELECTIVE DEMOLITION SCHEDULE

- A. Remove: All devices and wiring scheduled for replacement under the scope of this project.
- B. Remove and Reinstall: Suspended acoustical ceiling tile to the extent required for installations as included in the project scope.

END OF SECTION 02 41 19

SECTION 07 84 13 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
  - 1. Floors.
  - 2. Walls and partitions.
  - 3. Smoke barriers.
- B. Related Sections include the following:
  - 1. Division 28 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
  - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
  - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
  - 3. Fire-resistance-rated floor and floor/ceiling assemblies.
  - 4. Fire-resistance-rated roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:
  - 1. Penetrations located outside wall cavities.
  - 2. Penetrations located outside fire-resistive shaft enclosures.
  - 3. Penetrations located in construction containing fire-protection-rated openings.
  - 4. Penetrating items larger than 4-inch- diameter nominal pipe or 16 sq. in. in overall cross-sectional area.

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- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
  - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
  - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
  - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
  - 4. Products in public areas shall be paintable.
- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.
- F. Fire-Resistive Joint Sealants: Provide joint sealants with fire-resistance ratings indicated, as determined per UL 2079, but not less than that equaling or exceeding the fire-resistance rating of the construction in which the joint occurs.

#### 1.4 SUBMITTALS

- A. General: Submit in accordance with Section 01 33 0.
- B. Product Data: For each type of through-penetration firestop system product indicated. List product characteristics, typical uses, performance and limitation criteria, and test data.
  - 1. Include manufacture's installation procedures for each type of product.
- C. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Indicate which firestop materials will be used where and thickness for different hourly ratings. Include firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
  - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
  - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
  - 3. For those firestop applications that exist for which no UL tested system is available through a manufacturer, manufacturer's engineering judgement derived from similar UL system design or other tests shall be submitted to local authorities having jurisdiction for their review and approval prior to installation. Manufacturer's engineering judgement shall follow the requirements set forth by the International Firestop Council.

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- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Product Certificates: Signed by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- F. Product Test Reports: From an independent qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced Installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
  - 1. Firestopping tests shall be performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, Warnock Hersey, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
  - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
    - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
    - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
      - 1) UL in "Fire Resistance Directory."
      - 2) ITS in "Directory of Listed Products."
- D. Provide through-penetration firestop system products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, subpart F, Appendix A, Section 1, "Polarized Light Microscopy."
- E. Field-Testing: Each type of through-penetration firestop system shall be field-tested.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

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1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multi-component materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate the Work of this Section with the work of other trades to assure the proper sequencing of each installation and to provide a smoke- and fire-resistant installation.
- B. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- C. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- D. Notify Owner's inspecting agency at least seven days in advance of through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.
- E. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Bio Fireshield, Carlisle, MA.
  - 2. W. R. Grace & Co., Construction Products Division.
  - 3. Hilti Construction Chemicals, Inc.
  - 4. Isolatek International.

5. Nelson Firestop Products.
6. Specified Technologies Inc.
7. 3M Fire Protection Products.

## 2.2 FIRESTOPPING, GENERAL

- A. Firestop Systems: All firestop products and systems shall be designed and installed so that the basic sealing system will allow the full restoration of the thermal and fire-resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.
  1. Provide paintable firestop products at locations exposed to the public. Mechanical, electrical and elevator machine rooms are not considered public spaces.
- B. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- C. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
  1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-/rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
  2. Temporary forming materials.
  3. Substrate primers.
  4. Collars.
  5. Steel sleeves.

## 2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials indicated in the UL or Warnock Hersey tested assembly. Provide low VOC containing materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

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1. Product:
  - a. CP 680 Cast-In-Place Firestop Device; Hilti Construction Chemicals, Inc.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
  1. Product:
    - a. Biostop 500+ Intumescent Firestop; Bio Fireshield.
    - b. FlameSafe FS900 Sealant; W. R. Grace & Co.
    - c. Fire Barrier CP 25WB+; 3M Fire Protection Products.
    - d. SpecSeal LC 150 Sealant; Specified Technologies Inc.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
  1. Product:
    - a. Biostop Pipe Collar; Bio Fireshield.
    - b. FlameSafe FSWS Series FlameSafe Devices; W. R. Grace & Co.
    - c. CP 642 and CP 643 Firestop Jacket; Hilti Construction Chemicals, Inc.
    - d. SpecSeal Series LCC and Series SSC Firestop Collars; Specified Technologies Inc.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
  1. Product:
    - a. Biostop Composite Sheet; Bio Fireshield.
    - b. CS-195 Composite Sheet; 3M Fire Protection Products.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
  1. Product:
    - a. FlameSafe FSP 1000 Putty and FSP 1077 Putty Pads; W. R. Grace & Co.
    - b. CP 617 and CP 618 Putty Pads and Putty Sticks; Hilti Construction Chemicals, Inc.
    - c. MPS-2 Moldable Putty Stix and Putty Pads; 3M Fire Protection Products.
    - d. Spec-Seal Firestop Putty Bars and Putty Pads; Specified Technologies Inc.
- G. Intumescent Wrap Strips with Foil: Single-component intumescent elastomeric sheets with aluminum foil on one side.
  1. Product:
    - a. CP 645 Wrap Strips; Hilti Construction Chemicals, Inc.
    - b. Fire Barrier FS-195+ Wrap Strip; 3M Fire Protection Products.



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- H. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets.
1. Product:
    - a. Biostop Wrap Strip; Bio Fireshield.
    - b. SpecSeal Series SSWBLU and Series SSWRED Intumescent Wrap; Specified Technologies Inc.
- I. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
1. Product:
    - a. FlameSafe Mortar Safe; W. R. Grace & Co.
    - b. CP 636 Firestop Mortar; Hilti Construction Chemicals, Inc.
    - c. SpecSeal Firestop Mortar; Specified Technologies Inc.
- J. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
1. Product:
    - a. Bio Firestop Pillows; Bio Fireshield.
    - b. FlameSafe Bags and FlameSafe Pillows; W. R. Grace & Co.
    - c. CP 651 Firestop Cushion; Hilti Construction Chemicals, Inc.
    - d. SpecSeal Firestop Pillows; Specified Technologies Inc.
- K. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
1. Product:
    - a. CP 620 Firestop Foam; Hilti Construction Chemicals, Inc.
    - b. Fire Barrier 2001 Silicone RTV Foam; 3M Fire Protection Products.
    - c. SpecSeal Pen 200 Silicone Foam; Specified Technologies Inc.
- L. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
    - a. Product:
      - 1) Biotherm 200SL Firestop Sealant; Bio Fireshield.
      - 2) CP 604 Self-Leveling Firestop Sealant; Hilti Construction Chemicals, Inc.

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- 3) Fire Barrier 1003SL; 3M Fire Protection Products.
  - 4) SpecSeal Pen 300 Silicone Sealant; Specified Technologies Inc.
2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
    - a. Product:
      - 1) Biotherm 200SL Firestop Sealant; Bio Fireshield.
      - 2) CP 604 Self-Leveling Firestop Sealant; Hilti Construction Chemicals, Inc.
      - 3) Fire Barrier 1003SL; 3M Fire Protection Products.
  3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.
    - a. Product:
      - 1) Biotherm 100 Firestop Sealant; Bio Fireshield.
      - 2) CP 601S Elastomeric Firestop Sealant; Hilti Construction Chemicals, Inc.
- M. Accessories: Forming/damming materials composed of mineral fiberboard or other type as recommended by through-penetration firestop systems manufacturer.

## 2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
  1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.

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2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
  3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

### 3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with "Performance Requirements" Article and firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### 3.4 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Allow for 3 random samples of each type of firestopping system to be inspected. Reinstall disturbed samples to comply with requirements.
- C. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.

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- D. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 26 10 00 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Alternates: Refer to Division 01 to determine extent of, if any, work of this section that will be affected by any alternates if accepted.
- B. Furnish all materials, equipment, labor, and supplies and perform all operations necessary to complete the electrical work in accordance with the intent of the drawings and these specifications.

1.3 QUALITY ASSURANCE

- A. All wiring shall be in accordance with the latest issue of the National Electrical Code.
- B. The Contractor shall show evidence, upon request, of having successfully completed at least five similar projects. Installation of each system shall be under the supervision of a factory-authorized organization.
- C. The Contractor shall show evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor must have a service contract program for the maintenance of the system after the guarantee period.
- D. All electrical equipment shall be approved by Underwriters Laboratories, Inc. Each system shall be products of a single manufacturer of established reputation and experience. The Contractor shall have supplied similar apparatus to comparable installations rendering satisfactory service for at least three years.
- E. Prior to submission for review of any item of equipment, determine whether or not it will fit in the space provided. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Architect/Engineer and approval received before such alterations are made.

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1.4 SUBMITTALS

A. In accordance with Division 01, furnish the following:

1. Manufacturer's descriptive literature: For each type of product indicated.
2. Certification:
  - a. Prior to final inspection, deliver to the Owner's Representative four (4) copies of certification that the material is in accordance with the drawings and specifications and has been properly installed.
  - b. Submit certification of system operating test.
3. Manuals: Submit copies of complete set of operating instructions including circuit diagrams and other information of system components. Supply six complete sets of each.

1.5 PROJECT CONDITIONS

A. Regulatory Requirements:

1. Conform to the requirements of all laws and regulations applicable to the work.
2. Cooperate with all authorities having jurisdiction.
3. Compliance with laws and regulations governing the work on this project does not relieve the Contractor from compliance with more restrictive requirements contained in these specifications.
4. If the Contract Documents are found to be at variance with any law or regulation, the Contractor shall notify the Architect/Engineer promptly in writing. The Contractor shall assume full responsibility for any work contrary to law or regulation, and shall bear all costs for the corrections thereof.
5. Minimum Requirements: The National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), the National Fire Codes, and National Fire Protection Association (NFPA) are a minimum requirement for work under this section. Design drawings and other specification sections shall govern in those instances where requirements are greater than those required by code.

B. Permits, Fees, and Inspections:

1. Secure and pay for all permits, fees, licenses, inspections, etc., required for the work under Division 26.
2. Schedule and pay for all legally required inspections and cooperate with inspecting officers.
3. Provide Certificates of Inspection and Approval from all regulatory authorities having jurisdiction over the work in Division 26.

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C. Drawings:

1. Do not scale the drawings. The general location of the apparatus and the details of the work are shown on the drawings, which form a part of this specification. Exact locations are to be determined at the building as the work progresses, and shall be subject to the Architect/Engineer's approval. Actual field conditions shall govern all dimensions.
2. Anything shown on the drawings and not mentioned in the specifications or vice versa shall be provided as if it were both shown and specified.
3. It is not intended that the drawings shall show every wire, device, fitting, conduit or appliance, but it shall be a requirement to furnish without additional expense, all material and labor necessary to complete the systems in accordance with applicable codes and the best practice of the trade.

1.6 WARRANTY

- A. The Contractor shall guarantee all equipment and wiring free from inherent mechanical or electrical defects for one year from date of acceptance.

1.7 RELATED WORK

- A. Division 23 - Mechanical

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Boxes shall be steel minimum 2-1/2" deep.
- B. Wiring Materials:
  1. Wiring shall be enclosed in electrical rigid galvanized steel, intermediate metal conduit, or electrical metallic tubing sized in accordance with code requirements for the conductors.
    - a. Conduit fittings shall be steel compression type.
    - b. Terminations for all conduit shall have insulated bushings or insulated throat connectors in accordance with code requirements.
    - c. All conduits shall be substantially supported with approved clips or hangers spaced not to exceed ten feet on center. Minimum conduit size shall be 1/2".
  2. Flexible Metal Conduit shall be used for all connections to motors and vibrating equipment and shall comply with Fed. Spec. WW-C-566.
  3. Liquid-Tight Flexible Metal Conduit shall consist of flexible steel conduit with a liquid-tight PVC jacket over the conduit.

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- a. Fittings shall incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening.
  - b. Liquid-tight flexible metal conduit shall be used in damp or wet locations when flexible metal conduit would otherwise be used.
  - c. Liquid-tight flexible metal conduit shall not penetrate the roof or exterior walls, and shall not be installed in lengths exceeding 72" except where necessary for flexibility.
4. All Wiring shall be type THW, XHHW, or THWN, UL labeled, copper conductors with 600-volt insulation, except as otherwise noted. Minimum size wire shall be No. 12 AWG.
- C. Fire-Stop Material:
1. Fire-stopping material shall maintain its dimension and integrity while preventing the passage of flame, smoke, and gases under conditions of installation and use when exposed to the ASTM E 119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Cotton waste shall not ignite when placed in contact with the non-fire side during the test. Fire-stopping material shall be noncombustible as defined by ASTM E 136; and in addition for insulation materials, melt point shall be a minimum of 1700°F for one-hour protection and 1850°F for two-hour protection.
  2. Seals for floor, exterior wall, and roof shall also be watertight.
- D. Grounding Conductors:
1. Grounding conductors shall be copper. Insulated grounding wires shall be UL and NEC approved types, copper, with THWN or XHHW insulation color identified green, except where otherwise shown on the drawings or specified.
  2. Wire shall not be less than shown on the drawings and not less than required by the NEC.
- E. Ground Clamps:
1. Ground clamps shall be cast bronze or cast copper and shall be UL listed for grounding connections.
  2. Ground clamps shall be sized for the specific conductor and electrode to be clamped.
- F. Equipment Grounding Connections: Connections shall be of the compression type solderless connectors.



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PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. All work shall be in accordance with the National Electrical Code's requirements as amended to date, with the local electric utility company's rules, the Fire Underwriter's requirements, and all local, state and federal laws and regulations.
2. In general, all wiring in finished areas shall be concealed in walls or above ceilings. Where wiring cannot be concealed due to existing construction, exposed wiring shall be installed in conduit or surface metal raceway as directed by the Engineer. Exposed wiring shall not be installed in finished areas without prior written authorization from the Engineer.
3. Conduits shall be of sizes required by the National Electrical Code. Exposed conduits shall be installed with runs parallel or perpendicular to walls and ceiling, with right-angle turns consisting of bends, fittings, or outlet boxes. No wire shall be installed until work that might cause damage to wires or conduits has been completed. Conduits shall be thoroughly cleaned of water or other foreign matter before wire is installed.
4. Where conduits, wireways and other electrical raceways pass through fire partitions, fire walls, or floor, install a fire-stop that provides an effective barrier against the spread of fire, smoke and gases. Fire-stop material shall be packed tight and completely fill clearances between raceways and openings. Floor, exterior wall, and roof seals shall also be made watertight.
5. Where raceways puncture roof, coordinate with Division 07.
6. All splices shall be mechanically and electrically perfect, using crimp type wire connectors.
7. Revise existing panelboard directories. Furnish new cards as needed. Directories shall be typewritten or printed using a computer.
8. Feeder circuit wiring shall be in conduit or EMT.
9. In general, conductors shall be the same size from the last protective device to the load and shall have an ampacity the same as or greater than the ampacity of the protective device where the wire size is not shown on the drawings. Use the 60°C ampacity rating for wire sizes No. 14 through No. 1. For 120V circuits, home runs longer than 100 feet shall be minimum No. 10 AWG, longer than 200 feet shall be minimum No. 8 AWG.

B. Grounding:

1. The entire electrical system shall be permanently and effectively grounded in accordance with Code requirements.
2. Connections to junction boxes, equipment frames, etc., shall be bolted.
3. Conduit Systems:
  - a. Ground all metallic conduit systems.
  - b. Conduit systems shall contain a grounding conductor sized per NEC Table 250-122 or as shown on the drawings. Increase conduit size where necessary to accommodate the grounding conductor.

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4. Feeders and Branch Circuits: Install green grounding conductors with all feeders and branch circuits.
- C. Alterations:
1. The Contractor shall study all drawings and specifications, visit the site, and acquaint himself with the existing conditions and the requirements of the plans and specifications. No claim will be recognized for extra compensation due to the failure of the Contractor to familiarize himself with the conditions and extent of the proposed work.
  2. The Contractor shall execute all alterations, additions, removals, relocations or new work, etc., as indicated or required to provide a complete installation in accordance with the intent of the drawing and specifications.
  3. Reconnect existing circuits to remain. Remove existing equipment to be discontinued.
  4. Any existing work disturbed or damaged by the alterations or new work shall be repaired or replaced to the Engineer's satisfaction.
  5. Equipment relocated or removed and reinstalled shall be cleaned and repaired to a first-class condition before reinstallation.
- D. Continuity of Services: Arrange to execute work at such times and in such locations to provide uninterrupted service to the building or any of its sections. If necessary, temporary power shall be installed to provide for this condition. Authorization for interrupting service shall be obtained in writing from the Owner. Any interruption of normal supply shall be performed during an overtime period to be scheduled with the Owner. Cost for overtime work shall be included in the bid.
- E. Identification: Provide tags on each end of all pulled wires giving location of other end.
- F. Record Drawings: The Contractor shall keep on the job a set of prints showing any changes to the installation. These shall be given to the Engineer at the completion of the work.
- G. Testing and Adjusting:
1. The entire installation shall be free from short-circuits and improper grounds. Tests shall be made in the presence of the Engineer or his representatives.
  2. Each system shall be completely tested and shall be adjusted for proper operation as required by the Engineer.

END OF SECTION 26 10 00

## SECTION 28 10 00 - ACCESS CONTROL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section Includes:

- 1. Access control system.

- B. Related Requirements:

- 1. Section 28 20 00 "Video Surveillance" to integrate video surveillance system interface and control.
- 2. Section 28 30 00 "Duress Alarm System" to integrate duress alarm system interface and control.

#### 1.3 DEFINITIONS

- A. GP: Data gathering panel.
- B. NFC: Near field communications.
- C. REX: Request-to-exit.

#### 1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.5 ACTION SUBMITTALS

- 1. Project general notes.
- 2. Head-end hardware, equipment, and device locations.
- 3. Block diagram and cable/conduit routing illustrating end-to-end system wiring where applicable.
- 4. End-to-end system communications details.
- 5. Secondary power calculations

- B. Field quality-control reports.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Sample warranties.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:
  - 1. Installation and programming instructions for operating system software, including all applicable software add-ons.
  - 2. Installation and programming instructions for antivirus and security protection software.
  - 3. Manufacturer's recommended setup and testing procedure for operating system software and applicable software add-ons.
  - 4. Troubleshooting instructions for operating system software and applicable software add-ons.
  - 5. Manufacturer's recommended setup and testing procedure
- B. Warranty documentation.

#### 1.8 REGULATORY AGENCY APPROVALS

- A. Submittals for access control system requiring approval by authorities having jurisdiction must be signed and sealed by qualified life safety professional engineer responsible for their preparation. Obtain approval by authorities having jurisdiction prior to submitting for action by Architect. Submit for action by Architect prior to submitting for approval by authorities having jurisdiction.

#### 1.9 WARRANTY FOR ACCESS CONTROL SYSTEM

- A. Special Installer Extended Warranty: Installer warrants that fabricated and installed access control system performs in accordance with specified requirements and agrees to repair or replace components that fail to perform as specified within extended-warranty period.
  - 1. Extended-Warranty Period: Three years from date of Substantial Completion; full coverage for labor, materials, and equipment.
- B. Special Manufacturer Extended Warranty: Manufacturer warrants that components of access control system perform in accordance with specified requirements and agrees to provide repair or replacement of components that fail to perform as specified within extended-warranty period.
  - 1. Initial Extended-Warranty Period: Five years from date of Substantial Completion; full coverage for all failed components, and equipment, freight prepaid

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2. Follow-On Extended-Warranty Period: Ten years from date of Substantial Completion; full coverage for all failed components, freight prepaid.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURER

- A. Access Control System (Basis of Design):
  1. Gallagher Group Limited, Gallagher Security's Command Centre
  2. Approved equal- to be determined by owner and engineer
- B. Alternate manufacturers and installers will be considered for approval provided minimum requirements for performance, service, and integration as specified herein are met. Additional, alternate manufacturers will be required to assemble a presentation for the Owner which includes qualifications, capabilities, features, and demonstration for all aspects of their proposed access control system.
- C. All products and installations in patient accessible areas shall be tamperproof.
- D. Installer Qualifications: Access Control System manufacturer's authorized representative who is trained and approved for installation of system components required for this Project.
- E. The above list of manufacturers applies to operator workstation software, controller software, the custom application programming language, and controllers. All other products specified herein need not be manufactured by the above manufacturers.
- F. Longevity: The Access Control system contractor shall have a minimum of ten years experience installing and servicing Access Control Systems. The contractor shall self-perform the installation with no sub-contractors utilized for system/component installation.
- G. Past Projects: The Access Control contractor shall have completed a minimum of three projects within the last five years that are at least equal in dollar value and scope to this project. A list of similar projects, dollar volume, scope, contact name and contact number shall be provided by the contractor if asked for by the owner.
- H. Personnel, Coverage and Response Capabilities: The contractor shall have a minimum of ten full time electronic service personnel within a 120 mile radius of the project location. One of the five full time electronic service personnel must work within a 60-mile radius of the project location.
- I. The contractor shall have an established 24-hour emergency service organization. A dedicated telephone number shall be provided to the owner for requesting emergency service. A maximum of four hour, electronic service technician on sight, response time shall be guaranteed by the contractor.

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- J. Parts Stocking: The contractor shall have an independently verifiable inventory of electronic service parts. This electronic service parts inventory must have a worth of at least \$100,000 per year over the last five years.

2.2 General

- A. This specification calls for the supply, installation, and commissioning of a complete Integrated Security Management System (**ISMS**) in accordance with appropriate local and international standards and the technical and performance criteria set out in this document.
- B. The system is to be supplied with all equipment, hardware, software, cabling, and ancillary services as required to provide an ISMS complete and functional in all respects. The tenderers are to familiarize themselves with all matters related to such requirements and to account for such in the tendered price.
- C. Other security system components not included in this specification shall be fully integrated with this ISMS.
- D. It is the responsibility of the tenderer to obtain clarification of all matters in which doubt exists as to the exact intent of this document or in which a conflict appears to have arisen. Such information must be obtained prior to the closing and lodging of tenders.
- E. The response shall clearly detail all pricing for components, cabling, installation, engineering, training, commissioning, setting to work, and a 24-month comprehensive warranty.
- F. The tenderer must include as part of the tender submission a complete, clause-by- clause response.

2.3 Response Format

- A. The tenderer shall respond to each clause with one of the following responses.
- B. Should the tenderer wish to clarify or amplify the response, then the clarification or amplification shall not change the given meaning of the response statement.

Response	Meaning
Complies	The equipment/system offered complies fully in all respects with the specification clause.
Substantially complies	The equipment/system offered does not comply fully but offers most or a substantial part of the requirements of the particular clause. Compliance in excess of 75% of the requirement qualifies for this category. Areas of non-compliance must be clearly identified and explained.

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Partially complies	The equipment/system offered provides only a part of the requirements of the clause. Less than 75% compliance with the clause should invoke this response. Areas of non-compliance must be clearly identified and explained.
Does not comply	The equipment/system offered does not provide the requirements of the particular clause.
Accepted	The tenderer understands and accepts the conditions imposed or enunciated by the particular clause and has included provision for such in the tender.
Not accepted	The tenderer does not accept the condition imposed by the particular clause and as such is not included in the tender. Reasons for non-acceptance must be given.

2.4 Product Competence

- A. The successful tenderer will be required to demonstrate their competence to supply, install, commission, and maintain the products proposed in the tender submission as follows:
  - 1. Provide a letter of reference from the product manufacturers confirming the
  - 2. tenderer’s status with the manufacturer, advising:
    - a. exclusive or non-exclusive agreement to provide the system in the geographical territory for this specific project,
    - b. the tenderer will be fully supported by the manufacturer in meeting the requirements of this specification.
  
- B. The tenderer shall provide evidence of competency in carrying out the following areas of work:
  - 1. system design,
  - 2. installation management,
  - 3. system configuration,
  - 4. system commissioning,
  - 5. system maintenance.
  
- C. When working on the installation of the ISMS, each employee of the successful tenderer shall be required to carry an identification card issued by product manufacturers and/or government accredited bodies displaying evidence of current training, the type of products they may install, and indicating the level of training.

2.5 Functional Overview

- A. The ISMS shall allow multi-site configuration and be able to be managed by one or more of the connected sites.
  
- B. The ISMS shall include in the core product code (but not be limited to) the following:

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1. access control,
  2. alarm management,
  3. personnel management,
  4. CCTV integration,
  5. visitor management,
  6. guard tours,
  7. perimeter deterrent and detection.
- C. The ISMS shall provide a means to control access through nominated doors having electric locking door status monitoring and token or biometric access control readers. Access rights associated with a presented access token or biometric identifier shall be checked for validity based on token or identifier, access area, access time and any other access management function defined in this specification. All validity criteria shall be stored at the IFC. Access shall be granted or denied dependent on the access privilege. Access privileges shall be programmed in a variety of ways to allow flexibility as defined elsewhere in this specification.
- D. The ISMS shall provide access control in elevators enabling access to any combination of floors over specified time periods. The interface to the elevator manufacturers equipment shall be by either low level interface (relay outputs) or by a high level (data) interface.
- E. The ISMS shall monitor the condition of inputs. The ISMS shall be able to be programmed to apply a variety of conditions to the way in which these inputs are monitored and shall enunciate the condition of such inputs in accordance with such programming.
- F. The ISMS shall provide a fully functional intruder alarm system including entry and exit delays where intruder detection sensors are connected to system inputs. The intruder alarm ISMS component shall be fully integrated with the access control aspects of the system. It shall be possible to set (secure) or unset (unsecure) areas from any access control reader associated with an area, access control reader with keypad, AMT, or as required from defined central control locations.
- G. The ISMS shall provide an integrated software facility for the design and production of photo ID cards.
- H. Connection between ISMS servers and IFCs shall be achieved using cabling supporting the TCP/IP protocol. The network connection must be on-board the IFC. Interface transceiver units (Ethernet to RS485, RS232 etc.) are not acceptable.
- I. The ISMS shall have IPv6 address support for all TCP/IP network devices.
- J. Remote IFCs not permanently connected to the network can be connected via a PSTN service, using TCP/IP protocols.
- K. IFCs must support peer to peer communications for input and output communications between IFCs. Systems that require a server for communications between panels are unacceptable.
- L. All data communication between the ISMS and IFCs shall use an industry standard asymmetric encryption algorithm for mutual authentication and session key negotiation. This algorithm shall



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be equivalent to ECC P-384 or stronger. Session keys shall be re-negotiated on a regular basis at intervals no longer than 30 hours.

- M. All data communication between the ISMS and IFCs shall be encrypted using an industry standard symmetric encryption algorithm equivalent to AES-256 or stronger.
- N. All data communication between IFCs shall use an industry standard asymmetric encryption algorithm for mutual authentication and session key negotiation. This algorithm shall be equivalent to ECC P-384 or stronger. Session keys shall be re-negotiated on a regular basis at intervals no longer than 30 hours.
- O. All data communication between IFCs shall be encrypted using an industry standard symmetric encryption algorithm equivalent to AES-256 or stronger.
- P. All data communication between IFCs and intelligent edge devices such as readers and I/O devices shall use an industry standard asymmetric encryption algorithm for mutual authentication and session key negotiation. This algorithm shall be equivalent to ECC P-256 or stronger. Session keys shall be re-negotiated on a regular basis at intervals no longer than 30 hours.
- Q. All data communication between IFCs and intelligent edge devices such as readers and I/O modules shall be encrypted using an industry standard symmetric encryption algorithm equivalent to AES-128 or stronger.
- R. All dry contact type input to field I/O modules must support four state monitoring with the ability to configure the resistance values of the state changes.
- S. The ISMS shall report all events to the operator(s) as configured and shall produce and maintain a log of all system events, alarms, and operator actions.
- T. The ISMS shall provide a means for an operator to extract information relative to the event log and system configuration and produce this information in the form of printed reports, emailed reports directly from the ISMS itself, screen displays, or exported files.
- U. The ISMS shall provide for a GUI with site plans and interactive icons representing the location and real-time status of all monitored hardware within the ISMS.
- V. The ISMS shall provide emergency evacuation reporting.
- W. The ISMS shall be designed and manufactured by a company who shall be certified under the ISO 9001:2008 (or later) quality procedures.
- X. Where applicable, equipment shall have the following approvals:
  - 1. FCC Part 15,
  - 2. CE approval BS EN 50130-4 Alarm Systems Electromagnetic Compatibility (Immunity),
  - 3. CE approval BS EN 55022 Emissions,
  - 4. UL294 Access Control,

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5. UL1076 Burglar Alarms,
6. ULC-ORD-C1076.

Y. Encoders and readers shall also meet:

1. CE ETS 300 683 Short Range Devices,
2. C-Tick AS/NZS 4251 Generic Emission Standard,
3. C-Tick RFS29.

Z. The ISMS software shall be written in a fully structured, fully validated, and commercially available language that provides a strictly controlled development environment.

AA. Comprehensive backup and archiving facilities shall be incorporated as an integral part of the ISMS.

BB. The ISMS shall include partitioning suitable for multi-tenanted buildings. Users shall only be able to access those parts of the system which fall within their partition.

## 2.6 Licensing

A. If system licensing is required, the license to use the system shall allow usage in perpetuity.

B. Details of the license model shall be provided in the tender response.

C. Licensing shall permit all operational requirements for a specific system. This shall include but not limited to:

1. the live (operational) system,
2. temporary test installations used for investigating configuration options or new software releases,
3. secondary installations required for standby operation.

