

## SECTION 13761

### BIOMETRIC ACCESS CONTROL SYSTEM

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Biometric Reader Hardware
- B. Biometric Reader Software
- C. ICLASS Smart Cards
- D. Power Supplies
- E. Wiring

##### 1.02 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- A. ICLASS Smart Cards [\[Delete if not applicable\]](#)

##### 1.03 PRODUCTS INSTALLED BUT NOT SUPPLIED UNDER THIS SECTION

- A. RJ-12 Communications Cable if using serial communications.

##### 1.04 RELATED SECTIONS [\[Choose as related to your project\]](#)

- A. 08460 Automatic Entrance Doors [\(ADA\)](#)
- B. 08470 Revolving Doors
- C. 08740 Electro-Mechanical Hardware [\(card key locking hardware, electrical locks\)](#)
- D. 10450 Pedestrian Control Devices
- E. 10454 Rotary Gates
- F. 10456 Turnstiles
- G. 11150 Parking Control Equipment
- H. 13100 Lightning Protection
- I. 13720 Intrusion Detection Systems
- J. 13740 Video Surveillance Systems
- K. 13750 Communications Systems
- L. 13760 Security Furniture & Racking Systems
- M. 13820 Door Control Systems
- N. 13830 Elevator Monitoring and Control [\(interface with access control\)](#)
- O. 16050 Basic Electrical Materials and Methods
- P. 16120 Conductors and Cables [\(including Fiber Optic\)](#)
- Q. 16260 Uninterruptible Power Supply Systems [\(UPS for Server & Workstations\)](#)

## 1.05 SUMMARY

### A. Labor And Materials

Unless otherwise provided in the Drawings and Specifications, the Contractor shall provide and pay for all labor, materials, equipment, tools, utilities, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution, operation and completion of the Work.

### B. Specification Language

Specifications and notes are written in imperative and abbreviated form. Imperative language of the technical specifications is directed at the Contractor, unless specifically noted otherwise. Incomplete sentences