D. Updating of license content to make changes to the number of licensed items shall not require a server restart.

E. It is acceptable to require a restart to allow incorporating additional features to the license.

F. The license content shall be viewable from within the ISMS GUI.

## 2.7 System Requirements

A. The system shall be in commercial operation with the same or similar configuration as detailed in this specification and shall be available for inspection. A reference list of such similarly configured systems shall be submitted with the tender response.

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B. The system described in this specification must have the following capacity as a minimum:

1. Configured workstations 300
2. Graphical site plans Unlimited
3. Access readers Unlimited
4. Elevators 1000 elevators of 256 levels each
5. Fully supervised 6 state alarm inputs Unlimited
6. Output relays Unlimited
7. Access control zones Unlimited
8. Schedules per day 100
9. Schedule categories 50
10. Holiday days 30
11. Operators Unlimited
12. Concurrent operator sessions 100
13. Cardholders 500000
14. Cardholder card issue levels 15
15. Cardholder configurable data fields >1000
16. IFC 10000

C. The system architecture shall be a tiered system consisting of:

1. one installation of the head-end software application operating on a main server,
2. operator workstations as a sub-set of the application installed on the server,
3. IFCs managing the system in a distributed intelligence format,
4. semi-intelligent sub-units (output modules, input modules, readers, etc.) which rely on IFCs to function.

## 2.8 System Servers and Workstation Installation

- A. The server shall use a Microsoft Windows (64 bit) operating system. Server operating systems such as Linux, Unix, and OS X shall not be acceptable.
- B. The operating system used by the system server shall be Microsoft Windows Server 2022.
- C. The operating system used by the workstations shall be Microsoft Windows 10 Professional (64 bit) or Windows 11 Pro.
- D. The database engine used by the system shall be one of the following:
  1. Microsoft SQL Server 2019 (64 bit), or
  2. Microsoft SQL Server 2019 Express (64 bit).
- E. Workstations shall support multi-monitor operation, allowing an operator to configure one or more monitors for each workstation.
- F. Workstation display resolution shall be a minimum of 1920 x 1080 pixels.
- G. Workstation shall be able to use up to 4Gb of RAM.

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2.9 Central Control and System Management Software

- A. The ISMS servers shall use a Microsoft Windows operating system as defined previously.
- B. The system database shall be a version of Microsoft SQL Server appropriate for the system size required. The version of Microsoft SQL Server is among those defined previously.
- C. The connection between ISMS and Microsoft SQL Server shall use Windows Authentication.
- D. The ISMS shall employ a server incorporating current generation design and components. The hardware specification, including processor speed, internal memory and hard disk size shall be specified by the supplier and must be sufficient to meet or exceed the capacity and throughput of the specified system.
- E. The ISMS shall be capable of supporting a minimum of 100 hardware-based operator workstations running concurrently. Operator workstations running terminal emulation software will not be accepted.
- F. The ISMS shall automatically log and time/date-stamp all events within the system including intruder alarm set/unset events, access control events, operator actions and activity.
- G. The configuration GUI shall make extensive use of menus and windows and require a minimum of operator training to operate the system proficiently. Systems requiring a script/program language approach to configure the system will not be accepted.
- H. A free text notes/memo field shall be available for each logical/physical object to store abstract information relating to that item.
  - 1. The notes field shall support 128,000 characters of text.
  - 2. The notes field shall support word-wrap, insert, delete, cut, copy and paste functions.
- I. The ISMS must be capable of receiving simultaneous alarm signals from remote locations without loss or excessive delay in their presentation to the operator. Any authorized operator should be allowed to acknowledge, view and/or process an alarm.
- J. The ISMS shall be fitted with a real-time clock, the accuracy of which shall be preserved over the period of a mains power supply failure. Time synchronization between the ISMS and Ethernet connected IFCs shall be automatic and not require operator intervention.
- K. Operator selection of processing tasks shall be via menu selections. Authorized operators shall be able to process alarms, produce reports, and modify items without degrading system performance.
- L. The following is the minimum operational and monitoring functions required. The ability to:
  - 1. program either a group or individual card readers with access control parameters, without affecting other card readers,
  - 2. program the access criteria for individual cardholders or groups of cardholders,

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3. store non access control data fields for each cardholder. The names of these data fields shall be user-definable,
  4. authorize or de-authorize a cardholder in the system with the result reflected immediately throughout all access points in the system,
  5. enable a card trace against selected cardholders so that an alarm is raised each time that cardholder presents their access card or token,
  6. pre-program holidays so that different access criteria apply compared to normal scheduled days. The system must have a capacity to set at least 400 holiday days,
  7. recognize and manage regional holiday requirements,
  8. define as many access zones as there are card readers fitted,
  9. allow or disallow individual cardholder access to any single, or group of card readers, in real-time,
  10. log all ISMS and operator activity to hard disk as it is received at the ISMS server,
  11. program alarm response instructions into the system so that these are presented to the operator when processing an alarm event,
  12. enable an operator to enter messages against alarm events. This may be an enforced operator operation based on configuration on a per operator basis,
  13. configure user-definable short messages to allow the operator to enter commonly used comments with minimal effort when entering messages related to alarms. For example, false alarm, user error, etc. These messages should also be assigned to keyboard shortcut keys to enable faster commenting on alarms,
  14. temporarily override a cardholder, or group of cardholders, pre- programmed access criteria.
  15. Update multiple AMTs display messages quickly using the bulk change feature
- M. The operator GUI shall display a one-line plain language event message for every activity event (alarm or otherwise) occurring in the system. All activity logged shall be time and date stamped to the nearest second (hh:mm:ss). On having the appropriate operator authorization, it shall be possible to drill down into the properties of each component that makes up that event. The event message shall advise:
1. the time of event created at the IFC,
  2. the time the event was received at the ISMS server,
  3. the source of the event,
  4. any successful or unsuccessful access attempt,
  5. if the access attempt is unsuccessful, the reasons for the denial.
- N. This includes but is not restricted to the following items:
1. all card attempts,
  2. all door alarms,
  3. all operator activity including logon, logoff, and alarm response messages,
  4. all alarm monitoring activations,
  5. all communication link failures.
- O. Time schedules for different days shall be configurable.
- P. Regional holidays shall be configurable to allow for regional variations.

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- Q. The system shall provide a detailed operator help file. This help file shall provide operators with text, audio, and video, help instructions and tutorials.
  - R. The system shall allow for searching of items configured within the system based on the following:
    - 1. item characteristics,
    - 2. related items,
    - 3. times related to events including within properties of a configured item (creation and modification events).
  - S. The system shall integrate with Microsoft Active Directory enabling cardholder and user records to be fully synchronized on a real-time, bi-directional basis.
    - 1. Integrations that use third party applications to synchronize between Microsoft Active Directory and the system shall not be acceptable.
  - T. The system shall allow for a separate biometric operator privilege.
  - U. The system shall be able to find unmigrated and duplicate DesFire cardholder keys
  - V. ISMS shall be able to purge pending queued messages from IFCs as required by the user with this privilege.
  - W. ISMS shall be able to deploy IFC firmware as follows via an upgrade tool.
    - 1. On demand
    - 2. On a predetermined schedule
  - X. ISMS shall allow the user to track IFC firmware deployments status via the upgrade tool.
- 2.10 Communications and Diagnostics
- A. The ISMS shall automatically restart full and complete processing after a power failure.
  - B. The ISMS shall provide a full diagnostic log to enable system engineers to monitor system operations in the event of a system malfunction.
  - C. The diagnostic log shall be stored in a separate file on hard disk from all other data files.
  - D. The diagnostic log must be available without shutting down or pausing the ISMS.
  - E. The central control shall provide system diagnostic facilities which enable authorized operators or systems engineers to monitor and then tune the system performance (communications network performance tuning, for example).
  - F. ISMS shall be able to send the IFC its IP address

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- G. ISMS shall be able to accept requests from anywhere on the internet and connect these requests securely and easily to REST APIs hosted on an on-premise system using a WebSocket tunnel between the ISMS and the API gateway.
- H. API gateway shall have multiple redundant services internally allowing for zero- downtime upgrades, hardware and software fault tolerance and scalability.
- I. API gateway shall use TLS client certificates for Rest API requests.
- J. ISMS real-time data feeds shall integrate with Windows OS performance monitor

2.11 Cybersecurity

- A. The ISMS manufacturer shall supply documentation detailing the cryptography used in the supplied products including:
  - 1. included digital certificates,
  - 2. database encryption,
  - 3. server to workstation connections,
  - 4. server to IFC connections,
  - 5. data at rest on IFC.
- B. The ISMS manufacturer must provide proof of independent penetration testing for the release of software to be installed.
- C. Vulnerabilities found in the ISMS software must be notified to customers via a CVE Entry for a minimum of two years after software release.
- D. The ISMS manufacturer shall supply a software tool external to the ISMS server to test the installed server for vulnerabilities.
- E. The system SMTP library shall support Microsoft office 365.
- F. The system shall support a SQL Database monitor service which logs SQL Database login attempts.

2.12 Multiple Server Connectivity

- A. ISMS based on multiple servers shall be supported.
- B. Each server shall communicate directly with its local IFCs.
- C. Should a network failure occur between servers, each shall continue to communicate with their local IFCs.

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- D. Should a network failure occur between servers, operators shall be able to continue to manage the local system connected to their respective servers. This includes (but is not limited to) the following functions:
1. manage alarms,
  2. override and manage doors,
  3. arm and disarm alarms,
  4. edit cardholders,
  5. run reports.
- E. Alarms and events from all servers shall be able to be displayed on any or all of the system workstations.
- F. The cardholder database shall be automatically replicated to all servers as a global entity.
- G. Replication of cardholder changes shall occur as changes are made and not batch processed.
- H. Communication between servers shall be peer to peer.
- I. The multiple server environment shall allow for evacuation reports for each site on the multiple server system to be generated on one server, for one or more remote servers.
- J. Operator GUI views and program access privileges shall follow the same rules across multiple servers as apply within a single server.
- K. ISMS items configured on existing servers shall automatically be recognized by any servers added to the multiple server group. Likewise, ISMS items configured on the server(s) being added shall be automatically recognized by the existing multiple server group.
- L. Use of software interface custom written modules or scripts to connect servers into a multiple server configuration shall not be permitted.
- M. Manual or script re-entry of data for existing servers into any new servers being added to the multiple server group shall not be permitted.
- N. Synchronization of data across all servers shall be an automatic real-time function not requiring operator intervention or initializing.
- O. Should communication be lost between two or more servers, the individual servers shall continue to function independently and shall resynchronize all changes made whilst off-line automatically after reconnection to peer servers.
- P. Should a conflict occur resulting from two items being created in two or more servers whilst servers are off-line then an alarm shall be raised when the servers are re-joined advising of the conflict.
- Q. Should an existing record be modified in two or more servers whilst the servers are off-line then on reconnection, the modifications shall be carried out in time order of the modifications.



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- R. There must be a native tool within the operator GUI to remove redundant servers from a multiple server configuration. The use of scripts or external applications is not allowed.

2.13 Graphical Operator Interface

- A. Configuration or operation using scripting or other forms of text-based programming will not be accepted.
- B. There shall be a user configurable view, designed specifically for the task and the information needs of the operator.
- C. Default operator views shall be provided covering the primary site management functions of:
  - 1. events,
  - 2. alarm management,
  - 3. cardholder management,
  - 4. access management,
  - 5. site monitoring,
  - 6. calendars and scheduling,
  - 7. macros,
  - 8. operator management,
  - 9. mobile device management,
  - 10. site wide system changes,
  - 11. reports.
- D. The ISMS shall allow the creation of customized views to enable operators to access information relevant to a specific business workflow within one screen.
- E. The operator GUI shall be fully configurable by an operator with authorization to configure the GUI.
- F. The operator GUI may be dynamically separated into multiple windows to allow for multi-monitor operation, closing the secondary GUI will automatically return navigation items to the primary GUI.
- G. The primary operator GUI will always display an alarm count differentiated by alarm priority.
- H. Each view shall consist of a navigation menu area and a dynamic viewing area as detailed below.
- I. The navigation area shall provide a list of relevant data related to a specific workflow as defined by the task at hand.
- J. It shall be possible to select and order the columns of data in the navigation area associated with alarm and cardholder views.
- K. Dynamically updated search results shall be provided when typing into the search field for a cardholder view.

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- L. Selection of a line item in the navigation area shall cause the associated dynamic information viewing area to be populated with data relevant to the selected item.
- M. Within the dynamic viewing area one or more data tiles shall be provided to display detailed data associated with the navigation area item selected.
- N. Data tiles shall be able to be created based on a range of default tiles provided for this purpose.
- O. Each data tile shall be configurable with the required data fields as determined by the function of the tile.
- P. Data tiles shall be maximized to enlarge the display area for that data by single click operation. Another single click operation on this tile will return all tiles to original size and location.
- Q. When a data tile has been maximized, other tiles shall remain visible in thumbnail format, allowing a single click to make them the selected maximized data tile.
- R. Where applicable, minimized tile icons shall display dynamic content.
- S. There shall be provision for displaying data tiles within the dynamic viewing area that link to external sources.
- T. The linked data tile shall allow either a URL address, PDF, or TXT file to be selected.
- U. Navigation from a URL shall be configured either as:
  - 1. navigation enabled,
  - 2. restricted navigation allowing navigation to hyperlinks on the site but not to enter a URL,
  - 3. navigation disabled.
- V. Auto refresh of a URL shall be configurable down to 1-minute resolution.
- W. An event view shall be available with the following capabilities:
  - 1. allow the operator to view events in real-time,
  - 2. the displayed data columns shall be configurable,
  - 3. the columns shall be sortable,
  - 4. auto scroll capability.
- X. The event view shall also allow the operator to search for and select historic events, even when they have been cleared from the real-time view window. This shall include:
  - 1. search based on time/date,
  - 2. search based on the source of the event,
  - 3. the selected historic event shall appear in the event window with the same relevant data as if it were a real-time event,
  - 4. display a count of the number of events which were found.

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- Y. When a single event has been selected the following information shall be possible to be displayed:
  - 1. instructions for the operator,
  - 2. details of the event,
  - 3. site plan,
  - 4. cardholder image (where appropriate to the event),
  - 5. video camera feed (where appropriate to the event),
  - 6. recent event history for the door (where appropriate to the event),
  - 7. recent event history for the cardholder (where appropriate to the event).
- Z. The system shall support Microsoft Edge as the default browser if WebView 2 Runtime is installed on workstations.
- AA. 12.27 Calls from supported intercoms shall be managed from a central location from within the GUI using a unified intercom viewer.

2.14 System Operator Management

- A. Operator establishment and maintenance shall be a restricted privilege.
- B. It shall be possible to define specific ISMS privileges for a group of operators and an individual operator can be added or removed to this group without changing any other properties of that group or the operator than this relationship.
- C. Operator access to the operator GUI is to be restricted by means of a unique operator identifier and password.
- D. It shall be possible to apply password restrictions that consist of (but are not limited to) the following:
  - 1. minimum password length,
  - 2. mixed case,
  - 3. mixed alpha and numeric characters,
  - 4. mandatory change of password after a defined period,
  - 5. remembering and rejecting at least 999 previously used passwords.
- E. There shall be default password restrictions that cannot be disabled as follows:
  - 1. Passwords must not contain the login name, first name, or last name of the operator
  - 2. There shall be a file containing common passwords that will not be allowed, this file will be editable by the customer to strengthen or relax the disallowed passwords.
- F. The system shall support an Active Directory Single Sign-On feature to allow access to the operator GUI without password if they are already logged into an authenticated Windows session.
- G. Each operator shall have the authority to alter their own password.

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- H. Automatic logoff may occur after a preset time of up to 1440 minutes of operator inactivity.
- I. It shall be possible to configure the system to only allow one simultaneous logon per operator.
- J. It must be possible to allow or deny operators access to various menu functions.
- K. It shall be possible to blend the right to view groups of system objects for different operators; i.e. an operator in building 1 can see alarms for building 2 but is not able to
- L. perform any function on them. An operator in building 2 has the inverse relationship and can only action alarms for building 2 but still view alarms in building 1.
- M. Any menu option not available to an operator should be either greyed out or not visible.
- N. It shall be possible for a suitably authorized operator to view all connected data sessions on the ISMS, and the following minimum information shall be displayed:
  - 1. device name,
  - 2. login credential,
  - 3. session type, i.e. operator GUI, mobile application, data connection OPC/XML etc.,
  - 4. session status,
  - 5. it shall be possible for a suitably authorized operator to terminate any data session.

2.15 Cardholder Management

- A. The cardholder database shall be structured so that the name field is the master field for each record. A background unique identifier may be used as the key field for each record, but this must not be required by an operator to identify a cardholder. Use of the card number as the key field is not acceptable.
- B. The system must allow at least 15 issue levels per card or token. This must deny access and raise an alarm to the operator when a wrong issue level is presented to a reader.
- C. Cardholders must be able to be issued with more than one unique access token (i.e. access card, biometric identification, and vehicle token) whilst maintaining only one cardholder record in the database.
- D. Where biometric identification is required, the biometric data shall be a property of the cardholder record.
- E. Encoding and printing cards shall be properties of the cardholder record.
- F. The options for encoding and printing shall be:
  - 1. print card,
  - 2. encode card,
  - 3. print and encode card in a single operation.

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- G. It shall be possible to prevent the duplication and/or re-printing of cards on a per operator basis.
- H. Where a PIN is assigned to a card it should be stored in the database of the ISMS not as part of card data.
- I. There must be an option to save a copy of the PIN for later retrieval for forgotten PINs, if this option is not selected then a cardholder's PIN will be saved in a one-way hash to the database.
- J. Card numbers shall be enrolled against a cardholder by manually entering the card number or in the case of any Mifare technologies, a reading device connected directly to a workstation.
- K. Access groups shall be linked to cardholders by both assigning access groups to cardholders or cardholders to access groups.
- L. At least 64 user-definable data fields shall be provided which may be selectively reported on.
- M. cardholder data fields shall be able to be configured as:
  - 1. text; user data may be entered,
  - 2. text list; operator selects text from a pre-prepared list of text strings,
  - 3. numeric; operator must enter numeric data,
  - 4. date; calendar dates may be entered based on the workstation date format,
  - 5. default value; the field has a default value assigned,
  - 6. no default value; default value disabled,
  - 7. image; the field may only contain an image,
  - 8. email/mobile; the field contains an email address or mobile number to be used for communication by the ISMS,
  - 9. required field; the value may not be null,
  - 10. unique values; data must be unique from all other cardholder records.
- N. Cardholder data fields shall support regular expression rules to ensure data accuracy. Examples: @ in email addresses; employee codes are in the correct format.
- O. It shall be possible to group or filter cardholders for the purposes of editing access, generating reports, and assigning operator privileges.
- P. The following information fields shall optionally be displayed on the cardholder editing window:
  - 1. the date when a cardholder record was created,
  - 2. the date when the record was last modified,
  - 3. access groups that a cardholder is a member of,
  - 4. for ease of programming, cardholders shall be grouped into access groups sharing the same access criteria and default cardholder data fields,
  - 5. it shall be possible to allocate start and end dates and times for an access groups membership,
  - 6. cardholder additional data fields,
  - 7. images which may include photos, signatures etc,
  - 8. allocated cards,

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9. it shall be possible to enter an expiry date/time for the card,
  10. cardholder qualification information relating to fields such as “Security Clearance”, “Safety Induction” etc,
  11. a URL link to additional information which may be located on the customer intranet, or the internet.
- Q. Access shall have start and end dates and time to within one minute.
- R. The system shall be capable of importing database information, on selected cardholders, from other systems and be capable of exporting that cardholder’s data, either with or without controlled alteration or amendment to other databases.
- S. The system shall support the capability to allow bulk changes to cardholder records. It shall be possible to carry out the following changes as a bulk change:
1. delete selected cardholder records,
  2. change custom cardholder data fields
  3. change cardholder card details,
  4. change cardholder access options.
- T. The system shall support the ability to bulk change the system division that database objects are assigned to.
- U. A bulk change shall be able to be saved and scheduled to run at a later time.
- V. A window shall be provided to show details of created, saved, edited, pending, successful, and failed bulk changes.
- W. A personal user code (4 to 8 digits) shall be a property of the cardholder record to allow access via readers with a keypad and to arm and disarm alarms.
- X. Operator management shall be a property of the cardholder record.
- Y. A change history record associated with each cardholder record shall list all changes made to a cardholder record, including details of which operator or API login made the changes.
- Z. The system shall support an event trail for the cardholder which details recent card usage events for the cardholder as well as operator events which have modified the cardholder record.
- AA. The number of prior events to be shown or prior length of time to be covered shall be configurable.
- BB. The system shall allow different prior length of time / number of prior events to be displayed for different operators.
- CC. The cardholder record screen shall display a real-time event trail of cardholder activity.
- DD. The system shall allow an operator to search for a cardholder by entering any part of their first and/or last name, in any order and separated by a space if using both. After three characters have

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been entered the system shall automatically return matching results and filter these dynamically as the operator continues to type.

- EE. The system shall allow the cardholder search fields and search results to be configurable. The system shall allow different operators to use and see different search fields and search results for cardholder administration tasks.
- FF. The system shall allow the information returned for a cardholder and visible to the operator to be configurable and include any sub-section of the total information stored in the cardholder record (e.g. custom data fields, cards, access groups, biometric information etc). Different operators shall be able to view different sub-sections of the cardholder information.
- GG. It shall be possible to locate a cardholder record by presenting their card to a reading
- HH. device connected directly to an operator's workstation.
- II. The system shall allow cardholder information to be viewed and updated in one screen.
- JJ. Configuring operators shall, subject to the required privileges, be able to design a single screen cardholder management view adapted for the specific screen resolution of the operator(s) who will use the view, to ensure best use of available screen real- estate.
- KK. The system shall be able to display up to 30 historical cardholder activity items instantly in a viewer.

2.16 Photo ID Badging and Image Management

- A. The ISMS must have an integrated card design program. Systems offering a separate card design program where card designs must be created in alternate drawing programs and imported are not acceptable.
- B. The ISMS shall provide a means to:
  - 1. electronically capture images,
  - 2. store the images in the server database,
  - 3. integrate those images into a pre-designed ID card from within the system,
  - 4. produce an integrated and finished identification card.
- C. The ISMS must be capable of storing at least three images per cardholder.
- D. The ISMS offered shall capture images in 24-bit color and at least 800 x 600 pixel resolution, using standard video capture hardware offering a TWAIN, Direct Draw standard interface, or a USB digital camera.
- E. Images must be able to be cropped after capture to optimize the image size within the desirable image area. This size of the movable cropping box must be user-definable.
- F. The image capture editing controls must be integrated into the system software.

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- G. The ISMS shall store images in the JPEG compression format. User definable compression rates shall be easily selectable by the operator, a minimum of three levels of JPEG compression are required.
- H. The facility to import background images from other sources into the card designer must be available.
- I. The ISMS offered shall be capable of importing image files, for use in either card layout or cardholder images, from at least the following formats:
  - 1. JPEG,
  - 2. Windows BMP,
- J. The card design must be capable of incorporating, storing, printing and displaying bar- code information and must support the following bar-code formats:
  - 1. EAN 13,
  - 2. EAN 128,
  - 3. UPC A,
  - 4. UPC E,
  - 5. Code 39,
  - 6. Code 128,
  - 7. Interleaved 2 of 5,
  - 8. Codabar,
  - 9. Telepen,
  - 10. PDF417.
- K. The card design must be capable of user-selecting up to 16.7 million colors with a custom color palette available.
- L. Card design must be accomplished using drag and drop options via a mouse.
- M. Card design must support both sides of the card.
- N. The system shall be capable of linking data relating to the cardholder and printing it the card. This data shall include (but not be limited to):
  - 1. first name,
  - 2. last name,
  - 3. card number (displayed as text and/or barcode),
  - 4. card issue level,
  - 5. expiry date,
  - 6. personal data as defined in the cardholder database.
- O. The system must be capable of using all installed word processing fonts and must also be capable of normal text manipulation including, text sizing, left and right justification, centering, bolding, underlining and italicizing.



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- P. The image files that are selected to incorporate into the card design must be scalable on the card. When scaling the image, the card designer must offer automatic aspect ratio adjustment throughout the size range.
- Q. The system shall be capable of producing hard copy output of images and data using any standard MS-Windows printer.
- R. Cards must be capable of either landscape or portrait printing and barcodes must be capable of either vertical or horizontal orientation on the card when printed.

2.17 Intruder Alarm System

- A. The ISMS will incorporate a fully functional intruder alarm system.
- B. All inputs globally within the system must be able to be utilized as intrusion alarm inputs to allow intruder detection sensors to be connected to the system.
- C. All outputs anywhere within the system shall be available for intruder alarm purposes such as sounding remote sirens etc.
- D. Arming and disarming the intrusion detection system shall be either by using card readers, alarm management terminals, key-switches or schedules.
- E. It shall be possible for the system to cause readers to beep during entry and exit delays.
- F. It shall be possible for the system to active outputs during entry and exit delays.
- G. It shall be possible to configure the system to isolate faulty external devices so as not to trigger false alarms.
- H. It shall be possible to configure the system to fail to arm if an input point is active.
- I. It shall be possible to configure the system to fail to arm if an input point has unacknowledged alarms.
- J. It shall be possible for the system to cause readers to beep when alarms are present in the system.
- K. It shall be possible to set the system to a test mode to allow for testing and maintenance.
- L. The intruder alarm zone and the access zone for an area shall be treated as separate logical items.
- M. The intruder alarm system shall provide a dependency feature whereby an alarm zone does not go into the set state until all dependent alarm zones are in the set state.
  - 1. If the alarm zone is set (armed) and the access door is secure:
    - a. A cardholder shall require authorization to both unset (disarm) the intruder alarm zone, and to access the access zone to be allowed access.

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- b. If the cardholder is not authorized to unset the alarm zone or not allowed to access the access zone, then access shall be denied.
    - 2. If the alarm zone is unset (disarmed) and the access door is secure:
      - a. A cardholder shall require access to the access zone only for access to be allowed.
      - b. If the cardholder is not authorized to access the access zone, then access shall be denied.
    - 3. For normal operation, after an authorized token is presented, and access is granted, then the alarm zone shall remain unset after the door relocks.
    - 4. As an optional function, the alarm zone may auto-set after a predetermined time period.
  - N. When specified, alarm monitoring may use a connection with central alarm monitoring stations via digital communicators using Contact ID format, connected directly to the IFC panels.
  - O. Connection with central alarm monitoring stations may be by TCP/IP or cellular networks.
    - 1. It shall be possible for alarms from one IFC to be transmitted via a second IFC where the digital communicator is installed. (Peer-to-peer communications).
    - 2. Digital communicators are to be able to communicate alarms from all system IFCs, independent of system server.
    - 3. The system shall report and log all digital communicator activity and the reason for any failure to communicate.
    - 4. The system shall provide for up to two back up communicators on different IFCs to provide automatic backup capability should the designated digital communicator fail to operate on the appropriate alarm condition.
  - P. Cardholders shall be assigned to groups, to which any combination of the following intruder alarm privileges relating to the operation of the system may be assigned:
    - 1. unset intruder alarm zones,
    - 2. set intruder alarms zones,
    - 3. status of alarms and inputs on AMT,
    - 4. acknowledge alarms,
    - 5. shunt inputs,
    - 6. force-arm alarm zones,
    - 7. auto-isolate alarm zones.
- 2.18 Alarm Management
- A. The ISMS shall provide entry and exit delays for the setting (arming) and unsetting (disarming) of alarms.
  - B. The entry delay shall be configurable from 0 to 999 seconds in increments of one second.
  - C. An optional audible warning must sound during the entry delay (from the time the alarm occurs to the time that the zone state is changed). It must be possible to designate specific card readers

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and Alarm Management Terminals (AMTs) to sound entry delay warning beeps. Selected output relays should also be able to be operated during the entry delay period allowing suitable sounders to be connected at required locations.

- D. The exit delay shall be configurable from 0 to 999 seconds in increments of one second.
- E. An optional audible warning must sound during the exit delay (from the time that the alarm occurs to the time that the zone state is changed). It must be possible to designate specific card readers and AMTs to sound exit delay-warning beeps. Selected output relays should also be able to be operated during the exit delay period allowing suitable sounders to be connected at required locations. This applies to both manually and automatically changing the state of a zone in the case of automatically changing the state of a zone the exit delay and audible warning gives people working late in the building time to unset the alarms or leave the building.
- F. The system shall include an alarm escalation as a feature. The new event shall correspond to the original alarm but will have a higher priority and may include a different set of alarm relays to operate.
- G. Escalated alarms shall be able to be displayed in a window specifically provided for this purpose.
- H. Alarms shall be able to be escalated under the following conditions:
  - 1. Escalate if the alarm is not acknowledged for a period of time. This must be configurable from 0 to 9999 seconds in increments of one second.
  - 2. Escalate if the alarm point remains in an active state for a period of time. This must be configurable from 0 to 9999 seconds in increments of one second.
  - 3. Escalate if a user defined zone contains a specified number of unacknowledged alarms from any number of alarm points. This must be configurable from 0 to 99.
  - 4. Escalate if there are two events from the same alarm point within a user- defined period of time. This must be configurable from 0 to 9999 seconds in increments of one second.
  - 5. Escalate if there are two events from different alarm points in a defined group within a user-defined period of time. This must be configurable from 0 to 9999 seconds in increments of one second.
- I. It shall be possible to have automatic time-based setting and unsetting of alarms.
- J. It shall be possible to configure the system such that events (such as a card badge or operation of a key switch connected to an input) can change the state of an alarm zone.
- K. Authorized cardholders shall be allowed to set and unset alarm zones by:
  - 1. code access at an AMT,
  - 2. operation of the card plus PIN reader at an AMT,
  - 3. presenting a valid access card to a card reader associated with the alarm zone, twice within a nominated time period (double card badging).
- L. It shall be possible to set and unset multiple alarm zones from an AMT.

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- M. All alarm occurrences shall be presented at the ISMS within 5 seconds of their occurrence at the remote field device.
- N. All alarm events shall be viewable from an alarm stack.
- O. It shall be possible to view all alarm events by clicking on interactive site plan icons that, because of their changing audible and visual states, indicate the presence of alarms.
- P. All alarm events arriving at the central control shall be time-stamped with the time they occurred and the time they were logged at the ISMS.
- Q. All alarm events shall have a user-definable alarm priority assigned. A minimum of 8 alarm priority levels plus non-alarm event and ignore event shall be provided.
- R. Incoming alarms shall be presented in the alarm stack according to their assigned priority with the highest level at the top. Alarms with the same priority shall be presented in time order.
- S. It shall be possible to assign a different audio warning sound to each alarm priority.
- T. It shall be possible to assign a system definable color to each alarm priority.
- U. Identical consecutive alarms that occur within a predefined time span shall be report as a single alarm with the number of occurrences reporting as a flood alarm quantity.
- V. The ISMS must be able to control the priority assigned to any alarm activation according to a schedule. This means an alarm activation may be programmed as “Low Priority” during office hours and “High Priority” at other times.
- W. It shall be possible to nominate an input (e.g. smoke, fire, or gas detection) as an “Evacuation Input” in which case certain doors within the site will change immediately to free access.
- X. The ISMS shall support two-stage alarm processing as:
  - 1. Acknowledge alarm:
    - a. An acknowledged alarm shall remain in the alarm stack and be easily identified as having been acknowledged but not yet processed.
    - b. The ISMS shall record in the hard disk activity log that the operator has acknowledged the alarm.
    - c. A second alarm from the same source as the acknowledged alarm shall be indicated as a new alarm.
  - 2. Process alarm:
    - a. A processed alarm shall clear from the alarm stack.
    - b. The ISMS shall record in the hard disk activity log that the operator has processed the alarm.

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- Y. The system shall allow an operator to multi-select contiguous or non-contiguous alarms in the list to add a note, acknowledge, or process all selected alarms in one action.
- Z. The alarm list shall support mandatory fields of alarm time, alarm priority and alarm state.
- AA. the ISMS shall allow a suitably privileged operator to configure any of the following additional fields to be visible in the alarm list and to configure their order:
  - 1. full alarm message,
  - 2. related cardholder name,
  - 3. acknowledging operator name,
  - 4. alarm Zone,
  - 5. alarm source,
  - 6. related access zone,
  - 7. event type,
  - 8. event group,
  - 9. division of the alarm source,
  - 10. count (occurrences of alarm).
- BB. It must be possible for an operator to sort the alarm list by any of the available fields.
- CC. The ISMS shall display a summary of alarms, by priority, which is always visible to the monitoring operator and updated dynamically as new alarms occur or existing alarms are actioned.
- DD. The alarm summary shall indicate if there are any unacknowledged alarms for a given priority.
- EE. The ISMS shall allow configuration of filtered alarm lists. Alarm lists shall be filterable based on any combination of selected divisions, escalation status or alarm priority.
- FF. The ISMS shall allow different information to be configured and displayed to a monitoring operator based on the type of alarm.
- GG. “Door Open Too Long” alarms must display selected and configurable information. Including, as an example, the photo and contact details for the cardholder who left the door open, i.e. last successful access.
- HH. Cardholder related alarms shall automatically display recent events and selected information (name, photo, personal details etc.) for the cardholder causing the alarm.
- II. An active alarm shall not be able to be finally processed and cleared from the alarm window until the cause of the alarm has been removed and the alarm condition has returned to the normal state.
- JJ. Pre-programmed alarm instructions shall be available for the operator to provide instructions for acknowledging and processing each alarm.
  - 1. Alarm instructions shall have the following features:

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- a. Default alarm instructions shall be able to be programmed and automatically applied to all events of a common type e.g. all wrong PIN events applicable to all readers.
  - b. Individual alarm instructions shall be able to be programmed and applied to individual alarm events.
  - c. A repository of configurable data fields of volatile information shall be available when programming alarm instructions, and applied to alarm instructions via text tags or drag and drop.
  - d. When the data fields in the repository are updated, the linked alarm instructions shall automatically update with the current value when displayed to an operator.
2. The alarm instruction text shall be able to be formatted using common text formatting features including but not limited to:
    - a. bold, italic, underline,
    - b. text colors,
    - c. left, center, and right justified,
    - d. bulleted text,
    - e. standard Microsoft Windows font types and sizes.
  3. It shall be possible to copy and paste alarm instructions between alarm events.
- KK. The alarm window shall allow the operator to enter a comment. Such comment will be date/time stamped by the ISMS and recorded against that alarm event in the audit trail.
1. When required, a pre-defined list of alarm responses shall be available for operators to select the appropriate response to an alarm. The alarm responses shall be user configurable to suit site requirements.
- LL. Keyboard function keys (F1 to F8) shall be mapped to the first 8 alarm response messages to insert the associated message via keyboard as required.
- MM. ISMS shall allow the user with the appropriate privilege to mute alarms in the alarm stack
- 2.19 Class 5 Alarm System
- A. The system shall be capable of being installed and configured up to Class 5 level of the AS/NZS 2201 Intruder Alarm System standard.
  - B. The Class 5 system shall include provision of Class 5 compliant end-of-line modules for alarm sensor communications protection.
  - C. The Class 5 system shall include provision of Class 5 compliant cabinetry, including Class 5 compliant locking mechanism, tamper sensor, and vibration sensor.
  - D. The Class 5 system shall include provision of Class 5 compliant power supplies, capable of:
    1. recharging up to 100Ah of battery backup,

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2. recharging all batteries within 48 hours of power being restored.
- E. The Class 5 system shall include support for a battery backup system which meets the following:
1. a minimum of 16 hours of battery backup for a monitored system,
  2. a minimum 24 hours of battery backup for a non-monitored system.
- F. The Class 5 system shall include provision of Class 5 compliant AMT, supporting the following:
1. user authentication with card + 6-digit minimum PIN length,
  2. alarm arming,
  3. alarm disarming,
  4. manual alarm condition isolation,
  5. automatic alarm condition isolation.
- G. The Class 5 system shall include provision of Class 5 compliant controllers, supporting the following:
1. data communications authenticated utilizing a minimum of ECC P-256 to the following;
    - a. AMT
    - b. end-of-line modules
  2. data communications protected utilizing a minimum of AES-128 to the following;
    - a. AMT
    - b. end-of-line modules
    - c. dedicated hardware cryptographic key storage, compliant to the FIPS 140-2 specification.

2.20 Access Control

- A. The ISMS shall provide complete flexibility and be capable of programming an unlimited combination of access control, security alarm, and I/O parameters subject only to performance and memory limitations within each IFC.
- B. For ease of programming cardholders shall be grouped into groups sharing the same access criteria.
- C. Individual cardholders may be assigned with an extended door unlock time, as may be required by cardholders with a disability.
- D. It shall be possible to assign an individual cardholder to an access group on a temporary basis with predetermined start and finish times.
  1. During the period of temporary access, the cardholder shall have the rights of the group to which they have been assigned in addition to any permanent access rights they may have been assigned.

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- a. The access group details page shall display both permanent and temporary access members with the status of temporary members shown as:
    - 1) pending (with the start and finish times),
    - 2) active,
    - 3) expired.
  2. Any cardholder or access group in the ISMS shall be able to be programmed to have access to any combination of controlled doors in the ISMS with each period of access for each door controlled to within the nearest minute.
  3. The IFC shall check entry based on all of the following criteria:
    - a. correct site code,
    - b. authorized card in database,
    - c. correct issue number,
    - d. authorized door / access zone,
    - e. authorized time of day,
    - f. valid card holder analytics,
    - g. correct PIN (If PIN entry is required),
    - h. double entry (anti-passback, anti-tailgating, or escort modes).
- E. Anti-passback mode shall be able to be configured in any of the following modes:
1. disallow second access to an area if a valid exit has not previously been registered and generate an alarm (hard anti-passback),
  2. allow second access to an area if a valid exit has not previously been registered but generate an alarm (soft anti-passback),
  3. exclude specific access groups from the rules defined in (a) and (b) above.
- F. Anti-passback rules shall be able to be reset by:
1. automatically after a preset period after valid entry,
  2. automatically at a standard time each day,
  3. automatically on exit from site,
  4. manually as an override.
- G. The ISMS must support global anti-passback allowing multiple access zones to be linked for anti-passback, across multiple IFCs utilizing encrypted peer-to-peer communications.
- H. The IFCs shall not rely on the server for anti-passback operation. Global anti-passback shall work across multiple IFCs, even if the server is offline.
- I. The anti-passback capability of the ISMS shall enforce anti-passback on a single cardholder for the use of multiple credential types (e.g. mobile phone, keyfob, Mifare card).
- J. Anti-tailgate mode shall be able to be configured in any of the following modes:
1. disallow exit from an area if a valid access has not previously been registered and generate an alarm (hard anti-tailgate),



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2. allow exit from an area if a valid access has not previously been registered but generate an alarm (soft anti-tailgate),
  3. exclude specific access groups from the anti-tailgate rules.
- K. Anti-tailgate rules shall be able to be reset by either:
1. Automatically after a preset period after valid entry.
  2. Automatically at a standard time each day.
  3. Manually as an over-ride.
- L. The IFCs shall not rely on the server for anti-tailgate operation. Global anti-tailgate shall work across multiple IFCs, even if the server is offline.
- M. The anti-tailgate capability of the ISMS shall enforce anti-tailgate on a single cardholder for the use of multiple credential types (e.g. mobile phone, keyfob, Mifare card).
- N. Every incorrect PIN attempt shall be notified at the central control as an alarm condition.
- O. Each reader shall be capable of automatically switching the access mode of a door at different times of the day based on control parameters received from the ISMS. The following access criteria modes are required:
1. free access (no credential required),
  2. secure access (credential required),
  3. secure and PIN access (credential and PIN required),
  4. override from reader - members of certain access groups shall be able to change the access and PINs mode of the door at certain times,
  5. dual authorization - access is granted when two different but legitimate cards are presented within a given time frame,
  6. escort - a second card is required to be presented from a cardholder who is nominated in a specified access group,
  7. shared code - The ISMS operator determines what the code will be and programs this into the ISMS. Access is allowed through the door when the correct 4-digit code is entered.
  8. Cardholder access reporting to the ISMS and logging in the audit trail shall be configurable in two modes:
  9. only when there has been a successful presentation of a valid access card or token and the door open sensor has detected the door has opened,
  10. whenever there has been a successful presentation of a valid access card irrespective of whether the door has been opened.
  11. Readers with integrated PIN pads, or biometric readers using identification shall provide an "Entry under Duress" facility.
  12. Duress shall be initiated by the cardholder either by incrementing the last digit of their PIN number by one. Duress on biometric readers shall be initiated by the cardholder presenting their pre-enrolled "Duress finger." There must be no indication of a duress entry at the reader.
  13. When a duress alarm is raised at a reader a critical priority "Duress Alarm"
  14. shall be displayed at the ISMS.
  15. It must be possible to configure the ISMS such that duress or other selected critical alarms pop to the front of the display, ensuring immediate operator attention. The existence of

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lower priority incoming alarms shall be visible to the operator but must not interrupt their current task.

- P. Zone counting shall be available to provide real-time counting of cardholders in access zones.
1. The result of the number of cardholders in the zone being outside of the specified range(s) shall generate an event or an alarm, depending on ISMS configuration.
  2. The minimum and maximum numbers of cardholders in a zone before an event is generated shall be configurable.
  3. It shall be possible to set a “grace time” (in seconds) to allow the zone count to be outside the minimum within the mid-range or outside the maximum number of cardholders, without generating an event.
  4. It shall be possible to assign a specific message for each of the minimum, mid-range, or above maximum conditions.
  5. It shall be possible to set up the ISMS to prohibit one cardholder being alone in a zone by:
    - a. requiring two valid but different cards to access a zone should the zone count reports zero cardholders in the zone,
    - b. requiring one card to access a zone should the zone count report two or more cards in the zone,
    - c. requiring one card to exit from a zone should the zone count report three or more cards in the zone,
    - d. requiring two valid but different cards to exit from a zone should the zone count report two people present,
    - e. prohibiting exit from a zone and generate an alarm if the zone count reports one cardholder present.
  6. It shall be possible to increment and decrement zone counting based on physical inputs not related to access events.
  7. It shall be possible to increment and decrement zone counting based on logical inputs not related to access events.
  8. It shall be possible to schedule an access zone for a “First Card Unlock” mode, whereby the access zone is scheduled to go to free access, but only when a suitably privileged card is badged at the reader. All other cards will be granted access, but will not be able to set the door to free access unless they have the “First Card Unlock” privilege.
  9. It shall be possible for suitably privileged cardholders to toggle the access mode of a reader between free and secure by badging their card at the reader twice in quick succession.
  10. It shall be possible for suitably privileged cardholders to log on to a reader with a keypad either by a credential or credential and PIN and change the access mode of the reader to either free or secure.
  11. In addition to unlocking a door when granting access, it shall be possible to activate an additional output or macro which is uniquely related to the cardholder or access group to which they belong.
  12. It shall be possible to “lock down” specific areas of a site such that cardholders who would usually have access, are denied access. cardholders with suitable privileges such as security personnel will still have access. The “lock down” should be activated and/or cancelled by the following methods:

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- a. clicking an icon on a site plan,
- b. triggered based upon an event within the ISMS, 19.20.12.3. triggered from an input.

2.21 Personnel Identification Verification (PIV)

- A. The ISMS shall be certified as complying with the requirements of FIPS 201-2 on the GSA FIPS 201-2 Approved Products List (APL)
- B. The ISMS must provide a fully integrated solution that will harvest the information from the PIV card, validate it with the online certification authorities and store that information on the server database, this must include as a minimum:
  1. the PIV certificate,
  2. the CAK certificate,
  3. the biometric template,
  4. the cards “printed Information”,
  5. the full FASC-N for a PIV card or the GUID for the PIV-I card.
- C. The ISMS shall provide an interface to allow integration to Enterprise Identity Management systems. This interface shall allow certificates and images to be imported into the ISMS database.
- D. At all times the ISMS shall use the full FASC-N or GUID as the credential number in the ISMS and it shall not be allowable to use a truncated or non-unique representation for access control.
- E. All access validation shall be done at the IFC. This shall include:
  1. CAK signature check,
  2. CAK expiry or notBefore Check,
  3. CAK and PIV certificate revocation – based on cached data,
  4. The challenge of the PIV card’s CAK private key.
- F. The ISMS must implement the CAK Authentication single factor access mode authentication.
- G. Contactless CAK Access decisions, card presented to door released, shall take no longer than the following times:
  1. RSA 2048-bit keyed CAK Certificate: 3 Seconds,
  2. ECC P256 bit keyed CAK Certificate: 1.5 Seconds.
- H. The ISMS must validate all PIV credentials via the external Certification Authorities at configurable periods between 1 hour and 24 hours.
- I. Card readers must communicate to IFCs via a bi-directional supervised protocol on a physical RS485 transport layer. Additionally, the protocol shall be encrypted using AES- 128 keys and authenticated using 256-bit Elliptic Curve Cryptography.

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- J. Each card reader shall have a manufacturer's unique serial number and the ISMS must
- K. prevent unauthorized reader substitution.
- L. Card readers and IFCs must be able to show compliance to FIPS140-2 level 1 for communications and validation cryptography and FIPS140-2 level 3 for key storage.
- M. ISMS shall support on demand PIV certificate validation

2.22 Site Plans

- A. It shall be possible to manage and monitor alarms, overrides, the general real-time status of site items and open doors through the operator GUI with the use of interactive dynamic site plans, icons.
- B. The designing and editing of a site plan shall allow:
  - 1. The basic editing tools to assist in the design and creation of the site plan.
  - 2. Assigning icons to ISMS functions and place these at any position on a site plan.
  - 3. Provision for drawing lines and shapes to form objects shall be available. These objects shall be able to be associated with ISMS items allowing ISMS item status to be visually indicated by the object.
  - 4. It shall be possible to place free text onto a site plan.
  - 5. An optional grid shall be available with snap-to-grid available for all objects and vertices.
  - 6. Individual objects within a site plan shall be able to be moved behind and in front of other objects using a layer scheme.
  - 7. An alignment tool shall be provided to align groups of objects in both x and y dimensions.
  - 8. External drawings shall be able to be imported into the ISMS from external drawing software. The ability to import common and the following drawing formats shall be supported:
    - a. EMF,
    - b. PDF,
    - c. PNG,
    - d. WMF.
  - 9. It shall be possible to design and load icons from external software for use in the ISMS.
  - 10. It shall be possible to design interactive buttons to reside on site plans. On activation, the buttons must be capable of performing multiple overrides for ISMS items simultaneously.
- C. When an object is selected on a site plan, it shall present an interactive menu to the operator. All the following functionality must be included:
  - 1. View the current status of a door, input, or output,
  - 2. override a door, input, or output,
  - 3. monitor and acknowledge an alarm,
  - 4. open an access-controlled door,
  - 5. Change an unlock schedule on a door,

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6. move from one site plan to another,
  7. activate an intercom,
  8. override an alarm, access, or perimeter fence zone state,
  9. generate a report.
- D. Site plan usage shall support touch-screen technology and preclude the use of a mouse right-click as a separate function.
- E. Site plans shall be capable of pan and zoom functionality.
- F. All open site plans shall be updated immediately if that site plan is amended at any workstation.
- G. Icon names shall use the item name by default, but a shortened name shall be configurable so as not to clutter the site plan with text.
- H. The ISMS shall support a search functionality that when searching for an object, it will return a site plan containing the object.
- I. There shall be provision for sending a copy of the currently visible site plan to a printer, email, or Windows clipboard, natively within the ISMS workstation application.
- J. The site plan shall provide a means to show or hide objects at predetermined zoom levels to assist in reducing clutter on a highly populated plan.
- K. When zooming out of the site plan, objects must amalgamate into a summarized indicator.
- L. A site plan must support multiple floor layers in a single site plan item.
- M. Whilst panning around a site plan, a secondary site plan must automatically present itself when the display pans over the location of that site plan that represents that sub-area.
- N. Site plans shall allow icons for third party doors
- O. Site plans shall allow background color selection
- P. Site Plans shall allow the user to customize its orientation
- 2.23 Guard Tours
- A. The ISMS shall support multiple guard tours between check points.
1. There shall be no imposed limit on the number of guard tours that can be configured.
- B. Check points shall be card readers, inputs, or outputs.
1. There shall be no imposed limit on the number of check points.
- C. Multiple guard tours must be able to run concurrently.

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- D. The guard tour shall allow for flexible and configurable timing between check points which shall have (but not be limited to) the following:
1. transition time;
    - a. the time period that it should take the guard to move from the last check point to the next check point,
    - b. this shall be configurable in hours, minutes and seconds,
    - c. the time shall be uniquely configurable for each check point,
  2. deviation;
    - a. the time allowed for the guard to be early or late at the check point,
    - b. this shall be configurable in hours, minutes and seconds,
    - c. the time shall be uniquely configurable for each check point,
  3. late;
    - a. the time period that has elapsed since the guard was expected at the check point wherein they are now considered as late to the check point,
    - b. this shall be configurable in hours, minutes and seconds,
    - c. the time shall be uniquely configurable for each check point.
- E. The alarm priority for the guard tour events must be configurable.
- F. User configurable instructions shall be available to assist operators when a guard tour alarm occurs.
- G. The ISMS shall have an option to determine whether the guard must badge and open a door for a guard tour check point, or just present their card at the check point and not enter.
- H. The ISMS shall be able to send an email and/or SMS alert to selected personnel based on guard tour events:
1. it shall be possible to configure which events send alerts,
  2. it shall be possible to schedule when these alerts are sent.
- I. The guard tour shall display in real-time the following information:
1. the name of the guard,
  2. the list of check points,
  3. the time the guard is expected at each check point. This time shall display the deviation to indicate the time period the guard has to arrive at the check point.
    - a. This time period should update dynamically depending on the time the guard arrived at each check point.
  4. The time the guard arrives at the check point.
  5. The guard tour status should indicate (but not be limited to) the following:

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- a. not due,
  - b. due,
  - c. early,
  - d. overdue.
- J. The guard tour shall stop if the guard arrives at an incorrect check point and an alarm shall be raised to indicate this.
- K. The ISMS shall be configurable to restrict the individual guard tours that an operator can view.
- L. The ISMS shall be configurable to determine whether an operator can view, edit or delete selected guard tours.
- M. It shall be possible to display the real-time status of guard tours on a site map.
- N. The guard tours shall be able to be started and stopped from the site map.
- O. A site map showing the route of the guard tour shall be displayed.
- P. It shall be possible to print a guard tour report directly from the site map.
- Q. The reports shall be configurable to filter based on the following criteria:
- 1. date/time,
  - 2. guard tour,
  - 3. guard.

#### 2.24 Reports

- A. The ISMS shall provide report generation capabilities from the following sources of information:
- 1. system activity data,
  - 2. cardholder access data,
  - 3. cardholder data fields,
  - 4. cardholder access rights,
  - 5. site configuration and setup data,
- B. The report generation feature shall be easy to use and based on a “checkbox” style of parameter selection and preparation. The report preparation process shall provide features to simplify report generation by incorporating time selections such as “yesterday”, “last week”, “last month” etc. When these time-based selections are used in a saved report it will dynamically produce a report relevant to the time the report is run.
- C. Report cover page, header, and footer, shall be configurable per report.
- D. It shall be possible to re-order report columns.

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- E. It shall be possible to resize report columns.
- F. The parameters for producing the report must be fully user definable and must be capable of searching on any cardholder or event criteria.
- G. It shall be possible to produce the following types of reports:
  - 1. any site activity,
  - 2. last known location of all cardholders on site, with cardholder count summary,
  - 3. unprocessed alarms, un-acknowledged alarms and doors temporarily overridden from secure to free,
  - 4. details pertaining to cardholders, including images,
  - 5. time-and-attendance based reports.
- H. Reports shall be able to be saved for future use.
- I. There shall be no limit imposed on the number of reports that can be saved.
- J. It shall be possible to copy a report to be used as a template for another report.
- K. The report shall be generated by any of the following means, as may be required by the operator:
  - 1.1.1. within the report editor,
  - 1.1.2. manually triggered from within a map display,
  - 1.1.3. triggered by a hardware or software event,
  - 1.1.4. a one-time or recurring schedule.
- L. The ISMS shall generate and format reports as a background process. This means the operator must be able to process alarms, alter database parameters and perform other system changes while the report is being generated. Report generation must continue if the operator decides to perform any other task.
- M. The ISMS shall have a screen preview function, so that reports can be previewed during report preparation and on-screen before they are printed.
- N. The report generator shall be capable of exporting reports in the following formats:
  - 1. Adobe PDF (.PDF),
  - 2. Microsoft Word (.DOCX),
  - 3. Microsoft XPS (.XPS),
  - 4. Microsoft Excel (.XLSX),
  - 5. image file (.JPEG),
  - 6. CSV file with header (.CSV),
  - 7. CSV file without header (.CSV).
- O. It shall be possible to email reports to nominated people or groups of people using the above format.



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- P. The email capability shall be available from within the ISMS itself. Applications that require reports to be generated, saved to a file and then emailed using an external email application will not be acceptable.
  - Q. The report generator shall be capable of supporting wildcard searching when filtering data for reports.
  - R. It shall be possible for operators to change report parameters when generating reports.
  - S. Reports shall be able to be printed at any network-supported printers connected to the ISMS.
  - T. The ISMS shall be able to produce voltage reports for a networked energized fence.
    - 1. The energized fence voltage reports shall be displayed in graphical form showing the energized fence voltage along with the date and time.
  - U. The ISMS shall be able to produce temperature reports for a networked energized fence controller.
    - 1. The networked energized fence controller temperature voltage reports shall be displayed in graphical form showing the energized fence controller temperature along with the date and time
  - V. Operator privileges shall differentiate between:
    - 1. report preparation and configuration,
    - 2. report generation only (not allowed to change the configuration).
  - W. It shall be possible to generate reports with graphical representations of data for trend analysis in the following formats:
    - 1. bar graph,
    - 2. pie graphs,
    - 3. line graphs,
    - 4. summary report data shall be available in a table format.
  - X. 23.24 ISMS shall able to change the start of the reporting week as required
- 2.25 Notifications
- A. Specific event and alarm messages shall be able to be configured to be sent to nominated users via either email, SMS message, or mobile device application.
  - B. It shall be possible for persons receiving alarm messages to be able to acknowledge the alarms via return email or SMS message.
  - C. It shall be possible to send notification of imminent card or competency expiry to an individual, their manager or other nominated person.

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- D. When emailing cardholder details, it shall be possible to send an image of the cardholder from their personal data record.
- E. A comprehensive filtering feature shall be provided to manage notification information transmission.
- F. It shall be possible to schedule the notifications.
- G. The notification may be triggered via a pre-configured alarm condition removing the need for operator intervention.

2.26 Bulk Notifications

- A. The ISMS shall allow for the broadcasting of notification messages to multiple recipients directly from the server.
- B. The privilege to send the notification must be separate from the permission to create and see the setup of the notification.
- C. Preconfigured messages shall be created that may then be sent with a single action by an operator or as a system triggered message.
- D. The notification may be sent to groups filtered by previous access time, cardholder creation or modification date, access card type, or specific cardholder data criteria.
- E. Notifications shall have the ability to be send to dynamically updated groups based upon cardholder location in the ISMS.

2.27 Audit Trail

- A. The ISMS server hard disk shall be used to record all system activity for auditing purposes.
- B. All system activity event along with all details, including but not limited to the following list, shall be time stamped with the time of occurrence at the IFC and also the time the event was received by the server, to the nearest second, and shall be recorded in the system activity log for archiving:
  - 1. all access attempts (allowed and disallowed),
  - 2. alarm events,
  - 3. system events,
  - 4. operator activity.
- C. The central control shall provide a facility to archive system data and event records to an archive file to free database space for further activity logging.
- D. It shall be possible to archive the data to a network device by specifying a UNC path.

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- E. The archive process shall be initiated by either manual operation or automatically on a schedule.
- F. It shall be possible to nominate the number of days of data that shall remain in the database after an archive process.
- G. The ISMS reporting functionality shall return results from both live database and archive as a single contiguous report.
- H. The system shall allow the workstations to acquire OnDemand subscriptions to the following and terminate these subscriptions after 5 minutes of inactivity
  - 1. Event Viewer
  - 2. Event Trail title
  - 3. Event Trail title

2.28 Mobile Device Application

- A. The ISMS shall have a mobile device application which allows operators to remotely manage the ISMS via a smart phone or tablet. Dedicated devices with a single hardware option shall not be acceptable.
- B. The mobile device application must be available on both Android and iOS operating systems.
- C. The mobile device shall connect to the ISMS via:
  - 1. Wi-Fi or,
  - 2. mobile carrier data connection.
- D. Mobile devices shall be enrolled in the ISMS by way of an authorization code generated on the ISMS.
- E. The mobile device connection must have the option of connecting to the ISMS server via an HTTPS proxy.
- F. It shall be possible for the mobile device screen to lock after a preconfigured period of inactivity.
- G. The mobile device shall be able to manage ISMS alarms:
  - 1. Alarms shall be displayed in different colors to denote the priority.
  - 2. The alarms shall have a flashing indicator when unacknowledged.
  - 3. The alarms will have a constant color indicator when acknowledged.
  - 4. When multiple instances of the same alarm occur within a user-defined time frame, the mobile device will present alarms as a group and display the number of alarms in each group.
  - 5. The application will display the following alarm status:
    - a. alarm condition is still in an active state,
    - b. alarm priority has been escalated,

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- c. multiple occurrences of the same alarm within a user-defined time frame.
- 6. The mobile device operator will be able to view alarm details such as:
  - a. priority,
  - b. source of the alarm,
  - c. date and time,
  - d. alarm history,
  - e. contextual instructions on how to proceed resolving the alarm.
- 7. The mobile device operator will be able to perform operations on the alarm such as:
  - a. add notes to the alarm,
  - b. acknowledge alarms,
  - c. process alarms.
- 8. The mobile device operator will be able to filter alarms by (but not limited to) the following states:
  - a. priority,
  - b. acknowledged,
  - c. unacknowledged,
  - d. active,
  - e. inactive,
  - f. division.
- H. The mobile device shall be capable of monitoring the status of ISMS items such as (but not limited to):
  - 1. doors,
  - 2. access zones,
  - 3. alarm zones,
  - 4. fence zones,
  - 5. macros.
- I. It shall be possible to search for items monitored by the mobile device by selecting from a list or entering part of the text relating to the item name.
- J. The mobile device shall be able to override items such as (but not limited to):
  - 1. doors,
  - 2. access zones,
  - 3. alarm zones,
  - 4. fence zones,
  - 5. macros.
- K. The mobile device shall be able to lock down an access zone such that all cardholder access is disabled, excluding specifically authorized cardholders.

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- L. The mobile device shall have the capability to display the individual cardholders that are located in any access zone configured on the ISMS server.
- M. The mobile device application shall have the ability to read Mifare DESFire EV2 credentials using the native NFC antenna of the mobile device.
  - 1. It shall be possible for the mobile application using NFC antenna to log a cardholder into or out of an access zone in the same manner as if the cardholder presented their card to a fixed access control reader.
  - 2. The cardholder credentials shall be authenticated by the ISMS and displayed in the user interface, clearly indicating an access granted or denied decision.
  - 3. Access granted and denied decisions shall be indicated by different audio tones.
  - 4. It shall be possible to continuously read cards without pressing any additional “Read Card” buttons.
- N. The mobile device shall be able to manage cardholders.
  - 1. It shall be possible to search for cardholders by selecting from a list or entering part of the text relating to the cardholder name.
  - 2. It shall be possible to search for cardholders based on (but not limited to):
    - a. card number,
    - b. user defined data fields such as company, department, employee ID number, license plate etc.
  - 3. The mobile device shall display (but not be limited to) the following cardholder information:
    - a. name,
    - b. the last entered access zone, including date/time,
    - c. image,
    - d. access groups,
    - e. user defined data fields,
    - f. access credentials.
  - 4. Data fields such as email address, phone number etc. shall be hyperlinks to enable the operator to click on the field and automatically be taken to the default email or phone application.
  - 5. If a cardholder is not authorized for access, or has no active access groups, or has no active token, a highlighted message shall appear on the screen to alert the operator.
  - 6. It shall be possible to disable a cardholder’s access via the mobile device.
- O. The mobile device shall be able to validate a searched for cardholder:
  - 1. It shall be possible to conduct a spot check of cardholders whereby the operator can view the access credentials of the cardholder on the Mobile device and record whether the cardholder passes an ID check and has the appropriate access rights to their current location.
  - 2. The operator shall select a “Pass” or “Fail” which will be logged at the central server.

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3. It shall be possible for the operator to select user-definable reasons for the pass or fail.
4. It shall be possible for the operator to enter free text into a notes field.
5. It shall be possible to record the location of the mobile device to indicate where the spot check took place.

P. The mobile device shall be capable of reading barcodes.

1. Upon reading a barcode, it shall search for and display cardholder details based on the barcode identifier.
2. The barcode identifier associated with the cardholder must support alpha- numeric characters. Numeric only will not be accepted.
3. The mobile device shall be capable of reading (but not limited to) the following barcode formats:
  - a. Aztec Code 2D,
  - b. DataMatrix 2D,
  - c. PDF417 2D,
  - d. QR Code 2D,
  - e. Macro PDF417 2D,
  - f. Semacode 2D.

Q. The mobile device shall be capable of reading supported cards

R. ISMS shall allow the mobile version of the application to connect securely from anywhere on the internet hence removing the need for the mobile end point to be on a VPN or corporate network.

S. The mobile application shall display a selected profile image for cardholders who have been assigned this feature

## 2.29 Competencies

- A. Competencies shall be cardholder-based assignable attributes, used to determine if the cardholder is allowed access to specified areas based on factors relevant to the cardholder. The factors may be based on authority, or skill levels, or similar.
- B. Multiple competency attributes may be assigned to one or more cardholder records.
- C. Each competency will assume one of 4 different states:
  1. Active - The competency is currently valid for the cardholder.
  2. Expiry due - The competency is currently valid for the cardholder but will expire in a specified period.
  3. Expired - The competency has been assigned to the cardholder but has expired.
  4. Disabled - The competency, is temporarily disabled (or overridden) for the cardholder.
- D. The competency states shall be configurable as “soft” - allowing access but generating an alarm; or “hard” - denying access, should a competency requirement not be met.

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- E. Each competency shall be individually set per cardholder
- F. A field shall be provided to store the reason for disabling a competency.
- G. Competencies shall be configured as required per access zone.
- H. It shall be possible to exempt specific access groups from the requirement to meet specific competencies.
- I. Denied access due to an invalid or missing competency shall be displayed to the user at the door reader.
- J. Access permission based on competency criteria must be determined at the IFC, independent of the ISMS being on-line.
- K. The reason for denied access due to an invalid competency shall be displayed on the door reader or keypad.
- L. Advance warning of a cardholder's competency about to expire shall be sent to the individual and/or other nominated persons via email.
- M. A consolidated report detailing competency expiry warnings for cardholders shall be sent via email to the associated manager.

2.30 Random Selection

- A. The ISMS shall have an integrated component for selecting cardholders using a completely random or pseudo-random criteria when they badge at a door.
- B. The ISMS shall display a customizable message at a door's reader when the cardholder
- C. is selected.
- D. The ISMS shall allow for configurable allowance or denial of access when the cardholder is selected.
- E. The selection criteria shall be configurable with the following options:
  - 1. the maximum number of times that a single cardholder may be selected over a given period of time,
  - 2. the total number of cardholders that may be selected over a given period of time,
  - 3. that all cardholders must be selected at least once over a period of time.
- F. The selection algorithm must be able to function on the IFC without the aid of the ISMS server.
- G. The selection algorithm must be able to calculate the selection criteria across up to 30 doors in the system.

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- H. The selection algorithm must be able to differentiate between different groups of cardholders and assign a varying probability selection to each.

2.31 Elevator Control and Management

- A. The ISMS shall provide fully integrated elevator control facilities. The elevator control access equipment must communicate with the same central control as the door card readers.
- B. The elevator control architecture shall comprise a card reader in each elevator car, reporting to elevator control interface equipment mounted in or near the elevator motor room. Reader type shall be as specified for use on access control doors.
- C. The elevator control system shall be capable of controlling access independently in a number of elevator shafts simultaneously.
- D. The elevator control system shall incorporate dedicated intelligence and a local database of authorized cardholders.
- E. Each elevator reader shall be identified independently at the central control by means of a unique plain language descriptor. The central control plain language descriptor shall be at least 60 characters in length.
- F. The ISMS shall raise an alarm if the elevator reader stops communicating with its elevator controller.
- G. The elevator control shall check entry based on all of the following criteria:
  - 1. correct facility code,
  - 2. authorized card in database,
  - 3. correct issue number,
  - 4. authorized level,
  - 5. authorized time of day,
  - 6. correct PIN (If PIN entry is required).
- H. The access mode for each floor of an elevator shall be capable of automatically changing according to the programmed time schedules, as received from the central control. The following access criteria modes are required:
  - 1. free access (no credential required),
  - 2. secure access (credential required),
  - 3. secure and PIN access (credential and PIN required),
  - 4. dual authorization - access is granted when two different but legitimate cards are presented within a given time frame,
  - 5. escort - a second card is required to be presented from a cardholder who is nominated in a specified access group,
  - 6. shared code - The ISMS operator determines what the code will be and programs this into the ISMS. Access is allowed through the elevator when the correct 4-digit code is entered.



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- I. Levels must be securable on a level by level basis, using command instructions transmitted from the central control.
- J. The central control must provide operator override facilities to enable temporary override capability on a level by level basis.
- K. Where a low-level interface is specified:
  - 1. The interface between the access system elevator control equipment and the elevator switching control equipment shall be via dry relay contacts.
  - 2. The voltage from the elevator system connected to the relays shall not exceed 24 volts DC/AC.
  - 3. The elevator control system shall provide one relay contact per elevator shaft per level for the ISMS. This relay contact shall be used to interface with the elevator switching control equipment.
  - 4. An input shall be provided for each level per elevator to indicate what level the user selected. On activation of this input all relays return to secure state.
- L. Where a high-level interface is specified:
  - 1. The interface between the access system elevator control equipment and the elevator switching control equipment shall be via RS-232 or TCP/IP connection depending in the elevator system requirements.
  - 2. The elevator control equipment will provide feedback as to which level was selected by the cardholder.

2.32 Car Parking

- A. The ISMS shall integrate car park management functionality.
- B. Car parks may be allocated to a single cardholder or a group of cardholders.
- C. Car park functionality for a group of cardholders:
  - 1. When occupancy of a group's car parks is reached the system shall disallow entry to members of that group until another group member has left the car parking area.
  - 2. The car parking functionality may allow for a cardholder to enter the parking area temporarily although there are no available parks for their group to ensure they do not cause a traffic jam at the entry point.
  - 3. If the cardholder that was allowed temporary entry does not leave the car park area after a configured period of time, then an alarm shall be raised in the ISMS.
  - 4. If another member of the parking group leaves the car park, then this shall allow the cardholder with temporary entry to remain in the car park.
- D. The ISMS shall provide a real-time display to show the current occupancy of car parks.
- E. The car parking system shall use standard readers and i/o devices to interface to barrier arms.

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- F. There shall be a terminal provided that gives feedback to a cardholder at the time of credential presentation.
- G. The car parking system shall support all credentials specified in this tender including Bluetooth.

2.33 Locker System

- A. The ISMS shall include a locker management solution.
- B. The lockers shall have the ability to be dedicated to a single person, or allocated on- demand via a terminal when needed.
  - 1. On-demand allocation of lockers shall not be reliant upon the ISMS server.
- C. The lockers shall be able to be configured as either having an expiry period, or permanently assigned.
- D. The locker management system shall use standard readers and i/o devices to interface to locker bank hardware.
- E. There shall be a terminal provided that gives feedback to a cardholder as to which locker they have been provided at the time of credential presentation.
- F. A single terminal shall be able to support up to 256 lockers.
- G. There shall be no limit to the total number of lockers in the system.
- H. The locker management system shall support all credentials specified in this tender including Bluetooth.

2.34 Pre-programmed Override Macros

- A. To allow for making changes to the ISMS configuration on demand, it shall be possible to pre-configure the required changes and assign them to a macro action.
- B. Macro actions shall be capable of (but not limited) the following:
  - 1. open doors,
  - 2. change door modes such as free, secure, secure with PIN, dual authority,
  - 3. anti-passback forgive,
  - 4. active and release zone lock down,
  - 5. reset the cardholder count in a zone,
  - 6. switch an output on and off,
  - 7. activate the generation of pre-configured reports,
  - 8. start and stop a guard tour,
  - 9. initiating another macro.

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- C. A macro shall be capable of activating multiple actions from within a single macro. There shall be no fixed limit to the number of actions that can be configured.
- D. An operator shall be able to initiate the macro via either a menu item or by a site plan icon.
- E. Macros shall be capable of being activated by any ISMS events.
- F. Macro configuration must be by the use of GUI features such as drop-down lists and drag and drop techniques. The use of script language to write macros is not acceptable.
- G. It shall be possible to initiate macros based on a on a time schedule.
- H. Macros shall be able to execute Microsoft Windows command line actions.
- I. Up to 300-character variables shall be able to be specified for each command line.
- J. Each macro shall be able to contain multiple command line entries.
- K. The configuration and execution of command line macros shall be user account name and password protected. These usernames and passwords shall be obscured on entry and transmitted and stored at the central command ISMS server in an encrypted format.

2.35 Visitor Management Kiosk

- A. The ISMS shall allow visitors to self-register as defined in this section.
- B. The kiosk shall operate on a workstation provided to the specification defined in
- C. “System Servers and Workstation Hardware”.
- D. The kiosk shall support touch screen functionality.
- E. Visitor personal details shall be stored if required, to be reused for future visits.
- F. Visit details shall be recorded in the ISMS event database.
- G. Attributes associated with the visit shall be configurable and set as mandatory or optional fields. These shall include:
  - 1. the reception where the visitor(s) will be expected to arrive,
  - 2. the visitor category,
  - 3. the person the visitor(s) will be meeting,
  - 4. visitor arrival time,
  - 5. visitor departure time,
  - 6. building access rights to be given to the visitor(s),
  - 7. visitor photo-ID image.
- H. Visitor details for several visitors associated with a single visit shall be able to be pre- registered into the ISMS.

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- I. A welcome (default) screen shall be customer configurable to allow branding and imagery to be displayed.
- J. The kiosk shall support visitor site induction.
  - 1. The induction feature shall be customer configurable, incorporating the following features:
    - a. induction videos,
    - b. multi-choice questionnaire depending on induction level required,
    - c. multiple questionnaires,
    - d. induction hint feature to allow the visitor to request a hint for questions,
    - e. notify the host that the visitor requires induction assistance,
    - f. a conditions of entry screen,
    - g. a privacy statement screen.
- K. Visitors shall be able to search for themselves in the system and carry out the following functions:
  - 1. add or update their details,
  - 2. capture a photograph via a camera connected to the kiosk,
- L. The ISMS shall raise an alarm should a visitor not sign out by the due time.
- M. If the visitor has been assigned an access token, then the visitor shall be able to present their token as identification.
- N. The kiosk shall support business card scanning via a Dymo Executive Business Card Scanner.
- O. The kiosk shall support passport and driver license scanning via ScanShell products.
- P. For pre-arranged visits, the visitor shall be able to pick the visit from a drop-down list.
- Q. The visitor shall be allowed to print a visitor label.
- R. Visitors shall be able to advise their host via the ISMS that they have arrived via email or SMS message.
- S. Hosts shall be able to set the status of visitors to ensure current status of each visitor is always known. Host options shall include:
  - 1. marking a visitor on or off site,
  - 2. reprinting a badge for a visitor,
  - 3. updating visitor details such as arrival and departure times,
  - 4. assigning an access card to the visitor.

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- T. Tour groups shall be catered for.
  - 1. Tour group members are not individually named, however the number of people in the group shall be recorded.
- U. Groups of visitors shall be selectable as a group and their status processed as a single action.
- V. The kiosk shall support a QR Code scanner.
  - 1. Upon creating an appointment, the visitor may be emailed a QR code which can be used to sign in.
  - 2. The QR code if used for sign in shall also be used for signing out.

2.36 Door Functionality – Connected to Controller

- A. Access control for a door shall allow for the following features where specified:
  - 1. access reader,
  - 2. emergency release switch input,
  - 3. reception control switch input.
- B. Egress control for a door shall allow for the following features where specified:
  - 1. exit reader,
  - 2. push button request to exit,
  - 3. emergency exit break-glass.
- C. A push button request to exit shall record the exit in the event database.
- D. When requested by a valid means of access or egress, the door shall unlock for a preset period, after which the door shall relock.
  - 1. The door relock time shall support three modes of operation:
    - a. the door lock output will relock immediately on door open
    - b. the door lock output will relock after a door open/close cycle
    - c. the door lock output will relock after the configured time regardless of open-close cycles
  - 2. The period of unlock shall be extended should a cardholder have a suitable privilege.
- E. All entry and exit methods shall be recorded in the event in the event database.
- F. The door shall be monitored for both door open/closed, and door locked/unlocked using concealed monitor switches appropriate for the door installation.

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- G. Where the door is a double door, the inactive door leaf shall also be monitored for door open/closed and door unlocked/locked. The inactive leaf door monitor switches may be connected as part of the active door leaf monitoring.
- H. It shall be possible to configure the door in a way that generates a forced door alarm should the door be unlocked and/or opened without first being released by the ISMS.
- I. Should a door be left unlocked or open after a preset time, an alarm shall be generated reporting the condition.
- J. The door open/unlocked warnings shall provide an audible warning at the door.
- K. It shall be possible to disable the reader audible warning.
- L. It shall be possible to generate the audible warning via a relay connected elsewhere in the ISMS including any other IFC.
- M. Should a valid request to access a door be generated and access not taken, this will be recorded as a different event and the door will be re-secured.
- N. The ISMS shall have a lock down feature whereby cardholders who would usually have access to doors are denied access.
  - 1. It shall be possible to assign specific cardholders the right to access a door when the door is in lock down, whilst refusing access to all other cardholders.
- O. It shall be possible to create an interlock relationship between groups of doors for situations such as airlocks whereby a door cannot be opened until other doors or inputs are closed.
  - 1. Up to 20 doors shall be included in any interlock group.
  - 2. It shall be possible to configure interlock groups via GUI drag and drop functionality without the requirement to write scripted logic.
  - 3. It shall be possible to assign outputs that advise cardholders that there is an interlocked state active.
- P. The ISMS shall support a challenge or video verification mode as specified below:
  - 1. When a card is presented at a reader, images from the cardholder database (as many as required) shall be displayed in the challenge view of an operator GUI.
  - 2. Associated with the images, it shall be possible to display a video image from one or more assigned cameras.
  - 3. In challenge mode it shall be possible to view a site plan showing the location and status of the controlled entry point and nearby items.
  - 4. In challenge mode it shall be possible for the operator to view the status of the cardholder's cards and competencies for informing the cardholder, at the time of entry, if any expiries are imminent.
  - 5. Related data fields shall also be able to be displayed, associated with the cardholder (name details, department etc).

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6. Associated with a challenge entry, the selection and layout on screen of cardholder images, cardholder personal data, cardholder card or competency status, site plans or video images must be configurable using simple drag and drop, or click and drag techniques to resize or reposition information.
7. The challenge mode shall be configurable to either:
  - a. Automatically grant access to a valid card and display the current access decision (granted or denied) to the challenge operator.
  - b. Require operator intervention to grant access to a valid cardholder.
8. Should a second challenge be requested while an unanswered challenge remains in the ISMS, the second and subsequent challenges shall queue automatically awaiting response.
9. It shall be possible for an operator to view waiting challenge events and to select and process challenge events within the queue in any order they choose.
10. The ISMS shall allow challenge events to be managed from a single full- screen view per operator or multiple filtered views, as dictated by the specification.

2.37 Door Functionality – Data on Card

- A. Where specified, doors shall be managed using an offline door locking system.
- B. A single interface shall be provided that allows for administration and reporting including both the online and offline locking systems.
- C. The offline doors shall be fully integrated into the ISMS as described below:
  1. Card technology shall be contactless Mifare Classic, Mifare Plus, or Mifare DESFire EV2.
  2. Card encoding shall be carried out as a single encode operation for both online and offline door readers.
  3. Operational data shall be transferred between the ISMS and offline doors automatically, without the need for specific operator actions. This data shall include:
    - a. multiple levels of door low battery voltage alarms,
    - b. access activity from all doors,
    - c. blacklisted card information,
    - d. changes to cardholder access privileges.
  4. Access privileges based on time and day shall be available, with full flexibility in specifying the time intervals or day types for any cardholder.
  5. It shall be possible to configure the ISMS to ensure access updates for offline doors are enforced within a given period of time, configurable as a minimum of 1 day.
  6. Access privilege changes must not require connection of a management device to the escutcheon (eliminating the need to update each door escutcheon when a user is added or removed).
  7. The ability to specify an extended door opening time for specific cardholders shall also be available for offline doors.

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8. Offline doors shall support partitioning to allow specific administrators to control and assign access privileges within their own environment/facility.
  - D. The range of hardware shall include an option for an internal privacy lock which, when activated, prevents entry except for privileged users.
  - E. Hardware shall not use proprietary batteries. Batteries must be commonly available types.
  - F. Battery life shall support a minimum of 35,000 operations before replacement is required.
  - G. The escutcheon hardware shall be compatible with the lock hardware specified for this project.
  - H. Basic maintenance (changing batteries, changing basic configuration) shall be able to be carried out by general maintenance staff with minimal instruction.
  - I. The offline escutcheons should be able to hold an audit trail of at minimum the last 1000 events.
  - J. The offline escutcheons shall be able to function in a variety of modes such as but not limited to, free (unlocked), secure (locked) by schedule or as controlled by a cardholder with privilege to change the escutcheon mode.
  - K. It shall be possible to change a door state between the free and secure states using an authorized card.
  - L. It shall be possible to specify on a user by user basis what modes they can place the lock in (e.g. free or secure) and override functions the user can perform (i.e. entry allowed when privacy lock is on).
  - M. A handheld programming device may be used for the purposes of:
    1. diagnosing problems,
    2. performing an emergency opening of an offline escutcheon,
    3. updating software,
    4. provide power to the escutcheon to allow resolving a no battery voltage situation,
    5. initializing hardware.
  - N. Multiple levels of warning for low battery indication including audible, visual and physical warnings (i.e. initially a visual signal progressing to an audible and visual indicator and then finally progressing to an audible, visual and delayed opening of the door to indicate/prompt someone to report the occurrence). One or all may be used.
  - O. The hardware range shall include the ability to upgrade offline doors to online via wireless through a wireless gateway.
- 2.38 Door Functionality – Wireless Connectivity
- A. Where specified, doors shall be managed using an escutcheon based, wireless door locking system.



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- B. A single, seamless user interface shall be provided within the head end to ensure integrity of access decisions are maintained within the primary access control system.
- C. The flow of information from the RFID card shall be transmitted instantaneously to the wireless card reader/lock, (escutcheon or cylinder type) which shall in turn send the card credentials to the hub and access control system.
- D. The ISMS shall provide real-time access decisions as described elsewhere in this specification.
- E. Assignment of access privileges for use in both online and wireless doors shall be available through a single interface.
- F. Card encoding shall be carried out as a single encode operation for both online and wireless door readers
- G. A wireless RS485 communication hub shall support up to 8 wireless escutcheons or cylinders and have reliable communication to each reader within 15 meters.
  - 1. Wireless hubs shall be able to be wired in series with RS485 compatible cable.
  - 2. The wireless hub shall conform to the radio standard applicable to the region of installation and conform to IEEE802.15.4 (2400 – 2483.5 MHz).
  - 3. AES-128 encryption shall apply for communication between the hub and each wireless reader.
  - 4. Up to 16 (installer selectable) channels per hub shall be available to ensure each wireless escutcheon or cylinder is configured with reliable communication.
  - 5. Hardware shall not use proprietary batteries. Batteries must be commonly available types.
  - 6. Battery life shall support a minimum of 35,000 operations before replacement is required.
- H. The wireless doors shall be fully integrated into the ISMS as described below:
  - 1. Card technology shall be contactless Mifare Classic, Mifare Plus, or Mifare DESFire EV2.
  - 2. Operational data shall be transferred between the ISMS and wireless doors automatically, without the need for specific operator actions. This data shall include:
    - a. multiple levels of door low battery voltage alarms,
    - b. access activity,
    - c. blacklisted card information,
    - d. changes to cardholder access privileges.
- I. The escutcheon hardware shall be compatible with the lock hardware specified for this project.
- J. Basic maintenance (changing batteries, changing basic configuration) shall be able to be carried out by general maintenance staff with minimal instruction.
- K. An installer service tool shall communicate with each wireless hub and enable configuration, management, and override of each door independent of the access control system.

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2.39 Field Hardware

- A. The IFC shall be the main controller in the field. The ISMS shall communicate directly with all IFCs.
- B. The IFC shall use a Linux operating system, this OS shall be specifically re-developed for a security purpose. Applications on a general-purpose OS such as Windows CE, Arduino, or a standard Linux kernel shall not be accepted.
- C. Each IFC shall be intelligent such that in the event of failure of power or communications to the ISMS, for whatever reason, the IFC shall continue to allow or deny access based on the full security criteria at time of disconnection.
- D. The IFC shall store on-board all the security and access parameters to operate completely independently from the central control server. Systems that rely on the central control server for access decisions will not be considered.
- E. The IFC shall buffer activity data and immediately transmit it to the central control server upon re-establishment of communications.
- F. Should communications fail with the ISMS, each IFC shall be capable of buffering up to 80,000 events.
- G. All events shall be time-stamped at the IFC at the time of occurrence.
- H. ISMS that only time stamp the event upon receipt at the central control hardware shall not be acceptable.
- I. The IFC shall be capable of storing up to 500,000 card records with associated access criteria.
- J. The IFC shall support the use of six-state end-of-line circuits and enunciate whether the circuit is open, closed, alarm, trouble, open circuit tampered, or short circuit tampered as separate conditions.
- K. A configurable range of end-of-line resistor values shall be supported as a software function to support pre-existing input circuits when required.
- L. The IFC shall include tamper protection for the front and the back of the panel. The front panel shall be tamper protected for door open, and the rear of the panel to detect if the panel has been removed from the wall. These shall use optical tamper detection. Mechanical tamper devices are not acceptable.
- M. The IFC shall incorporate an ARM 9 processor with at least 256 Megabytes of non-volatile FLASH EEPROM. The IFC shall incorporate boot code in a protected sector of the flash memory. For software upgrades, all IFC software shall be downloaded from the central server over the network.
- N. The IFC shall support direct download via USB to allow local upgrade of the IFC.

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1. The upgrade process shall only accept authenticated downloads via the USB port.
- O. The IFC shall operate from a DC power supply with battery backup.
- P. The IFC shall continue to operate for at least 24 hours in the event of a mains supply failure.
- Q. The IFC shall be capable of automatically detecting and reporting a low power condition.
- R. IFCs shall automatically restart and resume processing following a power failure.
- S. IFCs shall be fitted with “watchdog” hardware and software to provide automatic detection and restart should the processor lock up.
- T. The IFC shall contain its own real-time clock. The clock shall be synchronized with the central control server clock at least once per hour. The accuracy shall be such that the time difference between IFCs shall not vary more than 0.5 second at any time.
- U. The IFC shall be allocated to a time zone appropriate to the IFC location to cater for regionally and globally located IFCs.
- V. The IFC shall have an on-board Ethernet (TCP/IP) connection and driver supporting 10BaseT and 100BaseT operation. Third party plug-in RS485/Ethernet modules will not be accepted.
- W. When specified, the IFC shall support 100/1000BaseT.
- X. When specified, the IFC shall be fitted with 2 Ethernet ports providing a fail-over communication capability.
- Y. The IFC shall have IPv6 address support.
- Z. The IFC shall support DHCP addressing.
- AA. The ISMS shall natively support WAN and NAT configurations to communicate with IFCs on distributed networks.
- BB. The IFC shall support DNS operation.
- CC. Should the primary DNS not be available, the IFC shall be able to automatically establish contact with a secondary or tertiary DNS.
- DD. The IFC shall be provided with a pre-configured IP address to allow offline initial configuration via a web browser application when required.
- EE. It shall be possible to view the IFC status and configuration for commissioning and diagnostic purposes without the use of the central server software or other proprietary software. This may be achieved using a conventional web browser.
- FF. The IFC diagnostic web interface shall not share common log on credentials with any other installed site.

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- GG. Should excessive network broadcast traffic occur (resulting from a denial of service attack or similar), an alarm shall be generated.
- HH. The IFC shall support a high security configuration that disables unnecessary ports and legacy communication methods, this shall be achieved by an onboard jumper or DIP switch.
- II. All ISMS data communication between the central server and IFCs shall be encrypted using an industry standard symmetric encryption algorithm equivalent to AES-256 or stronger.
- JJ. Communication between the management application and IFCs shall be continuous and monitored for interruption.
- KK. The IFC shall include one RS232 multi-communications port.
- LL. The IFC shall include one USB 2.0 port.
  - 1. There may be a USB removed version of the IFC as a derivative of the standard model
- MM. Remote communication between the IFCs and the ISMS server shall use the switched telephone network circuits.
  - 1. Incoming connection shall be via an ISP service.
  - 2. Outgoing connections via modems connected to the customer LAN are not permitted.
- NN. The IFC shall support a cellular module for alarm transmission to multiple alarm monitoring stations via a cellular network.
- OO. The IFC shall support logic functionality by way of configurable logic blocks.
  - 1. The IFC logic functionality shall be able to be run independent of the ISMS server being online.
  - 2. The following items shall be useable as input parameters to logic blocks:
    - a. physical input states,
    - b. output states (both physical and logical),
    - c. door states,
    - d. other logic block states.
  - 3. Up to ten logic block input parameters shall be configurable in AND/OR combinations to cause a logic block to operate.
  - 4. When a logic block changes state according to the input parameters then the following types of items may change to reflect the state of the logic block:
    - a. virtual output (software based),
    - b. physical relay.
  - 5. The state change of the logic block shall have configurable timing options with at least the following:

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- a. explicit,
  - b. delay on,
  - c. delay off,
  - d. pulsed,
  - e. maximum on time,
  - f. latched.
6. The IFC logic block shall be able to trigger actions across multiple IFCs, independent of the ISMS server being online.
- PP. A separate alarm message shall be transmitted to the ISMS for at least the following alarm conditions. The alarm message shall be displayed in plain language text.
1. tamper,
  2. tamper return to normal,
  3. unit stopped responding,
  4. card error,
  5. maintenance warning,
  6. alarm sector state change,
  7. user set alarm,
  8. user unset alarm,
  9. card trace,
  10. wrong PIN,
  11. access denied,
  12. duress,
  13. zone count maximum, 38.42.1.14. zone count minimum, 38.42.1.15. door open too long, 38.42.1.16. forced door, 38.42.1.17. door not locked, 38.42.1.18. power failure,
  14. system reboot,
  15. intercom.
- QQ. The IFC shall communicate with and control the following equipment:
1. biometric access readers,
  2. card access readers with PIN keypads,
  3. elevator access equipment,
  4. alarm monitoring input/output panels and equipment,
  5. alarm response equipment.
- RR. All communications links between the IFCs and remote devices shall be monitored such that an alarm is raised at the central control if the data being transmitted is corrupted or tampered with in any way.
- SS. All data communication between IFCs shall be encrypted using an industry standard symmetric encryption algorithm equivalent to AES-256 or stronger.
- TT. All data communication between IFCs shall use an industry standard asymmetric encryption algorithm for mutual authentication and session key negotiation. This algorithm shall be equivalent to ECC P-384 or stronger. Session keys shall be re-negotiated on a regular basis at intervals no longer than 30 hours.

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- UU. Communication between IFCs and downstream devices shall support a high-speed serial protocol of at least 1Mbit/second.
- VV. The IFC shall support up to 10 high speed serial communication ports.
- WW. The IFC shall support up 80 devices comprising a combination of readers, I/O devices and sensors.
- XX. Devices connected to the high communication serial port shall contain a manufacturer's unique serial number.
- YY. When connected to an IFC, the serial number of the downstream device shall be reported to the ISMS.
- ZZ. Once assigned to a function within an IFC, if any attempt is made to substitute readers in the field without authorization, an alarm shall be generated.

AAA. The IFC shall support the Wiegand connections protocol, supporting up to 65,535 bits.

- 1. Wiegand formats shall be configurable, allowing for:
  - a. number of bits,
  - b. facility/site code bits,
  - c. card number bits,
  - d. parity bit configuration.

BBB. The IFC shall have OSDP reader support.

CCC. The IFC shall provide relay output facilities that are activated in response to alarm activations. Relay functions required are:

- 1. Activate and latch a relay in response to an alarm. Relay to remain latched until alarm processed.
- 2. Activate a relay for pre-set "pulse" time. The relay to release after the
- 3. "pulse" time lapses.
- 4. Relay activation to "mirror" or "follow" the alarm input activation.

DDD. The ISMS shall incorporate relay outputs that can be activated according to time schedules, rather than alarm event.

2.40 Encrypted End of Line Device – Class 5

- A. Encrypted end of line devices shall be available to provide secure monitoring of alarm inputs, i.e. passive infrared sensors, contacts.
- B. The End of Line Device (ELD) must conform to the AS/NZS 2201 Class 5 Intruder Alarm Standard.

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- C. The ELD is required to fit securely inside the housing of a AS/NZS 2201 complaint PIR.
- D. Alarm input devices must connect to the ISMS via an ELD.
- E. The ELD must communicate with the ISMS using encrypted communications.
- F. The ELD shall support the following I/O to the alarm device:
  - 1. alarm input,
  - 2. tamper input,
  - 3. anti-masking input,
  - 4. walk test output,
    - a. the walk test output shall support either a positive or negative output voltage during testing.
- G. Events relating to the ELD shall be visible at the ISMS.
- H. The ELD shall be encapsulated in a protective resin and plastic casing to prevent tampering.
- I. The ELD shall support self-discovery on the ISMS.
- J. The ELD shall be identifiable via a manufacturer's unique serial number both indelibly marked on the ELM and at the ISMS.
- K. When connected to an IFC, the unique number of the ELD shall be reported to the ISMS.
- L. The ELD is required to generate an alarm for the following conditions:
  - 1. attempted substitution of the ELD,
  - 2. external tamper sensor activated,
  - 3. communications lost to ISMS,
  - 4. alarm input triggered,
  - 5. anti-mask input triggered.
- M. The ELD shall be upgradeable via software uploaded from the ISMS without any intervention at the ELD.
- N. Each ELD shall be identified on the operator GUI by means of a user definable unique plain language descriptor. The plain language descriptor shall be at least 60 characters in length.
- O. It shall be possible to connect up to thirty ELDs to a single IFC.
- P. The ELD shall support a serial wiring configuration.
- Q. The ELD shall operate at temperatures between -10°C to +70°C

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2.41 Encrypted End of Line Devices

- A. Encrypted end of line devices shall be available to provide secure monitoring of alarm inputs, i.e. passive infrared sensors, contacts.
- B. The purpose of the ELD is to overcome the security weakness created by non- authenticated sensor inputs using a balanced resistor network.
- C. The ELD shall be small enough to fit inside the housing of a PIR.
- D. Alarm input devices must connect to the ISMS via an ELD.
- E. The ELD must communicate with the ISMS using encrypted communications.
- F. The ELD shall support the following I/O to the alarm device:
  - 1. alarm input,
  - 2. tamper input,
  - 3. anti-masking input,
  - 4. walk test output,
    - a. the walk test output shall support either a positive or negative output voltage during testing.
- G. Events relating to the ELD shall be visible at the ISMS.
- H. The ELD shall be encapsulated in a protective resin and plastic casing to prevent tampering.
- I. The ELD shall support self-discovery on the ISMS.
- J. The ELD shall be identifiable via a manufacturer's unique serial number both indelibly marked on the ELD and at the ISMS.
- K. When connected to an IFC, the unique number of the ELD shall be reported to the ISMS.
- L. The ELD is required to generate an alarm for the following conditions:
  - 1. attempted substitution of the ELD,
  - 2. external tamper sensor activated,
  - 3. communications lost to ISMS,
  - 4. alarm input triggered,
  - 5. anti-mask input triggered.
- M. The ELD shall be upgradeable via software uploaded from the ISMS without any intervention at the ELD.
- N. Each ELD shall be identified on the operator GUI by means of a user definable unique plain language descriptor. The plain language descriptor shall be at least 60 characters in length.



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- O. Communication sessions between IFCs and ELDs shall use certificate exchange protocols using keys with a minimum strength of ECC P-256.
- P. Data communication between IFCs and ELDs shall use a minimum of AES-128 encryption.
- Q. It shall be possible to connect up to thirty ELDs to a single IFC.
- R. The ELD shall support a serial wiring configuration.
- S. The ELD shall operate between -10°C to +70°C.

2.42 Access Control Readers – Mifare Technology

- A. The reader shall support the following technologies:
  - 1. Mifare Classic,
  - 2. Mifare Plus,
  - 3. Mifare DESFire EV1,
  - 4. Mifare DESFire EV2,
  - 5. NFC.
- B. The reader shall be capable of reading the CSN of the Mifare card and store the CSN in the ISMS database
- C. The readers shall support self-discovery on the ISMS.
  - 1. Readers shall contain a manufacturer's unique serial number.
  - 2. When connected to an IFC, the serial number of the reader shall be reported to the ISMS.
  - 3. Once assigned to a function within an IFC, if any attempt is made to substitute readers in the field without authorization, an alarm shall be generated.
- D. Data communication rate between IFCs and readers shall be at least 1Mbit/second.
- E. Communication sessions between IFCs and readers shall use certificate exchange protocols using keys with a minimum strength of ECC P-256.
- F. Data communication between IFCs and readers shall be encrypted and use a minimum of AES-128.
- G. Readers shall generate a heartbeat signal to enable the IFC to identify lost communications and thereby generate an alarm.
- H. Readers shall be upgradeable via software downloaded from the ISMS without any intervention at the reader.
- I. The reader must accept a message from the IFC to advise that data from reader to IFC has been received and to consequently stop sending the card data.

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- J. Each reader shall be identified independently on the ISMS by means of a unique plain language descriptor. The plain language descriptor shall be at least 60 characters in length.
- K. Where a card only reader is specified, the reader shall include:
1. Integrated reader module supporting the technologies listed above.
  2. The card only reader option shall include an audible beeper and red/green LEDs to provide user feedback.
    - a. A steady red LED shall indicate door secure.
    - b. A flashing red LED shall indicate access denied.
    - c. A steady green LED shall indicate door free access.
    - d. A flashing green LED shall indicate access granted.
    - e. It shall be possible to turn off the reader LED indication via the ISMS software.
  3. The beeper shall give different beeps to indicate:
    - a. access granted,
    - b. access denied,
    - c. second card required when dual card authorization or escort mode is programmed,
    - d. it shall be possible to turn off the reader beeper via the ISMS software.
  4. The readers must comply with at least IP68 environmental protection rating.
  5. The readers must comply with an impact rating of at least IK07
  6. A vandal resistant enclosure having an impact rating of at least IK08 rating shall be available where:
    - a. Vandal covers shall be fixed to the wall surface using tamper- resistant screws.
    - b. Vandal covers shall have beveled edges to limit the ability for persons to use the reader as an aid to climbing the building.
    - c. All external surfaces shall be beveled and without protruding parts to meet anti-ligature requirements.
  7. The reader must be RoHS compliant
  8. The reader shall operate with a temperature range of -30°C to +70°C.
- L. Where a PIN pad is specified, the reader shall include:
1. integrated reader module supporting the technologies listed above,
  2. a minimum of a 3.5" LED color display indicating:
    - a. card required,
    - b. PIN required,
    - c. access denied,
    - d. intruder alarm set,
    - e. intruder alarm unset,
    - f. free access,
    - g. second card required.

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3. The display shall support multiple languages which shall be selectable from the ISMS software.
4. The reader shall display information to the user using a combination of text and graphics.
5. The reader shall display the date and time.
6. a PIN pad fully integrated with the reader,
7. the PIN pad shall be backlit,
8. The PIN pad shall include:
  - a. numerical 0 to 9 keys,
  - b. a cancel key,
  - c. an enter/accept key,
  - d. two soft keys that vary according to the current usage of the keypad.
  - e. An option with no reader module, for use as an AMT.
9. Menus shall be accessible by logging on with either a card or a PIN.
10. The reader shall be capable of (but not limited to) carrying out the following functions:
  - a. Arm alarm zones; A minimum of 50 per reader must be supported.
  - b. Disarm alarm zones; A minimum of 50 per reader must be supported.
  - c. View Alarms; A minimum of 100 per reader must be supported. 41.12.10.4. Acknowledge alarms; A minimum of 100 per reader must be
  - d. supported.
  - e. View alarm history; A minimum of 100 per reader must be supported.
  - f. Change the door to free access mode. 41.12.10.7. Change the door to secure access mode.
  - g. Change the door to operate from a user defined schedule.
  - h. Turn outputs on and off. A minimum of 50 per reader must be supported.
  - i. View the status of inputs. A minimum of 100 per reader must be supported.
  - j. Isolate inputs. A minimum of 100 per reader must be supported.
11. User definable custom images shall be displayed on the screen when the reader is idle.
12. The reader shall support the following image formats: 41.12.12.1. PNG,
  - a. 41.12.12.2. JPG,
  - b. 41.12.12.3. JPEG.
13. It shall be possible to adjust the reader beeper via the ISMS software to the following volume levels:
  - a. off,
  - b. quiet,
  - c. normal,
  - d. loud.
14. The reader shall have the ability to display the status of alarms and indicate the status of physical and logical items via LEDs on front panel.
  - a. The reader shall support at least 8 indication LEDs.

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15. It shall be possible to turn off the reader indicator LEDs via the ISMS software.
16. Tamper detection shall be provided against the unit being removed from the mounting surface.
17. Keypad readers must comply with a minimum IP66 environmental protection rating.
18. Keypad readers must comply with an impact rating of at least IK08.
19. The keypad reader shall operate with a temperature range of -30°c to +70°c.

M. All readers must be RoHS compliant.

2.43 Access Control Readers – Multi-Technology

A. The reader shall support the following technologies:

1. Proximity 125 kHz
2. Mifare Classic,
3. Mifare Plus,
4. Mifare DESFire EV1,
5. Mifare DESFire EV2,
6. NFC,
7. Bluetooth LE.

B. The reader shall be capable of reading the CSN of the Mifare card and store the CSN in the ISMS database

C. The readers shall support self-discovery on the ISMS.

1. Readers shall contain a manufacturer's unique serial number.
2. When connected to an IFC, the serial number of the reader shall be reported to the ISMS.
3. Once assigned to a function within an IFC, if any attempt is made to substitute readers in the field without authorization, an alarm shall be generated.

D. Data communication rate between IFCs and readers shall be at least 1Mbit/second.

E. Communication sessions between IFCs and readers shall use certificate exchange protocols using keys with a minimum strength of ECC P-256.

F. Data communication between IFCs and readers shall be encrypted and use a minimum of AES-128.

G. Readers shall generate a heartbeat signal to enable the IFC to identify lost communications and thereby generate an alarm.

H. Readers shall be upgradeable via software downloaded from the ISMS without any intervention at the reader.

I. The reader must accept a message from the IFC to advise that data from reader to IFC has been received and to consequently stop sending the card data.

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- J. Each reader shall be identified independently on the ISMS by means of a unique plain language descriptor. The plain language descriptor shall be at least 60 characters in length.
- K. Where a card only reader is specified, the reader shall include:
1. Integrated reader module supporting the technologies listed above.
  2. The card only reader option shall include an audible beeper and red/green LEDs to provide user feedback.
    - a. A steady red LED shall indicate door secure.
    - b. A flashing red LED shall indicate access denied.
    - c. A steady green LED shall indicate door free access.
    - d. A flashing green LED shall indicate access granted.
    - e. It shall be possible to turn off the reader LED indication via the ISMS software.
  3. The beeper shall give different beeps to indicate:
    - a. access granted,
    - b. access denied,
    - c. second card required when dual card authorization or escort mode is programmed,
    - d. it shall be possible to turn off the reader beeper via the ISMS software.
  4. The readers must comply with at least IP68 environmental protection rating.
  5. The readers must comply with an impact rating of at least IK07
  6. A vandal resistant enclosure having an impact rating of at least IK08 shall be available where:
    - a. Vandal covers shall be fixed to the wall surface using tamper- resistant screws.
    - b. Vandal covers shall have bevelled edges to limit the ability for persons to use the reader as an aid to climbing the building.
    - c. All external surfaces shall be bevelled and without protruding parts to meet anti-ligature requirements.
  7. The reader must be RoHS compliant
  8. The reader shall operate with a temperature range of -30°C to +70°C.
- L. Where a PIN pad is specified, the reader shall include:
1. integrated reader module supporting the technologies listed above,
  2. a minimum of a 3.5" LED color display indicating:
    - a. card required,
    - b. PIN required,
    - c. access denied,
    - d. intruder alarm set,
    - e. intruder alarm unset,
    - f. free access,
    - g. second card required.

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3. The display shall support multiple languages which shall be selectable from the ISMS software.
4. The reader shall display information to the user using a combination of text and graphics.
5. The reader shall display the date and time.
6. a PIN pad fully integrated with the reader,
7. the PIN pad shall be backlit,
8. The PIN pad shall include:
  - a. numerical 0 to 9 keys,
  - b. a cancel key,
  - c. an enter/accept key,
  - d. two soft keys that vary according to the current usage of the keypad.
9. Menus shall be accessible by logging on with either a card or a PIN.
10. The reader shall be capable of (but not limited to) carrying out the following functions:
  - a. Arm alarm zones; a minimum of 50 per reader must be supported.
  - b. Disarm alarm zones; a minimum of 50 per reader must be supported.
  - c. View alarms; a minimum of 100 per reader must be supported. 42.12.10.4. Acknowledge alarms; a minimum of 100 per reader must be
  - d. supported.
  - e. View alarm history; a minimum of 100 per reader must be supported.
  - f. Change the door to free access mode. 42.12.10.7. Change the door to secure access mode.
  - g. Change the door to operate from a user defined schedule.
  - h. Turn outputs on and off; a minimum of 50 per reader must be supported.
  - i. View the status of inputs; a minimum of 100 per reader must be supported.
  - j. Isolate inputs; a minimum of 100 per reader must be supported.
11. User definable custom images shall be displayed on the screen when the reader is idle.
12. The reader shall support the following image formats: 42.12.12.1. PNG,
  - a. 42.12.12.2. JPG,
  - b. 42.12.12.3. JPEG.
13. It shall be possible to adjust the reader beeper via the ISMS software to the following volume levels:
  - a. off,
  - b. quiet,
  - c. normal,
  - d. loud.
14. The reader shall have the ability to display the status of alarms and indicate the status of physical and logical items via LEDs on front panel.
15. The reader shall support at least 8 indication LEDs.
16. It shall be possible to turn off the reader indicator LEDs via the ISMS software.
17. Tamper detection shall be provided against the unit being removed from the mounting surface.

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- 18. Keypad readers must comply with a minimum IP66 environmental protection rating.
- 19. Keypad readers must comply with an impact rating of at least IK08.
- 20. The keypad reader shall operate with a temperature range of -30°C to +70°C.

M. All readers must be RoHS compliant.

N. The key pad reader shall support a backlight feature for dark environments.

2.44 Access Control Readers – Long Range

- A. The requirement for long range access control readers will be specified in accompanying documents. When required, these readers shall meet the following specification.
- B. The reader shall be provided in a vandal resistant enclosure, having an environmental rating of at least IP65.
- C. The reader shall have a read range up to 10m (33ft).
- D. The reader shall successfully read a tag/booster passing through the reader field up to 200km/hr (125mph).
- E. Multiple channel support shall allow at least 32 readers to operate within close vicinity of each other.
- F. A short-range access card or token shall have the ability to be temporarily associated with a booster to allow the data from the card or token to be transmitted to the long- range reader.
- G. The transfer of data from the access card or token, through the booster, via the reader to the system shall be seamless to the end user.
- H. A unique identifier for the booster shall be sent to the reader.
- I. The access control decision shall be able to be based on a combination of valid access card associated with a valid booster. For example, an access decision based on a driver (cardholder ID) permitted access only with an approved vehicle (booster ID).

2.45 Reader – Bluetooth and NFC

- A. The system shall have the capability to use a mobile device as an access credential in place of a traditional access control card.
- B. Connectivity between the mobile device and access control reader shall be via BLE communication or NFC technology (subject to the capability of the mobile device).
- C. In addition to BLE and NFC support, the access control reader must support multiple card and communication technologies to allow for scenarios where a mobile device may not be available. The reader shall support the following:

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1. Proximity 125 kHz,
  2. Mifare Classic,
  3. Mifare Plus,
  4. MIFARE DESFire EV1,
  5. MIFARE DESFire EV2.
- D. Any communication between the ISMS and a cloud server shall be limited to those initiated by outbound requests from the ISMS only to ensure system security.
- E. It shall be possible to configure the Bluetooth functionality of the reader via the ISMS.
- F. The options for configuration shall include:
1. enable/disable reader BLE functionality,
  2. enable/disable second factor authentication whereby the user must present their mobile device and enter a PIN or biometric identification,
  3. enable/disable the ability of the reader to advertise its name via BLE,
  4. adjust the overall transmit power of the reader,
  5. enable/disable the ability for the mobile device to automatically connect to the access control reader,
  6. adjust the signal strength threshold for auto connection to the access control reader,
  7. enable/disable the ability for the mobile device to manually connect to the access control reader,
  8. adjust the read range for manual connection to the access control reader.
- G. It shall be possible to apply a global setting for all readers.
- H. It shall be possible to apply a setting for individual readers.
- I. It shall be possible to configure and calibrate the BLE functionality of the reader via an application on the mobile device. The configuration and calibration options shall include:
1. enable/disable reader BLE functionality,
  2. enable/disable second factor authentication whereby the user must present their mobile device and enter a PIN or biometric identification,
  3. enable/disable the ability of the reader to advertise its name via BLE,
  4. adjust the overall transmit power of the reader,
  5. enable/disable the ability for the mobile device to automatically connect to the access control reader,
  6. adjust the signal strength threshold for auto connection to the access control reader by placing the mobile device at the distance where it is required to operate and selecting a calibration button,
  7. enable/disable the ability for the mobile device to manually connect to the access control reader,
  8. adjust the read range for manual connection to the access control reader by placing the mobile device at the distance where it is required to operate and selecting a calibration button.



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- J. Provisioning of a mobile device to be used as an access credential shall be carried out within the ISMS core software. Obtaining credential details via a third-party application or web site will not be acceptable.
  - K. Provisioning of the access credential shall be a two-step process to ensure security.
    - 1. An email shall be sent to the user who will confirm acceptance of the access credential on their mobile device.
    - 2. After acceptance, a confirmation code of no less than 6 digits shall be sent via SMS to the mobile device, whereby the user will enter this into the mobile device access control application to enable its operation.
  - L. The time allowed for the credential to be accepted shall be configurable within the ISMS. After the time has expired, the credential will need to be re-issued.
  - M. Systems that use a single step provisioning process are not acceptable. This is to avoid instances where the ISMS operator incorrectly enters an email address or mobile device number and an incorrect person receives the access credential.
  - N. It shall be possible to remove authorization of access credentials via the ISMS should a mobile device be lost.
  - O. It shall be possible to re-issue access credentials via the ISMS should a mobile device be replaced.
  - P. It shall be possible to re-issue access credentials to another cardholder.
  - Q. When the mobile device is presented to the reader, the access decision shall be made at the IFC. Systems where the access decision is made at the ISMS server or in the cloud are not acceptable.
  - R. In addition to using the mobile device as an access control credential, the following functionality shall be available via the mobile device access control application:
    - 1. arm and disarm an alarm zone,
    - 2. change the mode of a door from secure to free access, and vice versa,
    - 3. change the scheduled access mode of a door,
    - 4. activate/deactivate relay outputs anywhere on the system. The relays do not necessarily have to be connected to the access controller which is connected to the Bluetooth reader,
    - 5. receive messages from the ISMS via push notifications.
  - S. ISMS shall support Bluetooth Tag tracking utilizing Bluetooth Low Energy specification outline for i beacon and Eddystone.
- 2.46 Access Control Readers - Biometric (fingerprint)
- A. Where specified, biometric (fingerprint) readers are required for this project.

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- B. The reader shall be designed for wall mounting, positioned to allow ease of use for the user.
- C. Where required, visual (LED and LCD graphic display) and audible feedback shall be provided to indicate:
  - 1. reposition the finger for a valid read,
  - 2. access granted,
  - 3. access denied.
- D. The reader shall include a Mifare/DESFire contactless smartcard reader for verification mode where the fingerprint template is stored on a card.
- E. The reader shall support encryption for both data in transit and data at rest for all biometric templates.
- F. Tamper protection shall be provided against the unit being opened and against the unit being removed from the mounting surface.
- G. The sensor resolution shall be 500dpi or greater and FBI PIV-IQS certified
- H. Fingerprint read time shall be less than one second.
- I. The reader shall be able to detect and reject artificial fingers presented to the reader.

2.47 Access Control Readers - Biometric (contactless)

- A. Where specified, contactless biometric readers are required for this project.
- B. The reader shall be designed for wall mounting, positioned to allow ease of use for the user.
- C. The reader shall acquire a biometric scan from a hand waved within sensor range without requiring contact to any surface.
- D. Where required, visual (LED and LCD graphic display) and audible feedback shall be provided to indicate:
  - 1. pass hand through the sensor again for a valid read,
  - 2. access granted,
  - 3. access denied.
- E. The reader shall include a Mifare/DESFire contactless smartcard reader for verification mode where the hand template is stored on a card.
- F. The reader shall support encryption for both data in transit and data at rest for all biometric templates.
- G. Tamper protection shall be provided against the unit being opened and against the unit being removed from the mounting surface.

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H. Hand read time shall be less than one second.

I. The reader shall be able to detect and reject artificial hands presented to the reader.

2.48 Alarm Management Terminal – Access Control

A. AMTs shall be provided to allow keypad functionality as described in this section.

B. The AMT shall support self-discovery on the ISMS.

1. AMTs shall contain a manufacturer's unique serial number.
2. When connected to an IFC, the serial number of the AMT shall be reported to the ISMS.
3. Once assigned to a function within an IFC, if any attempt is made to substitute AMTs in the field without authorization, an alarm shall be generated.

C. Data communication rate between IFCs and AMTs shall be at least 1Mbit/second.

D. Communication sessions between IFCs and AMTs shall use certificate exchange protocols using keys with a minimum strength of ECC P-256.

E. Data communication between IFCs and AMTs shall use a minimum of AES-128.

F. AMTs shall generate a heartbeat signal to enable the IFC to identify lost communications and thereby generate an alarm.

G. AMTs shall be upgradeable via software downloaded from the ISMS without any intervention at the AMT.

H. Each AMT shall be identified independently on the ISMS by means of a unique plain language descriptor. The plain language descriptor shall be at least 60 characters in length.

I. The AMT must have a secure idle state to prevent unauthorized usage.

J. Where an AMT is specified, it shall include:

1. The AMT must have a color display, size being a minimum of 3.5”.
2. The display shall support multiple languages which shall be selectable from the ISMS software.
3. The AMT shall display information to the user using a combination of text and graphics.
4. The AMT shall display the date and time.

K. The AMT keypad shall be backlit.

L. The AMT keypad pad shall include:

1. numerical 0 to 9 keys,
2. a cancel key,
3. an enter/accept key,

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4. two soft keys that vary according to the current usage of the AMT.
- M. The AMT shall be capable of (but not limited to) carrying out the following functions:
1. Arm alarm zones; a minimum of 50 per AMT must be supported.
  2. Disarm alarm zones; a minimum of 50 per AMT must be supported.
  3. View alarms; a minimum of 100 per AMT must be supported.
  4. Acknowledge alarms; a minimum of 100 per AMT must be supported and be decoupled from the ISMS.
  5. View alarm history; a minimum of 100 per AMT must be supported.
  6. Turn outputs on and off; a minimum of 50 per AMT must be supported.
  7. View the status of inputs; a minimum of 100 per AMT must be supported.
  8. Isolate inputs; a minimum of 100 per AMT must be supported.
- N. User definable custom images shall be displayed on the screen when the AMT is idle.
- O. Customisable message shall be displayed as the AMT utilised for entry and exit.
- P. The AMT shall support the following image formats:
1. PNG,
  2. JPG,
  3. JPEG.
- Q. It shall be possible to adjust the AMT beeper via the ISMS software to the following volume levels:
1. off,
  2. quiet,
  3. normal,
  4. loud.
- R. Multiple AMTs can be used anywhere attached to the ISMS to remotely manage assigned intruder alarm zones.
- S. The AMT shall have the ability to display the status of alarms and indicate the status of physical and logical items via LEDs on front panel.
- T. The AMT shall support at least 8 indication LEDs.
- U. It shall be possible to turn off the AMT indicator LEDs via the ISMS software.
- V. Tamper detection shall be provided against the unit being removed from the mounting surface.
- W. AMT readers must comply with a minimum IP66 environmental protection rating.
- X. AMTs must comply with an impact rating of at least IK08.
- Y. The AMT shall operate within a temperature range of -30°C to +70°C.

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- Z. A mobile App shall be utilised to access the AMT while using dual factor authorization.
- AA. Cipher Pad function can be enabled to enhanced cardholder security.

2.49 Alarm Management Terminal – Perimeter

- A. AMTs shall be provided to allow keypad functionality as described in this section.
- B. The AMT shall support self-discovery on the ISMS.
  - 1. AMTs shall contain a manufacturer’s unique serial number.
  - 2. When connected to an IFC, the serial number of the AMT shall be reported to the ISMS.
  - 3. Once assigned to a function within an IFC, if any attempt is made to substitute AMTs in the field without authorization, an alarm shall be generated.
- C. Data communication rate between IFCs and AMTs shall be at least 1Mbit/second.
- D. Communication sessions between IFCs and AMTs shall use certificate exchange protocols using keys with a minimum strength of ECC P-256.
- E. Data communication between IFCs and AMTs shall use a minimum of AES-128.
- F. AMTs shall generate a heartbeat signal to enable the IFC to identify lost communications and thereby generate an alarm.
- G. AMTs shall be upgradeable via software downloaded from the ISMS without any intervention at the AMT.
- H. Each AMT shall be identified independently on the ISMS by means of a unique plain language descriptor. The plain language descriptor shall be at least 60 characters in length.
- I. The AMT must have a secure idle state to prevent unauthorized usage.
- J. Where an AMT is specified, it shall include:
  - 1. The AMT must have a color display, size being a minimum of 3.5”.
  - 2. The display shall support multiple languages which shall be selectable from the ISMS software.
  - 3. The AMT shall display information to the user using a combination of text and graphics.
  - 4. The AMT shall display the date and time.
- K. The AMT keypad shall be backlit.
- L. The AMT keypad pad shall include:
  - 1. numerical 0 to 9 keys,
  - 2. a cancel key,
  - 3. an enter/accept key,

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4. two soft keys that vary according to the current usage of the AMT.
- M. The AMT shall be capable of (but not limited to) carrying out the following functions:
1. Arm alarm zones; a minimum of 50 per AMT must be supported.
  2. Disarm alarm zones; a minimum of 50 per AMT must be supported.
  3. View alarms; a minimum of 100 per AMT must be supported.
  4. Acknowledge alarms; a minimum of 100 per AMT must be supported.
  5. View alarm history; a minimum of 100 per AMT must be supported.
  6. Turn outputs on and off; a minimum of 50 per AMT must be supported.
  7. View the status of inputs; a minimum of 100 per AMT must be supported.
  8. Isolate inputs; a minimum of 100 per AMT must be supported.
- N. Where an AMT is specified to control perimeter fence system, it shall be capable of (but not limited to) carrying out the following perimeter electric fence system functions:
1. Override fence zones as follows:
    - a. arm,
    - b. disarm,
    - c. isolated (lock out zone(s) for maintenance).
  2. Display Fence Zone status (“Armed”, “Disarmed”, “Alarms in System”) on the front panel LEDs.
  3. Display the Fence Zone status details such as High Voltage, Low Voltage and Isolated.
  4. Display current fence return voltages.
  5. Display fence return voltage range for the past seven days.
  6. Display backup battery status and voltage.
  7. Display current ambient temperature of the Electric Fence Controller.
    - 1.1.5. Display the temperature range for the past seven days.
- O. User definable custom images shall be displayed on the screen when the AMT is idle.
- P. The AMT shall support the following image formats:
1. PNG,
  2. JPG,
  3. JPEG.
- Q. It shall be possible to adjust the AMT beeper via the ISMS software to the following volume levels:
1. off,
  2. quiet,
  3. normal,
  4. loud.
- R. Multiple AMTs can be used anywhere attached to the ISMS to remotely manage assigned intruder alarm zones.

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- S. The AMT shall have the ability to display the status of alarms and indicate the status of physical and logical items via LEDs on front panel.
  - 1. The AMT shall support at least 8 indication LEDs.
- T. It shall be possible to turn off the AMT indicator LEDs via the ISMS software.
- U. Tamper detection shall be provided against the unit being removed from the mounting surface.
- V. AMT readers must comply with a minimum IP66 environmental protection rating.
- W. AMTs must comply with an impact rating of at least IK08.
- X. The AMT shall operate within a temperature range of -30°C to +70°C.

2.50 Access Cards and Tokens

- A. The access token technology for this project shall match the reader technology as specified separately but in association with this specification.
- B. Access cards shall be of standard credit card size, being no larger than CR-80 and shall be direct printable using a dye-sublimation print process or be capable of accepting an adhesive label printed through such a process.
- C. All cards shall meet ISO standards.
- D. As well as CR80 sized cards, vehicle tokens and key-ring transponders should also be proposed as an alternative, where available.
- E. The access token data shall include:
  - 1. support for up to 2008-bit card numbers,
  - 2. where a proprietary card number format is offered, the card format shall include:
    - a. a unique site code not used for any other system worldwide,
    - b. a unique cardholder identification number at least 7 digits long,
    - c. an issue level for each card number to allow for replacing lost cards without reducing the card database size. Up to 15 levels of issue levels shall be supported.
- F. The access control token shall uniquely identify the cardholder to the access control system.
- G. Uniquely identifiable information shall be stored in the access token in a secure format.
- H. Transmission of data between the proximity access token and the proximity reader shall be in a secure format.
- I. There shall be barriers employed to prevent the copying or altering of access control data stored on the card using any readily available equipment. The tenderer shall document the barriers used.

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- J. Cards and access tokens shall be able to be encoded by the supplier according to the client's specifications, made known at the time of order.
- K. Allowance shall be made for the supply of encoding software and hardware to the client to enable encoding of their own cards and/or tokens on site.

2.51 Token - Mifare Classic Technology

- A. The cards shall incorporate Mifare Classic technology.
- B. The card number must be a number specifically encoded to a sector of the card. It shall not be the CSN.
- C. The card data encoded shall use a secure sector authentication level of security to protect against card cloning. AES-128 shall be used.
- D. The encoded card data shall incorporate data consisting of:
  - 1. the assigned card number,
  - 2. a site-specific key consisting of 32 hexadecimal characters.
- E. Card encoding shall be an integral part of card production.
- F. It shall be possible to specify the card sector where the card number is stored.
- G. The Mifare sector unlock key and the MAD unlock key shall be user definable.
- H. Where multiple sectors on the Mifare card are configured for different applications, single pass card encoding shall be used.

2.52 Token - Mifare Plus Technology

- A. The cards shall incorporate Mifare Plus technology.
- B. The card number must be a number specifically encoded to a sector of the card. It shall not be the CSN.
- C. The card data encoded shall use a secure sector authentication level of security to protect against card cloning. AES-128 shall be used.
- D. The Mifare Plus "S" variant shall be provided.
- E. The encoded card data shall incorporate data consisting of:
  - 1. the assigned card number,
  - 2. a site-specific key consisting of 32 hexadecimal characters,
  - 3. the 32 hexadecimal key shall optionally be sourced from a customer specified key-safe.



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- F. Card encoding shall be an integral part of card production.
- G. It shall be possible to specify the card sector where the card number is stored.
- H. The Mifare sector unlock key and the MAD unlock key shall be user definable.
- I. Where multiple sectors on the Mifare card are configured for different applications, single pass card encoding shall be used.

2.53 Token – Mifare DESFire Technology

- A. The cards shall incorporate DESFire technology.
- B. The card number must be a number specifically encoded to an application on the card. It shall not be the CSN.
- C. The card data encoded shall use a secure sector authentication level of security to protect against card cloning. AES-128 shall be used.
- D. The DESFire EV2 variant shall be provided.
- E. The encoded card data shall incorporate data consisting of:
  - 1. the assigned card number.
  - 2. a site-specific key consisting of 48 hexadecimal characters.
- F. The 48 hexadecimal key shall optionally be sourced from a customer specified key-safe
- G. Card encoding shall be an integral part of card production.
- H. The application unlock key and the DESFire CAD unlock key shall be user definable.

2.54 Credential – Bluetooth and NFC on Mobile Device

- A. An application shall be provided that enables a mobile device to be recognized as a valid credential for the ISMS.
- B. The mobile device access control application shall support the following operating systems:
  - 1. iOS 11 and above,
  - 2. Android 6.0 and above.
- C. The mobile device access control application shall have a built-in help system.
- D. Credentials shall be managed via strong open standard authentication methods using public key cryptography. Proprietary encryption methods are not acceptable.
- E. It shall be possible to enable two factor authentication with the addition of either:

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1. PIN, or
  2. biometric (where supported by the mobile device).
- F. The second authentication factor shall be selected by the user at the time of registration.
- G. Where biometric authentication is deployed, no biometric information shall ever leave the device, this includes during the initial registration and authentication.
- H. It shall be possible to connect the mobile device access control application to the reader for access control verification by two methods:
1. Manual connection; whereby the user must interact with the mobile device access control application to request access. Interaction must be no more complex than opening the application and touching an icon relating to the reader.
  2. Auto-connection; whereby the phone is authorized with a reader when the signal strength reaches a configured threshold, and does not have to open the application and touch an icon.
- I. The mobile device access control application shall give an indication of signal strength for every reader within its range.
- J. Provisioning of the access credential shall be a two-step process to ensure security.
1. An email shall be sent to the user who will confirm acceptance of the access credential on their mobile device.
  2. After acceptance, a confirmation code of no less than 6 digits shall be sent via SMS to the mobile device, whereby the user will enter this into the mobile device access control application to enable its operation.
- K. The mobile device access control application shall support multiple sites without requiring the device holder to change any settings to move between sites.
- L. The mobile device access control application shall support a digital ID that may be displayed from within the application.
1. The digital ID shall support displaying all the information as is available in the integrated card design program.
  2. The digital ID shall verify the accuracy and currency of all data each time that the information is displayed.
  3. The digital ID shall display the time that the information was verified on the ISMS server.
  4. If the digital ID is not able to verify with the ISMS server then this shall be displayed as an additional message overlaying the digital ID.
- 2.55 Credential – Biometric
- A. The requirement for biometric authentication will be specified in accompanying documents. When required the following specifications shall be met.

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- B. The biometric readers and associated technology shall be fully integrated into the system. All biometric enrolment and template management user interfaces shall be provided seamlessly in the standard central control system user interface.
- C. The operator shall not have to access a separate biometric template database to manage biometric templates.
- D. The identification time (time to identify a presented biometric from the database) shall be less than 2 seconds.
- E. The reader shall have tamper protection against removal of the reader from the wall, and removal of the reader fascia from the base.
- F. Enrolment shall be carried out at a USB capable enrolment reader specifically provided for this purpose.
- G. The enrolled biometric templates shall conform to the following:
  - 1. Each template shall be based on three separate presentations to obtain the best template.
  - 2. A second template associated with a second biometric (in case the primary biometric temporarily cannot be used for any reason) shall be enrolled.
  - 3. Two optional duress biometric templates shall be able to be captured and stored in the reader.
  - 4. The enrolment user interface shall provide visual and audible guidance for correct biometric presentation during enrolment.
  - 5. The enrolment user interface shall display a quality score associated with the biometric capture and warn the operator if the quality of the template is low.
  - 6. The enrolment user interface shall provide an indication of the enrolment quality of the presented biometrics. The level of quality threshold for accepting presented biometrics shall be adjustable by the operator.
- H. When identification mode (1 to many, or 1:N) is specified:
  - 1. The enrolment reader shall read the biometrics and store them as biometric templates in a central database.
  - 2. The biometric templates defined above shall be a subset of the cardholder record.
  - 3. During the biometric read process, the presentation of a biometric at a reader shall initiate a database inquiry at the reader. If the biometric is determined to be of a valid cardholder, the associated access will then be verified by the access controller before access is granted.
- I. When verification mode 1 to one, or 1:1 is specified:
  - 1. The enrolment reader shall read the biometrics and store the template data onto a Mifare Classic, Mifare Plus, or DESFire card.
  - 2. When the card is to be encoded, the user shall be prompted to enrol the biometrics and the card shall then be encoded with both the system identification data and the biometric data.

3. There shall be a configurable option whether to save cardholder biometrics to the central database or discard after encoding to card.
4. During the biometric read process, the biometric read at a reader shall be compared with the template data read from the card. If the biometric is determined to be a match, then the associated access will be verified by the access controller before access is granted.
5. An authorized system operator shall be able to generate and download a Mifare A key to all readers in the system.
6. The A key shall be either generated automatically as a random hexadecimal key, or manually entered.
7. On a Mifare Classic or Mifare Plus card, the Mifare sectors where the biometric template data is to be stored shall be user definable.

2.56 RS485 Fibre Transceiver Requirements

- A. The fibre transceiver shall provide two independent data channels operating as either multi-mode or single-mode devices (depending on the model).
- B. Each channel will be capable of transparently supporting data speeds of 1MB/S on a single fibre.
- C. Each data channel will be capable of handling 2-wire half-duplex RS485 data as per the TIA/EIA standards.
- D. The multi-mode fibre transceiver shall be capable of supporting distances up to 4km between fibre transceivers.
- E. The single-mode fibre transceiver shall be capable of supporting distances up to 40km between fibre transceivers.
- F. Up to 60 devices per RS485 channel shall be supported.
- G. The fibre transceiver shall support the following network topologies:
  1. point-to-point,
  2. multi-drop,
  3. redundant self-healing ring topology.
- H. The fibre transceiver will provide indication of port faults and network damage which shall support the following:
  1. LED indication at the unit,
  2. relay output at the unit,
  3. configurable to indicate either local or global (all transceivers) faults.
- I. LED indicators on the fibre transceiver shall indicate the following:
  1. data activity,
  2. Synchronization status,
  3. fault status,

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4. fault location.

- J. Each channel shall support individually selectable RS485 biasing via a dip-switch.
- K. The operating temperature for the fibre transceiver will be -40°C to +75°C.
- L. The fibre transceiver shall have reverse polarity protection.
- M. Mean time between failure for the fibre transceiver should be no less than 100,000 hours.

2.57 Energised Perimeter Intruder Detection - Structure

- A. The physical fence part of the energised intruder detection system shall be a multi-wire Energised Security Fence (ESF) which consists of a horizontally spaced grid of conductive wires supported by a specially made carrier fence. This will comprise of insulated components exclusively used for a security fence, and support posts retro-fitted to an existing solid and/or mesh type fence or wall.
- B. The system shall be installed in accordance with the manufacturer's installation instructions.
- C. The operating voltage for the energised fence shall be a high voltage short duration pulse, managed and continually monitored to deter intrusion by giving any intruder a high voltage pulse should they touch any part of the grid of conductive wires whilst earthed or in contact with other conductive elements.
- D. All energised fence wires must deliver a deterrent pulse to an intruder touching a wire and earth, or attempting to penetrate between any adjacent wires.
- E. The ESF shall contain intermediate insulating posts at a spacing not greater than three metres to minimise ability to spread the grid of conductive wires creating a viable opening in the energised fence.
- F. Physical hardware (e.g. tensioning devices, springs and insulators) should be inherently designed to suit security applications. Items designed and used for agricultural applications will not be acceptable.
- G. Intermediate insulating components shall have a minimum electrical tracking distance of not less than 80mm.
- H. Intermediate insulating components shall have no area where the conductive wires can be trapped easily between insulator surfaces of the insulating components if the conductive wire is demounted from its nominal position on the insulating component.
- I. Shielding of insulating components should be designed to direct the conductive wire to an earth contact to maximise alarm generation if the conductive wire is demounted from its nominal position.

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- J. The retention mechanism of the conductive wire on the insulating components shall be designed to break during climbing attempts where a load greater than 30kg is applied in a direction away from the physical fence structure.
- K. All structural climb points must be fitted with additional intrusion detection and anti-climb protection.
- L. The conductive wires shall be attached to the inner face of the barrier security fence and access gates when installed within 1.5m of ground level. The barrier security fence provides a physical separation barrier between the general public and the exposed pulsed conductive wires.
- M. Unless otherwise specified, the conductive wires shall extend at least 0.6 metres above the top of the existing barrier security fence fabric or a minimum of 1.0 metre above a wall.
- N. Each energised fence circuit on the same fence control device must be capable of being operated independently.
- O. Where two fence circuits are operating within the same detection zone, shorting of one conductive wire to earth or another conductive element (excluding second conductive wire) should not directly affect the performance and detection of the second conductive wire.
- P. Each access gate or perimeter access door shall be fitted with a switching device that will detect the opening of the gate/door. The switching device and/or attached controls shall ensure all high voltage pulses on or around the gate/door are effectively shorted to earth or disabled at the fence controller.
- Q. Opening of a perimeter access door or gate should annunciate an alarm condition on the system and inhibit the deterrent pulses on that gate.
- R. Each active fence circuit shall be individually configurable for all functionality.
- S. Anti-climb configuration at strain points shall be provided, above the physical barrier. The fence circuit shall be routed around strain posts and connected to strainers such that it forms part of the continuous electrical circuit and does not constitute a parallel, redundant or dead-end path.
- T. Re-tensioning of fence wires must be possible without the need to reposition anti-climb elements.
- U. All joints between conductive elements in a fence circuit shall be clamped and not rely solely on tension of the conductive wire to maintain the integrity of the electrical connection. This excludes the external pressure contact between gate switch halves.
- V. All metal components of the system must be protected against the environment using aluminium alloy, or steel with zinc-based galvanising.
  - 1. Copper based components are not permitted.
  - 2. Stainless steel should not be mechanically or electrically coupled to aluminium or zinc galvanised components without measures to prevent galvanic corrosion.

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- W. Security posts shall be galvanised to ensure maximum environmental protection and performance.
- X. The termination point of the conductive wire should be at the tensioning device.
- Y. Tensioning devices should be attached to the ESF structure by insulated mounting hardware. Tensioners that are attached to the ESF structure by wire hooks shall not be acceptable.
- Z. Fine pitch tensioning capability shall be provided for ease of adjustment during installation and maintenance.
- AA. The tensioning of the conductive wire shall be integrated into the tensioning device directly attached to the security fence post. Independent tensioning devices shall not be acceptable.
- BB. Re-tensioning of conductive wire must be possible without the need to reposition the configuring links.
- CC. Where springs are attached to the grid of conductive wires, an indication of the tension of the conductive wire must be clearly visible on the spring device.
- DD. Where springs are attached to the grid of conductive wires, the spring must be in direct electrical contact to the tensioning device.
- EE. Springs used in the tensioning of the conductive wire should be of a single continuous wire which forms part of the conductive circuit.
- FF. Any spring which form part of the conductive circuit should have a means of physically limiting the length of extension of the spring.
- GG. Each conductive wire shall be capable of deterring and detecting potential intruders by means of a high voltage pulse and detecting the following types of attack:
  - 1. cutting or disconnecting any wire,
  - 2. shorting any wire to ground or the support fence,
  - 3. shorting adjacent but different polarity wires,
  - 4. shunting the wires with an electrically conductive material to reduce the pulse voltage.
- HH. Each active fence circuit shall always be monitored.
- II. The system shall be configured in accordance with the specific contract drawings.
- JJ. The system shall generate an alarm within four seconds if any one wire is cut or continuously short circuited to an adjacent wire or to earth.
- KK. The shorting together of any conductive wires, or cutting of any wires, shall have no impact on the deterrent or detection capability of the remaining active fence circuits and zones.
- LL. The shorting together of any conductive wires, or cutting of any wires, shall raise an alarm in the ISMS.

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- MM. The system shall generate minimal nuisance alarms in any environmental conditions of wind, rain, or temperature, nor from wildlife of less than five kilograms.
  - NN. The system shall have a false alarm rate no greater than one false alarm per fence line kilometre per week.
  - OO. All fence pulses shall be synchronized so that the pulses on adjacent fence sections do not occur at a time interval less than permitted in the current version of relevant standards (IEC60335-2-76).
  - PP. When specified, local control at field cabinets shall be provided via an AMT.
  - QQ. Fully adjustable lightning diverter and protection devices shall be connected to each ESF circuit connection.
  - RR. An independent earthing system must be provided for the ESF earth return with a physical separation of 10m from any other earthing system.
  - SS. Where the ESF abuts to, attaches to or passes over any metallic structure, that structure must be grounded or earthed using a separate earthing system.
  - TT. When specified, the ESF must be capable of interfacing with an emergency shutdown system, which in the event of an incident will electronically deactivate and isolate the high voltage deterrent pulses on the conductive wire array.
    - 1. The emergency shutdown when specified shall be a fail-safe interface, carried out at each of the field cabinets to minimise dependency on site communication systems.
  - UU. The system manufacturer shall support the product for a minimum period of ten years from the time at which the product is superseded.
  - VV. The system must be formally inspected and assessed by a manufacturer approved representative, to the manufacturer's published standard.
  - WW. Full system documentation meeting the manufacturer's compliance, minimum quality, safety codes, and instruction must be provided to the system end user representative.
  - XX. An annual preventative maintenance program must be offered to check and maintain the ESF to an operational and safe condition.
- 2.58 Energised Security Fence Controller - Standalone
- A. The physical fence part of the energised intruder detection system shall be a multi-wire ESF which consists of a horizontally spaced grid of conductive wires supported by a specially made carrier fence. This will comprise of insulated components exclusively used for a security fence, and support posts retro-fitted to an existing solid and/or mesh type fence or wall.
  - B. The ESF controller shall generate pulses at intervals of not less than 1.1 seconds.



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- C. The ESF controller shall be available as a single fence circuit or dual fence circuit option.
- D. The ESF controller shall be capable of delivering 2.3 Joules when configured as a live/earth system, i.e. alternate wires have a voltage or are earthed.
- E. The ESF controller shall be capable of delivering 4.6 Joules when configured as a dual- pulse system, i.e. alternate conductive wires have positive to negative voltages.
- F. The ESF controller shall provide an optional reduced voltage operating mode to provide full detection capability as per high voltage but with reduced deterrent.
- G. An alternative ESF controller shall be available with the following capabilities where the project requires:
  - 1. When configured as a live/earth system, the ESF Controller shall be capable of increasing the output from 2.3 Joules to 3.6 Joules per fence circuit. This is triggered when there is a drop in voltage from one high voltage pulse to the next, which has reached a pre-defined alarm threshold.
  - 2. When configured as a dual-pulse system, the ESF Controller shall be capable of increasing the output from 4.6 Joules to 7.2 Joules. This is triggered when there is a drop in voltage from one high voltage pulse to the next, which has reached a pre-defined alarm threshold. Output is measured across alternate wires.
  - 3. The ESF shall return to the standard output after 20 minutes.
- H. The conductive wire pulses shall be synchronized so that the pulses on adjacent fence sections occur within time intervals as permitted in the reference standards.
- I. The ESF controller shall operate within an ambient temperature range of -20°C to +50°C.
- J. The ESF controller shall have temperature sensors to monitor the internal temperature of its enclosure and adjust performance as follows:
  - 1. 75°o. Over-temperature.
    - a. An indicator LED on the front panel shall flash and the ESF controller shall reduce its pulse rate to reduce the internal temperature
  - 2. 85°C Critical temperature.
    - a. The ESF controller must stop generating pulses and turn off.
- K. The ESF controller shall have indicator LEDs on the front panel to indicate the following:
  - 1. over temperature alarm,
  - 2. service alarm,
  - 3. tamper,
  - 4. mains power failure,
  - 5. battery test failed, or battery missing,
  - 6. high voltage mode,

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7. low voltage mode,
  8. fence circuit pulsing with return voltage measurement in the form of a bar- LED indicator,
  9. Synchronization status:
    - a. off,
    - b. Synchronization conflict,
    - c. correct Synchronization.
- L. The ESF controller shall have a service mode to allow a service technician to easily isolate and locally control fence circuits.
- M. This service mode shall be accessible at the ESF controller by means of a special key.
- N. The ESF controller shall provide battery management as follows:
  - a. trickle charge; slow charge rate when battery is below 10 VDC,
  - b. bulk charge; maximum charge rate for fast battery recovery,
  - c. float charge; slow charge rate to accommodate temperature variations,
  - d. battery save; reduce electric pulse rate to save battery power.
- O. The ESF controller shall support external power supplies such as additional backup batteries or solar cells to be connected.
- P. The ESF controller shall operate in a standalone mode such that it does not require any external system software for its configuration and control.
- Q. Configuration shall be via dip-switches inside the ESF controller.
- R. The fence circuits shall be armed and disarmed via input signals from an external switch, keypad, or alarm panel.
- S. The ESF controller shall have output relays to indicate the following:
  1. system alarm,
  2. power supply failure,
  3. primary fence circuit alarm,
  4. armed status,
  5. secondary fence circuit alarm, for the dual fence circuit ESF controller.
- T. The ESF controller shall have the capability to be changed from a standalone unit to a networked unit which is connected to an ISMS via a dip-switch, without the need to change any firmware within the ESF controller.
- 2.59 Energised Security Fence Controller - Networked
- A. The ESF controller shall deliver an electric pulse through the fence wires to maximise the intruder deterrent and detection capabilities whilst meeting global safety standards.

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- B. The ESF controller shall operate in a networked environment and be controlled and monitored by the ISMS.
- C. The ESF controller shall generate pulses at intervals of not less than 1.1 seconds.
- D. The ESF controller shall be available as a single fence circuit (single zone) or dual fence circuit (dual zone) option.
- E. The ESF controller shall be capable of delivering 2.3 Joules when configured as a
- F. “live/earth” system, i.e. alternate wires have a voltage or are earthed.
- G. The ESF controller shall be capable of delivering 4.6 Joules when configured as a dual- pulse system, i.e. alternate conductive wires have positive to negative voltages.
- H. The ESF controller shall provide an optional reduced voltage operating mode to provide full detection capability as per high voltage but with reduced deterrent.
- I. The ESF controller shall support self-calibrating alarm thresholds that vary the required voltage drop to generate an alarm in response to long-term environmental factors.
- J. An alternative ESF controller shall be available with the following capabilities where the project requires:
  - 1. When configured as a live/earth system, the ESF Controller shall be capable of increasing the output from 2.3 Joules to 3.6 Joules per fence circuit. This is triggered when there is a drop in voltage from one high voltage pulse to the next, which has reached a pre-defined alarm threshold.
  - 2. When configured as a dual-pulse system, the ESF controller shall be capable of increasing the output from 4.6 Joules to 7.2 Joules. This is triggered when there is a drop in voltage from one high voltage pulse to the next, which has reached a pre-defined alarm threshold. Output is measured across alternate wires.
  - 3. The ESF shall return to the standard output after 20 minutes.
- K. The conductive wire pulses shall be synchronized so that the pulses on adjacent fence sections occur within time intervals as permitted in the reference standards.
- L. The ESF controller shall operate within an ambient temperature range of -20°C to +50°C.
- M. The ESF controller shall have temperature sensors to monitor the internal temperature of its enclosure and adjust performance as follows:
  - 1. 60°C Temperature warning.
    - a. It shall be possible to activate a relay to turn on an external cooling fan.
  - 2. 75°C Over-temperature.

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- a. An indicator LED on the front panel shall flash and the ESF controller shall reduce its pulse rate to reduce the internal temperature
3. 85°C Critical temperature.
  - a. The ESF controller must stop generating pulses and turn off.
- N. The ESF controller shall have indicator LEDs on the front panel to indicate the following:
  1. over temperature alarm,
  2. service alarm,
  3. tamper,
  4. mains power failure,
  5. battery test failed, or battery missing,
  6. high voltage mode,
  7. low voltage mode,
  8. fence circuit pulsing with return voltage measurement in the form of a bar- LED indicator,
  9. Synchronization status:
    - a. off,
    - b. Synchronization conflict,
    - c. correct Synchronization.
- O. The ESF controller shall have a service mode to allow a service technician to isolate and locally control fence circuits.
  1. An event shall be sent to the system when the ESF controller is in service mode.
  2. The service mode shall be capable of being enabled from the ISMS.
  3. This service mode shall be toggled at the ESF controller by means of a special key when enables by the ISMS.
- P. The ESF controller shall provide battery management as follows:
  1. trickle charge; slow charge rate when battery is below 10 VDC,
  2. bulk charge; maximum charge rate for fast battery recovery,
  3. float charge; slow charge rate to accommodate temperature variations,
  4. battery save; reduce electric pulse rate to save battery power.
- Q. The ESF controller shall support external power supplies such as additional backup batteries or solar cells to be connected.
- R. The ESF controller shall support self-discovery on the ISMS.
  1. ESF controller shall contain a manufacturer's unique serial number.
  2. When connected to an IFC, the serial number of the ESF controller shall be reported to the ISMS.
  3. Once assigned to a function within an IFC, if any attempt is made to substitute ESF controllers in the field without authorization, an alarm shall be generated.

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- S. Data communication rate between IFC and the ESF controller shall be at least 1Mbit/second.
- T. Communication sessions between IFC and ESF controller shall use certificate exchange protocols using keys with a minimum strength of ECC P-256.
- U. Data communication between IFCs and ESF controllers shall use a minimum of AES- 128.
- V. ESF controllers shall generate a heartbeat signal to enable the IFC to identify lost communications and thereby generate an alarm.
- W. ESF controllers shall be upgradeable via software downloaded from the ISMS without any intervention at the controller.

2.60 Disturbance Sensor

- A. The ISMS shall provide fully integrated disturbance sensor devices which intelligently detect vibration and movement of a structure.
- B. The disturbance sensor shall be able to work on a fence structure that also incorporates an ESF.
- C. The disturbance sensor shall communicate with the same IFC that controls the access control and alarms management system.
- D. The disturbance sensor shall communicate with the IFC via RS485. Low level I/O based interfaces are not acceptable.
- E. Up to 32 sensors shall be able to be established on a single IFC communications channel.
- F. the ISMS shall dynamically monitor the disturbance sensors and raise an alarm should communication to a device be interrupted.
- G. Each disturbance sensor shall be individually addressable.
- H. The number of disturbance sensor zones supported by the ISMS shall be unlimited.
- I. the ISMS shall configure all parameters of a disturbance sensor within the one user interface.
- J. the ISMS shall display the disturbance sensors on a site plan to indicate their location and status.
- K. The disturbance sensor representation on a site plan shall flash when an alarm condition has occurred.
- L. the ISMS shall provide for configuration of each sensor independently. Configuration options shall include:
  - 1. tilt threshold; a value relating to the tilt angle that must occur to cause an alarm.
  - 2. dynamic threshold; a value relating to the dynamic threshold that must occur to cause an alarm.

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3. dynamic count threshold; the number of disturbances within the given time period required to generate an alarm.
4. dynamic hold time; the time period for the dynamic count.
  - a. dynamic memory length; the time for which a disturbance shall be stored as a single event.
  - b. alarm latch duration; the time the alarm output must latch for, as a result of a disturbance.

2.61 Perimeter Taut-Wire

- A. The ISMS shall provide fully integrated perimeter taut-wire sensor devices which measure the mechanical disturbance of a tensioned fence wire.
- B. The sensors shall be able to be installed and operate correctly on an ESF.
- C. The sensors shall communicate with the same IFC that controls the access control and alarms management system.
- D. The sensors shall communicate with the IFC via RS485. Low level I/O based interfaces will not be acceptable.
- E. Up to 80 sensors shall be able to be established on a single IFC communications channel.
- F. The ISMS shall dynamically monitor taut-wire sensor devices and raise an alarm should communication to a device be interrupted.
- G. Each taut-wire sensor device shall be individually addressable.
- H. The sensors shall support firmware upgrades initiated from the ISMS without the need to physically attend the sensors.
- I. The ISMS shall have the ability to configure all parameters of taut-wire sensor devices within the one user interface.
- J. The ISMS shall allow configuration of event and alarms, alarm instructions and action plans for an integrated perimeter taut-wire security system.
- K. The ISMS shall allow monitoring and processing for an integrated perimeter taut-wire security system.
- L. The ISMS shall, for each taut-wire sensor device, indicate in real-time; the tension, temperature, alarm status, and unique identifier.
- M. The ISMS shall include sensor group icon representation on site plans.
- N. The ISMS shall identify a communication failure on the sensor channel in less than 4 seconds.

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- O. The ISMS shall use sensor aggregation to differentiate between slow deflection attacks and environmentally induced tension change.
- P. The ISMS shall provide for configuration of each sensor group independently. Configuration options shall include:
  - 1. tension span; length of tensioned wire attached to sensor,
  - 2. bay width; distance between wire support/retention positions (post spacing),
  - 3. wire type; specification of the tensioned wire,
  - 4. springs; type and number of springs connected in line with the tensioned wire,
  - 5. temperature range; historic temperature minimum and maximum for the installation location,
  - 6. minimum tension; adjustable lowest desirable wire tension,
  - 7. maintenance alarm for high tension; tension at which an alarm is raised to indicate tension above normal operating range,
  - 8. maintenance alarm for low tension; tension at which an alarm is raised to indicate tension below normal operating range.
- Q. the ISMS should identify and warn of any fence configuration that is not within system design parameters.
- R. The taut-wire sensor devices should monitor the ambient temperature, allowing the ISMS to adjust algorithms to allow for changes in temperature which affect wire tension, thus reducing the possibility for false alarms.
- S. It shall be possible to activate a mode that enables on-site fault finding and correct tension adjustment via an LED test indicator at the sensor. The activation of the fault- finding mode shall be done at the ISMS.
- T. It shall be possible to activate a mode which enables an LED indicator on the sensor to indicate alarm generation when the attached wire is sufficiently deflected. The activation of this mode shall be done at the ISMS.
- U. In normal operating mode the sensor LED indicators shall not be active.
- V. The number of taut-wire sensor devices supported by the ISMS shall be unlimited.
- W. The sensor shall detect and “remember” if it has exceeded the maximum load rating. Indication of overload shall be via the LED indicator and in the ISMS.

2.62 System Integration

- A. The ISMS shall support OPC AE protocol.
  - 1. The OPC AE interface shall allow third party OPC clients to subscribe to receive alarms and events from the ISMS.
  - 2. When an alarm is processed, the OPC AE client shall send an event processed message back to the ISMS to process the alarm on the ISMS.

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3. The ISMS shall support multiple simultaneous OPC AE connections.
- B. The ISMS shall support OPC DA protocol.
1. The OPC interface shall support OPC DA specification 2.0 and 3.0.
  2. The OPC DA interface shall allow the status of system components to be reported to an external OPC DA client.
  3. The OPC Interface shall allow third party OPC DA clients to generate system component overrides including but not limited to alarm zone and access zone overrides.
  4. The ISMS shall support multiple simultaneous OPC DA connections.
- C. The ISMS shall support a REST Web Service API.
1. The ISMS cardholder functionality shall support a REST Web Service to allow an external system to create, remove, and modify cardholders, including assigning access rights.
  2. The ISMS alarms and events functionality shall support a REST Web Service to allow external systems to receive alarms and events from the ISMS.
  3. The ISMS shall provide a REST Web Service that will allow a third-party system to perform actions in the ISMS such as open doors, disarm alarm zones, and turn an IFC output on.
  4. The ISMS shall provide a REST Web Service that will allow a third-party system to perform actions in the ISMS such as open doors, disarm alarm zones, and turn an IFC output on.
- D. The ISMS shall allow data exchange with other applications using XML protocols.
1. The system shall provide an XML interface to allow for the import, export, and synchronization of data in an on-going basis from other applications directly into the cardholder database both in a real-time manner and in a
  2. batch-oriented approach. A developer's kit with a sample application shall be readily available.
  3. The system shall provide an XML interface to allow for updating access control schedules from other applications directly into the ISMS database in both a real-time manner and in a batch-oriented approach. A developer's kit with sample application shall be readily available.
- E. The system shall provide a tool which allows configuration and Synchronization of cardholder data with third party systems via a csv file. The CSV import functionality shall support the following functionality:
1. manually triggered data import,
  2. schedule triggered data import,
  3. images imported via flat file.
- F. An API that communicates directly to the IFC shall be available.
1. The API shall allow third party systems to pass events to the IFC and for the events to appear in the ISMS event window.



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2. It shall be possible for the IFC to be programmed to trigger actions based upon these external events. For example, a video analytic alarm from a video management system is passed to the IFC, the IFC in turn will lock doors and raise an alarm.
  3. It shall be possible for a third-party system to send a card number and site code to the IFC to act as a “virtual card reader”.
  4. The API shall allow the third-party system to interact directly with the IFC with no reliance on the ISMS server.
- G. The ISMS shall support the BACnet communications protocol.
1. BACnet communication will be via TCP/IP.
  2. The IFC will communicate with BACnet devices with no need for server intervention.
  3. The BACnet integration will enable the IFC to monitor BACnet objects for state changes and raise alarms accordingly.
  4. The BACnet integration will enable the IFC to change BACnet object states in response to events.
- H. The ISMS shall support the SNMP communications protocol.
- I. Events from third party systems shall be managed in the same way as inputs connected directly to IFCs.
- J. Interactions with third party systems shall be logged in the ISMS.
- K. ISMS shall support smart sensor integration which detects the following
1. Masking
  2. Air quality
  3. Volatile organics
  4. Vaping
  5. Gunshot
  6. Tetrahydrocannabinol (THC)
  7. Fine particulate matter (PM 2.5 and PM10)
  8. Ammonia
  9. Nitrogen dioxide
  10. Carbon monoxide
  11. Carbon dioxide
  12. Help keyword
  13. Aggression
  14. Barometric pressure
  15. Light level
  16. Temperature
  17. Humidity
  18. Tampered
  19. Sound level
- L. 61.12 The system shall support biometric reader integration which can read all four finger prints on a cardholder’s hand.

2.63 Video Management System Integration

- A. The ISMS shall be capable of concurrently interfacing with VMS from multiple vendors.
- B. It shall be possible for the ISMS to view live video from multiple cameras within its interface.
- C. The ISMS shall be capable of viewing stored (archived) video from the VMS within its interface.
- D. Where supported by the integrated VMS, it shall be possible to operate camera controls such as:
  - 1. PTZ,
  - 2. pause,
  - 3. forward,
  - 4. rewind.
- E. It shall be possible to maximize a camera window.
  - 1. Whilst a camera window is maximized, the other camera windows should be changed to live thumbnail images to ensure the operator is able to see activity in all cameras.
- F. It shall be possible to drag a camera icon from a site plan into a video view to dynamically be able to view cameras in an ad hoc manner.
- G. It shall be possible to drag a camera icon from a list into a video view to dynamically be able to view cameras in an ad hoc manner.
- H. It shall be possible to find a camera from a search box.
- I. Where supported by the integrated VMS, it shall be possible for the ISMS to send a message to the VMS to move cameras to priests.
- J. Where supported by the integrated VMS, it shall be possible for the ISMS to receive motion detection and video analytic events from the VMS.

2.64 REST API

- A. The ISMS shall support a RESTful web API .
- B. The RESTFUL API shall support client certificate pinning for connection security.
- C. The RESTful API shall be authenticated and secured using TLS client certificates (2048- bit RSA).
- D. The RESTFUL API shall support HTTPS for data transfer.
- E. Rest API should allow Cardholder data Synchronization between ISMS servers

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- F. Rest API shall be able to interface to the Visitor Management setup on the ISMS in order to set up the following
  - 1. Create Visitor
  - 2. Modify any Visit attributes
  - 3. Delete Visitor
- G. ISMS shall allow Restful APIs to create, amend and delete access schedules as a requirement for a single source of truth.
- H. Restful API shall allow for mixed key-and-certificate authentication
- I. Restful APIs are utilized for Active Directory Cardholder Synchronization
- J. The system shall support Events and Cardholder data Synchronization from a source to destination servers by utilizing Rest APIs.

2.65 Glossary of Abbreviations

- A. AMT Alarms Management Terminal, a stand-alone terminal that can perform basic alarm setting, unsetting, and diagnostics, while not relying on a central server to communicate with alarm panels.
- B. BLE Bluetooth Low Energy, is intended to provide considerably reduced power consumption and cost while maintaining a similar communication range to Bluetooth.
- C. BS British Standards.
- D. CAK Card Authentication Key, an optional PIV authentication mechanism (or the PIV Card key of the same name) that is implemented by an asymmetric or symmetric key challenge/response protocol.
- E. CE Conformité Européenne - CE marking is a certification mark that indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area (EEA).
- F. CSN Card Serial Number, a unique identifier for a token, although this unique identifier may not technically be a CSN the term is used for familiarity.
- G. ECC Elliptic Curve Cryptography, is an approach to public-key cryptography based on the algebraic structure of elliptic curves over finite fields.
- H. ELD End of Line Device, a method of determining more states at the end of two wires than simply open and closed circuit (tamper detection etc.).
- I. FASC-N Federal Agency Smart Credential Number.

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- J. GUID Global Unique Identifier, is a 128-bit number used to identify information in computer systems.
- K. IFC Intelligent Field Controller, a device installed for security purposes that is capable of processing input from multiple sources without intervention from a central server.
- L. ISMS Integrated Security Management System, a single system that combines the functions of different system types such as access control, video, and alarm systems into a single interface for configuration and administration.
- M. MPF Monitored Pulse Fence, a physical barrier and electrical circuit energized with a deterrent pulse, an alarm is raised when the electrical circuit is compromised.
- N. OPC Open Platform Communications / OLE Process and Control, a series of standards and specifications for industrial telecommunication.
- O. OPC AE OPC Alarms and Events, a variant of the OPC protocol for querying historic events.
- P. OPC DA OPC Data Access, a variant of the OPC protocol that defines how real-time data can be transferred between a data source and a data sink.
- Q. OSDP Open Supervised Device Protocol, is an access control communications standard between access control and security products.
- R. PIR Passive Infra-red Sensor, is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. PIR is also used as a generic term for a range of motion sensor technologies.
- S. PIV Personal Identity Verification, is a US Federal governmentwide credential used to access Federally controlled facilities and information systems at the appropriate security level.
- T. PTZ Pan-Tilt-Zoom, is a camera that is capable of remote directional and zoom control. SMS Security Management System, see ISMS.
- U. VMS Video Management System, refers to any system whose primary purpose is the storage and retrieval of security camera footage.
- V. WPF Windows Presentation Foundation, is a graphical subsystem by Microsoft for rendering user interfaces in Windows-based applications.
- W. XML eXtensible Markup Language, is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

PART 3 - EXECUTION

3.1 SYSTEM STARTUP

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks in accordance with manufacturer's published instructions.

3.2 ADJUSTING

- A. Control Sensor Adjustments: Adjust control devices to suit actual occupied conditions.
  - 1. For proximity motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.

3.3 PROTECTION

- A. After installation, protect access control system components from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

3.4 MAINTENANCE

- A. Control Sensor Readjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in readjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

END OF SECTION 28 10 00



## SECTION 28 20 00 - VIDEO SURVEILLANCE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes a video surveillance system consisting of cameras, digital video recorder, data transmission wiring, and a control station with its associated equipment.
- B. Related Requirements:
  - 1. Section 28 10 00 "Access Controls" to integrate access control system interface and control.
  - 2. Section 28 30 00 "Duress Alarm System" to integrate duress alarm system interface and control.

#### 1.3 DEFINITIONS

- A. AGC: Automatic gain control.
- B. BNC: Bayonet Neill-Concelman - type of connector.
- C. B/W: Black and white.
- D. CCD: Charge-coupled device.
- E. FTP: File transfer protocol.
- F. IP: Internet protocol.
- G. LAN: Local area network.
- H. MPEG: Moving picture experts group.
- I. NTSC: National Television System Committee.
- J. PC: Personal computer.
- K. PTZ: Pan-tilt-zoom.

- L. RAID: Redundant array of independent disks.
- M. TCP: Transmission control protocol - connects hosts on the Internet.
- N. UPS: Uninterruptible power supply.
- O. WAN: Wide area network.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
  - 3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
  - 4. UPS: Sizing calculations.
  - 5. Wiring Diagrams: For power, signal, and control wiring.
- C. Design Data: Include an equipment list consisting of every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For cameras, power supplies, infrared illuminators, monitors, videotape recorders, digital video recorders, video switches, and control-station components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include the following:
  - 1. Lists of spare parts and replacement components recommended to be stored at the site for ready access.

#### 1.6 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:



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1. Control Station: Rated for continuous operation in ambient temperatures of **60 to 85 deg F (16 to 29 deg C)** and a relative humidity of 20 to 80 percent, noncondensing.
2. Interior, Controlled Environment: System components, except central-station control unit, installed in temperature-controlled interior environments shall be rated for continuous operation in ambient temperatures of **36 to 122 deg F (2 to 50 deg C)** dry bulb and 20 to 90 percent relative humidity, noncondensing. Use NEMA 250, Type 1 enclosures.
3. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of **minus 30 to plus 122 deg F (minus 34 to plus 50 deg C)** dry bulb and 20 to 90 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to **85 mph (137 km/h)** and snow cover up to **24 inches (610 mm)** thick. Use NEMA 250, Type 4X enclosures.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
  1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

- A. MANUFACTURERS
  1. Avigilon Control Center (Basis of Design)
  2. Approved equal- to be approved by owner and engineer
- B. Alternate manufacturers will be considered for approval provided minimum requirements for performance, service, and integration as specified herein are met. Additional, alternate manufacturers will be required to assemble a presentation for the Owner which includes qualifications and capabilities demonstration for all aspects of their proposed video surveillance system.
- C. All products and installations in patient accessible areas shall be tamperproof.
- D. Installer Qualifications: CCTV System manufacturer's authorized representative who is trained and approved for installation of system components required for this Project.
- E. The above list of manufacturers applies to operator workstation software, controller software, the custom application programming language, and controllers. All other products specified herein need not be manufactured by the above manufacturers.
- F. Longevity: The CCTV system contractor shall have a minimum of ten years experience installing and servicing CCTV Systems. The contractor shall self perform the installation without the use of sub-contractors for the system and components.

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- G. Past Projects: The CCTV contractor shall have completed a minimum of three projects within the last five years that are at least equal in dollar value and scope to this project. A list of similar projects, dollar volume, scope, contact name and contact number shall be provided by the contractor if asked for by the owner.
- H. Personnel, Coverage and Response Capabilities: The contractor shall have a minimum of ten full time electronic service personnel within a 120 mile radius of the project location. One of the five full time electronic service personnel must work within a 60-mile radius of the project location.
- I. The contractor shall have an established 24-hour emergency service organization. A dedicated telephone number shall be provided to the owner for requesting emergency service. A maximum of four hour, electronic service technician on sight, response time shall be guaranteed by the contractor.
- J. Parts Stocking: The contractor shall have an independently verifiable inventory of electronic service parts. This electronic service parts inventory must have a worth of at least \$100,000 per year over the last five years.

## 2.2 VIDEO MANAGEMENT SOFTWARE

- A. Video Management Software (VMS): shall be Avigilon Control Center (ACC) (Basis of Design) or approved equal. P/N: ACC7-ENT, Avigilon Control Center, Enterprise v7.X for each camera.
- B. The VMS shall include unlimited viewing clients and available Mobile App. The VMS must be ONVIF Profile S, T & G compliant and be of an open platform as to accept multiple camera manufacturers. The VMS shall not require recurring annual support fees and must provide free updates within the version software. The VMS shall include Avigilon Cloud Services (ACS) for centralized access, mobile access, and system health monitoring. The VMS shall also include the following features:
  - 1. 100 servers per site.
  - 2. 300 cameras per server.
  - 3. 10,000 cameras per site.
  - 4. Unlimited client licenses per server.
- C. Focus of Attention: the VMS shall provide an overview of events across all cameras in a site, including Avigilon analytic events, face and license plate watch list matches, Unusual Activity Detection (UAD) events, Unusual Motion Detection (UMD) events, motion events and alarms. Allow the operator to triage the most important and critical events to determine if a response is required.
- D. Facial Recognition Technology: the VMS shall have the ability to detect people of interest based on secure watch lists managed by authorized users. Include the ability to upload an image or find a face from a recorded video. Receive alerts from potential watch list matches and create alarms that trigger when an individual on the watch list is detected.

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- E. Appearance Search Technology: the VMS shall implement a sophisticated AI search engine to allow investigators to sort through large amounts of recorded video to quickly locate individuals or vehicles of interest across an entire site. Search for people or vehicles of interest by entering its physical description, uploading a photo or by finding an example in a recorded video.
- F. Next-Generation Analytics: the VMS shall have the ability to view and search analytic events and alarms through an intuitive user interface, to allow the user to be notified of real-time events and alarms, scene changes and rules violations. Detect, classify and track up to 50 moving or stationary objects in a scene, such as people, cars, trucks, buses, motorcycles and bicycles.
- G. Self-Learning Analytics: the VMS shall accurately recognize the movements of people and vehicles while ignoring motion not relevant to a scene. This learning will allow the VMS to reduce false positives while keeping alarms and events meaningful.
- H. Teach-by-Example Technology: the VMS will use this object classifier technology to enable users to provide feedback about the accuracy of an alarm and events generated by the system and connected devices.
- I. Unusual Activity Detection (UAD): the VMS shall provide this new object-aware, edge-based intelligence using advanced AI technology to enable the detection of atypical activities such as people and vehicles traveling at faster speeds or in unusual locations.
- J. Unusual Motion Detection (UMD): the VMS shall utilize this advanced AI technology to assist the system in learning what typical activity in a scene looks like, and then detect and flag unusual motion.
- K. Intelligent Searches: the VMS shall incorporate powerful search tools that enable users to quickly search recorded video for motion, the presence of classified objects (people or vehicles), background changes in the scene (thumbnail search), and for events.
- L. License Plate Recognition (LPR) Analytics: the VMS shall include a next-generation LPR analytics engine to enable the system to monitor multiple license plate watch lists and detect potential license plate matches.
- M. Avigilon Cloud Services (ACS) Web Client: the VMS shall have the ability to securely stream live and recorded video from firewall-protected Avigilon Control Center (ACC) sites using Chrome or Safari web browsers to leverage peer-to-peer connections to ACC servers.
- N. ACC Mobile 3 Software: the VMS shall include a Mobile app to allow for the following: push alarm notifications, view live and recorded video, monitor two-way audio, view self-learning video analytics overlays, monitor digital output triggers, and allow PTZ control for Android and iOS mobile devices. Using Avigilon Cloud Services (ACS), log into connected ACC sites without any firewall configuration.
- O. Video Archive: the VMS shall have the ability to retain and manage large amounts of video for on-demand retrieval and review. Extend storage beyond NVRs for reliable and scalable storage.

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- P. ONVIF Profile S, T and G Compliance: the VMS shall use industry standards to ensure interoperability between IP-based and ONVIF conformant devices regardless of manufacturer.
- Q. Compression: the VMS shall support storage and processing of video and audio as follows: Natively record camera signals with no transcoding. Support industry standard video compression formats, including, but not limited to, the following:
1. JPEG2000
  2. MJPEG
  3. MPEG-4
  4. H.264
  5. H.265
- R. S. High-Definition Stream Management (HDSM)<sup>TM</sup>: Must perform as follows:
1. Provide Avigilon High-Definition Stream Management (HDSM)<sup>TM</sup>.
  2. Reduce system bandwidth and storage usage by only transmitting video to client as determined by the owner.
  3. Tile multi-megapixel video streams and only transmit requested portion of video stream to the client.
  4. Extend recorded video storage by dynamically reducing quality of recorded video over time so video is still viable but uses less storage.
    - a. Reduce JPEG and JPEG2000 video image rate to one-half or one-quarter of original image rate.
    - b. Record both a high-quality stream and a low-quality stream, discarding high quality streams after a set amount of time determined by the Owner.
    - c. Allow availability of dynamic video stream management to local users, remote users, and mobile devices.

## 2.3 VIDEO INFRASTRUCTURE

- A. AI Video Management Server and Storage Solution (AINVR)
- B. The Artificial Intelligence (AI) Network Video Recorder (NVR) shall be a cloud-ready, purpose-built managed solution built on Avigilon's security-hardened OS, with built-in server-side analytics unlocking advanced AI capabilities on any connected video stream.
- C. The Video Management Server shall run Avigilon Control Center (ACC) video management software to accommodate all cameras shown and specified, plus 20% available overhead to scale for future expansion.
1. Video Management Server shall be Avigilon AINVR Premium+: Specifications for AINVR Premium:
    - a. Operating System: Avigilon hardened OS, supports secure remote upgrades.
    - b. Hard Disk Drive Config (video): RAID 6, up to 12 x 3.5" hot swappable.
    - c. Hard disk config (OS): 2 x M.2 SSD drives, RAID 1.

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- d. Storage Capacity: up to 1608 TB (RAID 6).
- e. Network Interface: 4 x 1 GbE RJ-45 ports; 4 x 10 GbE direct attach SFP+ ports.
- f. System Memory: 8 x 8 GB.
- g. Processor: 2 x Intel Xeon.

## 2.4 CAMERAS & SENSORS

### A. H4 Multisensor Cameras: offered in 180°/270° 15 and 20MP.

- 1. 180° camera shall be Avigilon H4 Series Multisensor Camera:
  - a. P/N: 15C-H4A-3MH-180, 3x5 MP, WDR, 4mm lenses.
- 2. 270° camera shall be Avigilon H4 Series Multisensor Camera:
  - a. P/N: 24C-H4A-3MH-270, 3x8 MP, WDR, with 2.8mm lenses.
- 3. IK10 vandal resistant fixed dome, H.264/265, autofocus, day/night, 180° and 270° 3-lens high-definition digital camera with triple exposure ultra-wide dynamic range (WDR) and patented LightCatcher™ technology. Each imager embedded with self-learning video analytics, ONVIF Profile S, T & G compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology.
- 4. IK10 vandal resistant fixed dome, H.264/265, autofocus, day/night, 360° 4-lens high-definition digital camera with triple exposure ultra-wide dynamic range (WDR) and patented LightCatcher™ technology. Each imager embedded with self-learning video analytics, ONVIF Profile S, T & G compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology.
  - a. Mounting Accessories for Pendant Wall Mounting:
    - 1) P/N: H4AMH-AD-PEND1, outdoor pendant mount adapter.
    - 2) P/N: IRPTZ-MNT-WALL1, pendant wall arm adapter.
    - 3) P/N: H4AMH-AD-IRIL1, optional IR illuminator ring, add P/N: POE-INJ2-60W-NA.
    - 4) 1. For Additional Corner Mounting include:
    - 5) P/N: H4-MT-CRNR1, aluminum corner mounting bracket.
    - 6) P/N: IRPTZ-MNT-WALL1, pendant wall arm adapter.
    - 7) 2. For Additional Pole Mounting include:
    - 8) P/N: H4-MT-POLE1, aluminum pole mounting bracket.
    - 9) P/N: IRPTZ-MNT-WALL1, pendant wall arm adapter.
  - b. For Pendant NPT Mounting include:
    - 1) P/N: H4AMH-AD-PEND1, outdoor pendant mount adapter.
    - 2) P/N: IRPTZ-MNT-NPTA1, pendant NPT adapter.

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- 3) P/N: H4AMH-AD-IRIL1, optional IR illuminator ring, add P/N: POE-INJ2-60W-NA.

c. For Surface Mounting include:

- 1) P/N: H4AMH-AD-DOME1, outdoor surface mount adapter.
- 2) P/N: H4AMH-AD-IRIL1, optional IR illuminator ring, add P/N: POE-INJ2-60W-NA.

d. For In-Ceiling Mounting include:

- 1) P/N: H4AMH-AD-CEIL1, in-ceiling adapter.
- 2) P/N: H4AMH-DC-CPNL1, metal ceiling panel.

e. Other Accessories:

- 1) P/N: H4AMH-DO-COVR1, clear dome cover for outdoor surface or pendant mount.
- 2) P/N: H4AMH-DO-COVR1-SMOKE, smoke dome cover for outdoor surface or pendant mount.
- 3) P/N: H4AMH-DC-COVR1, clear dome cover for in-ceiling mount.
- 4) P/N: H4AMH-DC-COVR1-SMOKE, smoke dome cover for in-ceiling mount.
- 5) P/N: ES-PS-S4, 5-port managed switch, outdoor IP66, Gigabit Ethernet, AC power input, 1 x SFP uplink and 4-port RJ45.
- 6) P/N: ES-PS-MNT-POLE, pole mount bracket for ES-PS-S4 switch.
- 7) P/N: POE-INJ2-60W-NA, indoor single port Gigabit PoE++ 60W, North American power cord.
- 8) P/N: POE-INJ2-PLUS, indoor single port PoE+ injector.

B. H5SL Cameras: offered in 5 MP.

1. Outdoor Bullet camera shall be Avigilon H5SL Series Bullet Camera:

- a. P/N: 5.0C-H5SL-BO1-IR, fixed bullet, 5 MP, WDR, 3.1-8.4mm lens with IR.

2. IK10 vandal resistant fixed bullet, H.264/265, autofocus, day/night, 5 megapixel high-definition digital camera with triple exposure ultra-wide dynamic range (WDR) and patented LightCatcher™ technology. All cameras shall be equipped with a varifocal lens and include integrated IR. Cameras embedded with Unusual Motion Detection, ONVIF Profile S, T & G compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology. Optional back box P/N: H4-BO-JBOX1 may be required for certain mounting applications.

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- a. Mounting Accessories for Outdoor Bullet camera:
    - 1) P/N: H4-BO-JBOX1, junction box for H5SL, H4SL and H4 HD bullet cameras.
    - 2) P/N: H4-MT-CRNR1, aluminum corner mounting bracket.
    - 3) P/N: H4-MT-POLE1, aluminum pole mounting bracket.
  - b. Other Accessories:
    - 1) P/N: H4-AC-WIFI2-NA (or -EU), USB Wi-Fi adapter.
3. Outdoor Dome camera shall be Avigilon H5SL Series Dome Camera:
- a. P/N: 5.0C-H5SL-DO1-IR, fixed dome, 5 MP, WDR, 3.1-8.4mm lens with IR.
4. IK10 vandal resistant fixed dome, H.264/265, autofocus, day/night, 1.3, 2, 3 and 5 megapixel high-definition digital camera with triple exposure ultra-wide dynamic range (WDR) and patented LightCatcher™ technology. All cameras shall be equipped with a 3.1-8.4mm varifocal lens and include integrated IR. Cameras embedded with Unusual Motion Detection, ONVIF Profile S, T & G compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology.
- a. Mounting Accessories for Pendant Wall mounting:
    - 1) P/N: H4SL-MT-NPTA, pendant NPT adapter for H5SL and H4SL domes.
    - 2) P/N: CM-MNT-WALL1, pendant wall arm adapter.
    - 3) P/N: H4-MT-CRNR1, aluminum corner mounting bracket.
    - 4) P/N: H4-MT-POLE1, aluminum pole mounting bracket.
  - b. Mounting Accessories for In-Ceiling mounting:
    - 1) P/N: H4SL-MT-DCIL1, in-ceiling mounting adapter for H5SL and H4SL domes.
    - 2) P/N: H4-DC-CPNL1, metal ceiling panel.
  - c. Other Accessories:
    - 1) P/N: H4SL-DD-SMOK1, replacement outdoor smoke dome cover.
    - 2) P/N: H4SL-DD-CLER1, replacement outdoor clear dome cover.
    - 3) P/N: H4SL-DO1-BASE, replacement outdoor surface mount adapter.
    - 4) P/N: H4-AC-WIFI2-NA (or -EU), USB Wi-Fi adapter.
- C. H5A Cameras: offered in 4 and 8 MP.
1. Surface Mount Outdoor Dome camera shall be Avigilon H5A Series Dome Camera:
    - a. P/N: 4.0C-H5A-DO1-IR, fixed dome, 4 MP, WDR, 9-22mm lens, onboard analytics.

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- b. P/N: 8.0C-H5A-DO1-IR, fixed dome, 8 MP, WDR, 4.9-8mm lens, IR, onboard analytics.
  
- 2. IK10 vandal resistant integrated IR dome, H.264/265, autofocus, day/night, 2, 4, 5, 6 and 8 megapixel high-definition digital camera with triple exposure ultra-wide dynamic range (WDR) and patented LightCatcher™ technology. All cameras shall be equipped with a varifocal lens. Cameras embedded with self-learning video analytics, ONVIF Profile S, T & G compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology.
  - a. Mounting Accessories for Surface Mount Outdoor Dome camera:
    - 1) P/N: H4A-DO-SMOK1, outdoor dome camera cover with smoked bubble.
    - 2) P/N: H4A-DO-CLER1, outdoor dome camera cover with clear bubble.
  
  - b. Other Accessories:
    - 1) P/N: H4A-AC-GROM1, camera sealing grommet, pack of 10.
    - 2) P/N: CM-AC-GROM1, pipe grommet, pack of 10.
    - 3) P/N: H4-AC-WIFI2-NA (or -EU), USB Wi-Fi adapter.
    - 4) P/N: CM-AC-AVIO1, 3.5mm jack with 1.8m fly wire.
  
  - c. Camera Licenses:
    - 1) P/N: CAM-FIPS, camera license to enable FIPS Level 1 cryptographic mode on any H5A camera.
    - 2) P/N: CAM-FIPS, CRYPTR-L3, MSI CRYPTR SD with camera license to enable FIPS Level 3 cryptographic mode on H5A cameras.
  
- D. H5A Dual Head Cameras: offered in 10 MP.
  - 1. Dual Head camera shall be Avigilon H5A Series Dual Head Camera:
    - a. P/N: 10.0C-H5DH-DO1-IR, surface mount, 2x5 MP, 3.35-7mm varifocal lens.
  
  - 2. IK10 vandal resistant fixed dome, H.264/265, autofocus, day/night, 2x3 and 2x5 megapixel high-definition digital camera with triple exposure ultra-wide dynamic range (WDR) and patented LightCatcher™ technology. All cameras shall be equipped with a 3.35-7mm varifocal, remote focus and zoom lens and include integrated IR. Cameras embedded with object detection, Appearance Search, Unusual Motion Detection, ONVIF Profile S & T compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology. Camera shall be FIPS 140-2 compliant.
    - a. Mounting Accessories for Pendant Wall Mounting:
      - 1) P/N: CM-MNT-WALL1, pendant wall arm adapter.
      - 2) P/N: H4-MT-CRNR1, aluminum corner mounting bracket.
      - 3) P/N: H4-MT-POLE1, aluminum pole mounting bracket.



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- 4) P/N: H5DH-MT-NPTA1, pendant NPT adapter.
- 5) P/N: H5DH-DO-CLER1, replacement outdoor dome cover.
- 6) P/N: H5DH-DI-CLER1, replacement indoor dome cover.

b. Mounting Accessories for Junction Box Mounting:

- 1) P/N: H5DH-DO-JBOX1, junction box mounting adapter.

c. Camera Licenses:

- 1) P/N: CAM-FIPS, camera license to enable FIPS Level 1 cryptographic mode on any H5A camera.
- 2) P/N: CAM-FIPS-CRYPTR-L3, MSI CRYPTR SD with camera license to enable FIPS Level 3 cryptographic mode on H5A cameras.

E. H5A Fisheye Cameras: offered in 12 MP.

1. Surface Mount Fisheye camera shall be Avigilon H5A Series Fisheye Camera:

- a. P/N: 12.0W-H5A-FE-DO1-IR, surface mount, 12 MP, WDR, 1.6mm fisheye lens with IR.

2. IK10 vandal resistant fixed dome, H.264/265, day/night, 8 and 12 megapixel high-definition digital camera with patented LightCatcher™ technology (8 MP models only). Cameras shall be equipped with a fisheye lens. Cameras embedded with self-learning video analytics and Unusual Motion Detection (UMD), ONVIF Profile S, T & G compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology.

a. Mounting Accessories for Surface/Pendant Wall Mounting:

- 1) P/N: CM-MT-WALL1, pendant wall mount.
- 2) P/N: H5A-FE-MT-NPTA1, NPT adapter for H5A Fisheye surface mount camera.
- 3) P/N: H4-MT-CRNR1, aluminum corner mounting bracket.
- 4) P/N: H5A-FE-DD-CLER1, package of 3 dome replacement parts for H5A Surface Mount Camera.

F. H5 Pro Cameras: offered in 61 MP.

1. Ultra High-Definition camera shall be Avigilon H5 Pro Series Camera:

- a. P/N: 61C-H5PRO-B, 61 MP fixed camera.

2. Fixed camera, H.264/265, day/night, 8, 16, 26, 40 and 61 megapixel high-definition digital camera with 120+ dB WDR and patented LightCatcher™ technology. Cameras shall be a single sensor and require compatible lenses. Cameras will require ES-HD-HWS-LG, ES-HD-CWS-LG, or ES-HD-HS-XL enclosure for exterior use. Cameras

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embedded with self-learning video analytics, ONVIF Profile S, T & G compliant, include wi-fi camera configuration support and utilize HDSM SmartCodec technology.

3. Lens Options:
  - a. P/N: LEF163528CA2, Canon 16-35mm f/2.8
4. Enclosure Options for Outdoor Use:
  - a. P/N: ED-HD-HWS-LG, IP66-rated large housing with heater and wall arm.
  - b. P/N: ES-HD-CWS-LG, large housing with cooling fan and wall arm.
  - c. P/N: ES-HD-HS-XL, IP66-rated extra large housing with heater (wall arm sold separately).
5. Camera Licenses:
  - a. P/N: CAM-FIPS, camera license to enable FIPS Level 1 cryptographic mode on any H5A camera.
  - b. P/N: CAM-FIPS-CRYPT-R-L3, MSI CRYPT-R SD with camera license to enable FIPS Level 3 cryptographic mode on H5A cameras.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.
- B. Examine roughing-in for LAN, WAN, and IP network before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 WIRING

- A. Comply with requirements in Section 27 05 28 "Pathways for Communications Systems."
- B. Wiring Method: Install cables in raceways unless otherwise indicated.
  1. Except raceways are not required in accessible indoor ceiling spaces and attics.
  2. Except raceways are not required in hollow gypsum board partitions.
  3. Conceal raceways and wiring except in unfinished spaces.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

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- D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- E. For communication wiring, comply with the following:
  - 1. Section 27 13 13 "Communications Copper Backbone Cabling."
  - 2. Section 27 13 23 "Communications Optical Fiber Backbone Cabling."
  - 3. Section 27 13 33 "Communications Coaxial Backbone Cabling."
  - 4. Section 27 15 13 "Communications Copper Horizontal Cabling."
  - 5. Section 27 15 23 "Communications Optical Fiber Horizontal Cabling."
  - 6. Section 27 15 33 "Communications Coaxial Horizontal Cabling."
- F. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

### 3.3 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras and infrared illuminators level and plumb.
- B. Install cameras with ~~84-inch-~~ (2134-mm-) minimum clear space below cameras and their mountings. Change type of mounting to achieve required clearance.
- C. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms, and adjust.
- D. Install power supplies and other auxiliary components at control stations unless otherwise indicated.
- E. Install tamper switches on components indicated to receive tamper switches, arranged to detect unauthorized entry into system-component enclosures and mounted in self-protected, inconspicuous positions.
- F. Avoid ground loops by making ground connections only at the control station.
  - 1. For 12- and 24-V dc cameras, connect the coaxial cable shields only at the monitor end.
- G. Identify system components, wiring, cabling, and terminals according to Section 27 05 53 "Identification for Communications Systems."

### 3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

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- C. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
  - 1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
  - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
    - a. Prepare equipment list described in "Informational Submittals" Article.
    - b. Verify operation of auto-iris lenses.
    - c. Set back-focus of fixed focal length lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Adjust until image is in focus with and without the filter.
    - d. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object **50 to 75 feet (17 to 23 m)** away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
    - e. Set and name all preset positions; consult Owner's personnel.
    - f. Set sensitivity of motion detection.
    - g. Connect and verify responses to alarms.
    - h. Verify operation of control-station equipment.
  - 3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
  - 4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
- E. Video surveillance system will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

### 3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose. Tasks shall include, but are not limited to, the following:

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1. Check cable connections.
2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
3. Adjust all preset positions; consult Owner's personnel.
4. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
5. Provide a written report of adjustments and recommendations.

3.6 CLEANING

- A. Clean installed items using methods and materials recommended in writing by manufacturer.
- B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

3.7 DEMONSTRATION

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

END OF SECTION 28 20 00



SECTION 28 30 00 - DURESS ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Provide an Integrated Personal Alarm Locating System of the type, size, capacity, and characteristics as indicated herein. Program system and assign device/zone numbers as per bid documents and owner's directives. All systems, products, and equipment shall be rated for 24 hour per day continuous operation. Equipment shall be rated for operation at 110V, 60Hz AC power, unless otherwise noted. All devices exposed to traffic in secure areas shall be in high impact housings with tamper proof screws.
- B. The Personal Alarm System shall be capable of functioning as either a stand---alone system or as an integrated sub system with an interface to the Electronics Control System (ECS) so that the other systems are prompted for support as necessary. The System shall be capable of interfacing to the ECS via Ethernet, Serial connections or dry contacts to allow display and acknowledgement of alarms on the main system.
- C. Related Requirements:
  - 1. Section 281000 "Access Controls" to integrate access control system interface and control.
  - 2. Section 282000 "Video Surveillance" to integrate duress alarm system interface and control.

1.3 PURPOSE

- A. The Personal Alarm System shall provide a means for the wearer to summon help in a security or life-threatening situation.

1.4 SUBMITTALS:

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For duress system. Include plans, elevations, sections, details, and attachments to other work.

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1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period
1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Duress Alarm System:

1. Basis of Design: Subject to compliance with requirements, provide equipment and components including, but not limited to, the following items manufactured by Actall Corporation. The system supplied shall be the Personal Alarm Locating System ATLAS. Systems specified above shall have no substitutions unless otherwise directed by the engineer or owner.
  - a. 60350 ATLAS Monitoring Center
  - b. 60001 Heavy Duty Tag (HDT)
  - c. 60003---C Ceiling LDN
  - d. 60003---W Wall LDN
  - e. 60004 Managed Gateway
  - f. 70700 Rackmount Switch
  - g. 70500 Alarm Printer, Laser Jet
  - h. 91901 Page Alert 2 Watt Transmitter
  - i. 90149 Motorola Advisor Gold Pager
  - j. 47102 3V lithium battery, PMT, one per unit
  - k. 40301 Nylon Holster
  - l. 60850 Solar Panel with Battery Pack in Weather Resistant Enclosure w/mount
  - m. 47206 Barcode Reader
  - n. 91919 Dipole Antenna
  - o. 70310 Alert Communicator Modem 56Kbps
  - p. 35100 Alert Remote Diagnostics Communications Software Program
2. Approved equal: to be approved by owner and engineer

- B. Alternate manufacturers will be considered for approval provided minimum requirements for performance, service, and integration as specified herein are met. Additional, alternate manufacturers will be required to assemble a presentation for the Owner which includes qualifications and capabilities demonstration for all aspects of their proposed duress alarm system.

- C. Installer: Qualified with at least five (5) successful installations on projects with personal alarm system work similar to that required for this project. Contractor must be a fully authorized



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dealer of duress alarm system manufacturer's products and be trained by Manufacturer. Proof of authorization shall accompany all documents. Contractor must show proof of trained technical personnel as per Manufacturer's requirements.

- D. Contractor: Approved Contractor shall contract with Manufacturer to perform a RF site survey in order to verify coverage from LDNs to Managed Gateways. Site test will determine proper system configuration and number of LDNs to cover all areas that are specified on the plans. A report of this test shall be provided to the Owner.
- E. Longevity: The duress alarm system contractor shall have a minimum of ten years experience installing and servicing duress alarm systems. The contractor shall self-perform the installation of all components associated with the duress alarm system.
- F. Personnel, Coverage and Response Capabilities: The contractor shall have a minimum of ten full time electronic service personnel within a 120 mile radius of the project location. One of the five full time electronic service personnel must work within a 60-mile radius of the project location.
- G. Past Projects: The Duress Alarm System contractor shall have completed a minimum of three projects within the last five years that are at least equal in dollar value and scope to this project. A list of similar projects, dollar volume, scope, contact name and contact number shall be provided by the contractor if asked for by the owner.
- H. The contractor shall have an established 24-hour emergency service organization. A dedicated telephone number shall be provided to the owner for requesting emergency service. A maximum of four hour, electronic service technician on sight, response time shall be guaranteed by the contractor.
- I. Parts Stocking: The contractor shall have an independently verifiable inventory of electronic service parts. This electronic service parts inventory must have a worth of at least \$100,000 per year over the last five years.
- J. All products and installations in patient accessible areas shall be tamperproof.

2.2 General:

- A. The system shall operate using Radio Frequency (RF) technologies only. Systems using an alternate technology (or hybrid technologies) shall not be acceptable. Alarms shall be received from all of the secure areas of the building, as defined by the owner. Due to the variations in system layouts, exact locations of devices may not be shown on the drawings. Locating devices should be able to locate Persons carrying Heavy Duty Tags in the following areas:
  - 1. Dayrooms
  - 2. Kitchen
  - 3. Laundry
  - 4. Program areas
  - 5. Other locations indicated on plans

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B. Operational Overview:

1. The system shall continuously supervise all devices specified herein. If a fault occurs, the CPU and alarm software will indicate an alarm function on screen. It shall be possible, via system software, to visually read out which component in the system is at fault, also indicating date and time of that fault. Systems without full supervision and reporting of faults via software will not be accepted.
2. System shall provide the capability (through software programming) to allow individual buildings to receive only alarms associated with that building at their respective Monitoring Stations so as not to disturb or disrupt other buildings during an alarm situation. System shall also provide the capability to transmit all alarms to the control center(s) for full site wide alarm status via wireless transmissions to the Managed Gateways and then by Ethernet to the Monitoring Center.
3. System devices and HDTs shall be field programmable through the use of hardware and/or software provided by the Manufacturer. No components of the system shall require disassembly in order to change features of software programming parameters. The system shall have remote programming capabilities via a commercially available remote access program preinstalled on an Administrative CPU and remote access provided by means of internet connectivity or dial up modem.

C. Basis of Design:

1. This system is designed using the ATLAS Duress System, as manufactured by Actall Corporation. The system includes personal mobile transmitters (HDTs) that are worn on by the staff and RFID locators (LDNs) positioned in the ceilings or walls on opposite sides of ingress and egress points between zones within the facility. Throughout daily activities, HDTs will transmit their ID number to the LDNs as the wearer passes underneath. LDNs will then wirelessly transmit the PMT ID to the appropriate Managed Gateway (MGEs), which then shall send that data to the Monitoring Center Location Server via Ethernet. The Location Server will translate the available LDN information to determine the location of the HDT and report that to the Monitoring Center Display CPU. Upon alarm activation, HDTs will transmit an ID number and status to the Monitoring Center servers. The Monitoring Center servers will interpret this data to correspond to a specific HDT and location.

D. Normal Operation:

1. HDTs will be permanently assigned to all staff and contractors where duress or emergency situations may occur in the facility. Staff shall be able to initiate an alarm when using the HDT by utilizing the push button, pull cord or man down options. Visitors to the facility shall be issued HDTs on a temporary basis while inside the institution or facility. HDTs can be worn using the attached belt clip, the belt or shoulder (epaulet) holster, neck straps or by placing the device in a shirt or pants pocket. If the HDT is placed in a pocket, care should be used to affix the clip to the pocket to prevent accidentally triggering the man down alarm (if applicable).
2. Once issued and activated, the HDT will detect that it does not have network configuration data. The HDT will then transmit a message to the network to determine which MGEs are in range. The HDT will listen to all of the MGE responses and

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- choose a Gateway that represents the best quality signal as its contact point to the Monitoring Center CPUs. When searching for a network connection, the HDT
3. will give the wearer a visual indication of that condition. Once a network is located, the visual indication will distinctly change.
  4. The HDTs are powered with a commercially available, disposable Lithium Ion battery. The normal life of the battery will be 6 to 9 months, dependent upon the features used by the HDT and the duty assignment of the person using the device. A low battery indication will also be transmitted to the Alert Monitoring Center for replacement, and a visual indicator will be present upon the HDT itself. Upon a low battery condition, the HDT will still operate for approximately 7 days. Spare batteries can be stocked and distributed at the issuance point for easy replacement by the user or control officer.
  5. Locating Device Nodes (LDNs) are located throughout the facility. Each LDN will be installed (per manufacturer's instructions) both inside and outside of the ingress/egress points between the desired location zones. Multiple LDNs may be installed inside of single zones for additional granularity. HDTs will be programmed to emit a ping message every .5 to 1.0 seconds. As HDTs pass underneath LDNs, the ID number of the HDT is wirelessly transmitted to the LDN and then wirelessly to the nearest MGE. The ID numbers of the HDT and the LDN are then transmitted via Ethernet to the Monitoring CPU and logged in the system. Certain LDNs will be capable of operating as test points throughout the facility. Alarm messages received from HDT whose location resolves to a test point LDN will not display as an active alarm in the Crisis Controller software.
  6. The Personal Alarm Locating System shall have the capability to download all system information and data via Ethernet to Main Alarm Monitoring Computer. This will allow selected personnel to monitor selected areas for alarm activity generated throughout the day. All individual systems must be compatible with the system and software at the main monitoring CPU.
  - 7.

E. Administrative Operations:

1. The HDT issuance point will be the location where spare transmitters and batteries are stocked. It may also be necessary to issue HDTs to visitors from this location (staff will need to have the ability to add/update personal information on any person utilizing the HDT). In addition, all persons assigned to a HDT should routinely test the unit at the issuance point. If their identity has been changed or the unit swapped, a name change will be required within the alarm database.
2. Issuing HDTs will normally be performed on a dedicated, administrative workstation at a predetermined point and not on the main alarm computer in the Control Center. This will prevent alarm reception from being interrupted or delayed by system administration activities.
3. The system will be designed to provide comprehensive and periodic reports. Monthly summary reports shall, at a minimum, provide alarm totals for a desired period and alarm distribution by category (incident type). Other periodic reports shall include device detail reports and a HDT assignment report.

F. Emergency Operation:

1. The Control Center will receive all alarms. Additional Remote Alert Monitoring Centers may provide alarm notification locally in multiple building applications or campus type

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- environment. The system shall transmit all alarms back to the main control CPU via Ethernet from the MGEs. With no HDTs in
2. alarm, a site plan will be displayed on the CPU Monitor. The system will continuously supervise all
  3. HDTs, Fixed Point Transmitters, LDNs and MGEs.
  4. Employees with HDTs will be able to activate alarms via Pushbutton (PANIC), Pull Cord or Tilt Switch (Man Down). Each alarm type shall be capable of operating independently, and each shall send a unique alarm code to the Monitoring Computer. When an alarm is activated, a tone will sound on the speakers attached to the Monitoring Center Server designed to display that alarm. The alarm icon will blink red when the appropriate alarm event is chosen via mouse. The alarm details will be displayed in text form (Date/Time, Name, Current and Previous Location, Alarm Type, Unit ID and Alarm Status) on the Monitoring Center Server and the software shall be capable of loading the appropriate graphic map displaying the alarm location. If the mapping option is chosen, a flashing icon will be displayed within the zone indicated by the alarm. The software shall log the alarm data into the database and shall have the capability of printing the data on a local printer.
  5. The control officer shall click the “acknowledge” icon on the monitor to silence the tone if programmed to do so. A solid icon will now be displayed at the alarm location. The control officer may reset and clear the alarm event as soon as it is categorized. If the device condition has not cleared after the alarm has been reset, the alarm will clear in the Active Alarm window and appear in the Queue Alarm window, until the device condition has been cleared. After resetting the alarm, the alert monitoring screen shall automatically return to normal operational mode if no other alarms are pending and/or active.

G. 60001 Heavy Duty Tag (HDT):

1. The HDT shall be capable of UHF radio transmissions upon alarm activation. Each HDT shall transmit alarms over a single channel at 900 MHz, in accordance with the device configuration received from the local MGE. HDTs shall be small, compact, and lightweight units. The HDT housing shall be constructed of durable, high impact plastic. HDTs shall also be capable of transmitting ID information over 2.4 GHz radio to provide location to determine the location of the unit.
2. HDTs shall use one (1) standard 3V lithium battery. Battery life shall be approximately 2,160 hours per unit or 6 to 9 months based on an 8 hour per day usage (also dependent upon features used). Systems requiring special order batteries or NiCad rechargeable batteries to achieve the above mentioned life will not be acceptable. HDT shall indicate low battery condition to the Crisis Controller software when batteries are to be replaced, and shall provide a visual notification to the HDT wearer.
3. The HDT shall regularly transmit a status message to the monitoring software to notify the system of a malfunction. If a status message is not received within a programmable time frame, an alarm will be displayed in the monitoring software. Systems not utilizing fully supervised HDTs will not be acceptable. The HDT shall be programmable without disassembling the unit.
4. Address Capacity:
  - a. The HDT shall be given an address between 1 and 65,535 inclusive. It shall also be capable of being

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- b. assigned a proprietary house code or "System ID", which will facilitate reusing the same radio frequency with overlapping coverage areas without losing any address capacity or interfering with other HDTs of multiple systems.
5. Actuation of Alarms:
- a. The HDT shall provide three ways to start an alarm transmission sequence.
    - 1) **Panic Button Operation:** Pressing the recessed red button on the HDT shall activate a push button alarm and send an alarm notification to the Monitoring Center CPU.
    - 2) **Pull Cord Operation:** Detaching the lanyard from the HDT body will activate a Pull Cord alarm and send an alarm notification to the Monitoring Center CPU.
    - 3) **Man Down Operation:** If the HDT is tilted by more than 60 degrees from a vertical position (it is tilted by 90 degrees when lying on its side), the device will pause for a user programmed period of time, prior to sending out warning. Warning tones will then be sent out for a programmed period of time, tones to alert the user that their device is about to go into alarm. If the HDT is not returned to upright prior to the end of the warning tones, then an alarm will be sent. This preT tone shall assist in eliminating false alarms when the unit is tilted upright and no emergency situation has taken place.
  - b. It shall be possible to eliminate/deactivate the Man Down features, both in hardware and software.
- H. 60003 Locating Device Node (LDN):
- 1. Location Device Nodes shall be powered by 12 -18VDC. Each LDN shall draw no more than 40mA. LDNs can be programmed to a maximum of 65,535 different ID codes via a hardware interface. Each code will be associated with a zone or distinct area that will relate to the software program to a specific data entry when an alarm transmission is received from a HDT. No data or home run wiring is required for these units to properly function. Each unit can be powered separately or in parallel on the same supply circuit. LDNs will receive ID information from the HDT sent at 2.4 GHz, and relay that information wirelessly to the appropriate Managed Gateway at 900MHz. LDNs are designed to mount onto standard, Two Gang (US) electrical boxes. Depth of electrical boxes shall be capable of housing a transformer to power a Locator when required.
- I. 60350 ATLAS Monitoring Center:
- 1. The Alert Monitoring Center shall control the entire Personal Alarm Locating System and shall include a Data Server CPU(Location Engine), the Alarm Server CPU, Crisis Controller software package, 48 port switch (use additional switches if necessary) and optional software modules.
  - 2. Both central computers (Location Engine and Alarm Server) shall be IBM compatible, Intel Core I7 2.8 GHz processors (minimum), 4GB DDR3 Ram, 250 GB hard drive, DVD---RW, integrated Video, Sound and P/S2 bus mouse, and Keyboard. The system shall have at least one gigabit Ethernet port, one serial port, one parallel port and two

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USB ports. The system shall also have VGA, DVI and/or HDMI video outputs. The operating system shall be Windows 2008 Server or Windows 7. Actall Alert Communicator Boards (for utilizing for up to 8 additional COM ports) may be installed and programmed into the system for expanding the number of available serial ports for external devices.

3. A minimum 56K modem may be installed into the system for off-site remote diagnostics, programming and system upgrades to the system. Monitor shall be upgradeable to a larger touch screen without further modifications to the software program.
4. System shall be equipped with an alarm printer that will print hard copies of all alarms, acknowledgments, system faults, dates and times of alarms, and shall be compatible with system software. It shall be possible through the alarm software to generate special reports relating to a particular alarm date, which shall include all data and mapping relating to that particular incident.
5. Reports can be viewed through the report menu on the software or printed on the alarm printer.
6. The Alert Monitoring Center shall have the capability of utilizing a Barcode Reader to activate or deactivate HDTs. A bar code on the HDT will indicate ID code of the unit and a bar code on a nametag will indicate the person's name and other pertinent information that is needed to update the software.
7. Provide uninterrupted power supply (UPS) or battery backup on computer system and all modules within the ATLAS System for a minimum of 1 hour in the case of power failure.
8. The registry keys of the Alert Monitoring Center shall be modified to eliminate the capabilities of accessing non-related Windows screens, icons, games, exiting capabilities, or other software program within the operator or admin levels.

J. 91901 Page Alert Transmitter:

1. An Alpha Numeric Paging system shall be provided to alert administrative staff and response teams to all alarms generated by the ATLAS System. The paging system shall display information regarding the alarm on individual Alpha Numeric Pagers. This information shall include alarm ID code, the person's name, present and previous locations, and type of alarm (such as push button, pull cord, and/or manT down).
2. Paging system shall provide no less than 2 watts of output power for site coverage. Frequency shall be in the 450T 470MHz FCC band allocated as a "Shared Use Frequency Band" to provide immediate installation of equipment without the need of FCC licensing. Paging system shall provide the capability for 100 alphanumeric pagers.

K. 90419 Alpha Numeric Pagers:

1. System shall provide Alpha Numeric Pagers to notify alarm response personnel in the event of an alarm. Receivers shall be small, compact units that have the capability to be placed in a belt clip type holder. Unit shall provide a minimum of a 4 line, 120 character display that can be scrolled to view alarm information, date/time, 8 selectable audible alerts, silent vibration mode, built in audible alarm clock, and a programmable on/off feature. Units shall operate on a standard single AA battery.

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L. 60850 Solar Panel:

1. System shall provide a Solar Panel module for the operation of RF Locator devices and Wireless RF Repeaters where power is not available. Solar panel shall provide sufficient voltage to power the attached unit(s) continuously. Solar Panels shall be housed in weather resistant housing and shall have provisions for different mounting hardware for poles, walls, and fences.

M. 35100 Remote Diagnostics Software Program:

1. Provide a remote diagnostics and maintenance program that will directly interface with the Alert Monitoring Center for remote communications to factory or contractor for software modifications, updates, data storage, and backups. A 56K bps data modem shall be provided for the CPU for communications setup between onsite Alert Monitoring Center and offsite diagnostics CPU. The Facility shall provide a direct Telco line for connection to the modem.

2.3 Alarm Monitoring Software (AMS) Description: General Operation:

- A. The AMS must be compatible with all equipment or components specified herein. It shall be written
- B. for ease of operation by the user and for installation and initial programming by the contractor. The AMS shall include at least three different operating levels. The AMS shall be fully compatible with Windows® 2008 Server or Windows 7 and shall be preprogrammed to prevent unauthorized use of other software on the CPU. System software shall provide network capabilities between Alert Monitoring Centers. When an alarm is received, the date and time of the alarm, the person who sent the alarm and where the alarm came from shall be displayed in plain text. The display also includes the person's previous location to assist in determining the direction in which the person was moving. The type of alarm shall also display (push button and/or man-down) in text. All alarms will automatically be displayed in graphical form on the screen. Alarms shall be acknowledged and reset from the PC keyboard or mouse, or directly on a touch screen. Historical alarm data shall be stored on the CPU for retrieval at a later date or can be printed for hard copy storage. It shall be possible to print lists of all associated system equipment such as LDNs and MGEs on the alarm printer. Graphical drawings of the installation shall be stored on the CPU. These drawings shall be easily edited or new drawings produced with a compatible editing program that reads ". BMP and/or .JPG" formats. Maps shall be sized to a resolution suitable for viewing on a 24" monitor at a distance of Y feet. Icons indicating locations of all alarm points on maps shall be easily added, deleted, or moved by touch screen, keyboard, or mouse without any outside editing program. Icons indicating items such as transmitters and LDNs, shall also be programmable into the graphics screen. It shall be possible to indicate and verify all equipment locations on the maps for servicing and maintenance.

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- C. The AMS shall be capable of programming certain parameters of the PMTs and other devices at any time. The AMS shall also be capable of accepting a barcode reader device that will activate/deactivate PMTs using code 128 type barcodes.
- D. The AMS shall provide real time Guard Tour capabilities. This shall be accomplished without the need of additional hardware to the system and shall utilize standard PMT, LDNs and Gateways.
- E. AMS Pointing Device Modes:
  - 1. The AMS shall provide two pointing device modes: touch screen and standard mouse/keyboard.
- F. Touch Screen Mode:
  - 1. Provide a 24" touch screen monitor. Use touch screen controller as the primary pointing device, but permit simultaneous use of a mouse, trackball, or other secondary pointing device. Size touch screen views to accommodate graphical mapping formats. Also include window title bars, menu bars, or task bars relating to the AMS only (refer to sample screen graphic accompanying these specifications for an illustration).
- G. Mouse/Keyboard Mode:
  - 1. Provide a 24" SVGA monitor. Use mouse, trackball, or other pointing device as the primary pointing device. Software program should be consistent with the standard Windows® user interface taking full advantage of its multiple windows, control objects, toolbars, menus, and other features. The AMS shall restrict users in the operator and administrator modes to only the appropriate screen and shall not have access to the standard Windows® programs.
- H. AMS User Levels:
  - 1. Provide a minimum of three user levels based on user name and password.
- I. Administrative Level:
  - 1. Shall be able to log HDTs in/out of the system to update AMS program. This level will have access to associating personnel ID's and HDT numbers for HDT activation or deactivation. Do not permit access to functions relating to operating system, configuration menus, or other applications outside the AMS. Upon check in of HDT and check in screen, each unit logging into the system for operational assurance can perform a test function.
- J. Operator Level:
  - 1. Shall be able to access to alarm monitoring screen for full monitoring privileges via touch screen shall be permitted. Do not permit access to functions relating to operating system, configuration menus, or other applications outside the AMS. If programmed by a supervisor, allow tab functions for viewing Tracking, System status, Pager status, and



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Day/Night operation. Allow access to print item or list tabs. Alarm status window shall have an acknowledgment and reset button for the operator to confirm all alarms.

K. Supervisor Level:

1. Shall be able to access all AMS features and functionalities.

2.4 AMS Login/Logout:

A. Display a dialog box to enter user name and password.

B. Mask password field for privacy.

C. Store preferences by user name and automatically restore user's individual preference upon login.

D. Display current user's name in status bar.

E. AMS Main Menu:

1. The AMS will provide an intuitive program menu to facilitate programming of all System devices and features. Menus shall have similar operation to those commonly found in most Windows based products.

F. AMS Alarm Monitoring Tabs:

1. The AMS will group different alarm monitoring screens in a tabbed format for ease of access.

G. Network Support:

1. The AMS shall have the capability of networking multiple monitoring/admin stations to utilize a networked database on the located on the Main Monitoring system. The AMS shall be capable of supporting up to 10 CPUs attached to a common set of data files located on a network server.

2.5 Screen Layout:

A. Screen Design:

1. Design each view with consistent elements. In order from top to bottom include AMS
2. Main Menu, AMS Alarm Monitoring Tabs, Alarm Monitoring Information Window, map area, and status bars.

B. Building Plan Designs:

1. Draw building plans showing walls with a 50% gray scale laid over a 10% gray scale background. Place both elements on top of a white background. Within floor plan

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delineated and label alarm zones using ideal zone boundaries. Use room labels and other label nomenclature most meaningful to the user.

C. 3---D Icons and Buttons:

1. Provide a three---dimensional affect for all buttons, icons, queues/lists, toolbars, status bars, and other objects by surrounding object with color---paired borders that create a raised or sunken appearance, consistent with a light source to the upper---left of the screen.

D. Button/icon designs:

1. Use button/icon designs with clip art that shall be intuitive to the user. Provide both visual and color cues (for color---blind users) to represent state changes.

### PART 3 - EXECUTION

#### 3.1 Field Quality Control:

- A. After installation of the Personal Alarm Locating System, and prior to point-by- point performance testing, perform the necessary adjustments and balancing of all signals and levels to ensure proper system operation and compliance with requirements. If proper system operation and compliance with requirements is not achieved, correct malfunctioning units at site by making necessary changes or remove and replace with new units. Then proceed with necessary readjustment and re---balancing o f all signals and levels t o e n sure proper system operation and compliance with requirements. Functionally test all LDNs, Managed Gateways, RF coverage, other hardware interconnections, and all interfaces to the ATLAS System.

#### 3.2 Point-by-Point Performance Testing:

- A. Perform a thorough, point-by---point operational test including system integration to other systems when applicable. Demonstrate software performance and system reporting in accordance with owner's requirements and all previous owners review comments. Demonstrate complete functionality of all integrated ATLAS System functions. Perform a site test to determine RF coverage from HDTs to receivers. Site test will determine proper system configuration to cover area that is specified on the plans for coverage and to determine the repeater network for proper and reliable operation. If test results are not in compliance with requirements, make necessary changes, corrections, repairs, or adjustments at no additional cost and arrange for another point by point performance test. This process shall continue until the systems are acceptable to the owner.

END OF SECTION 28 30 00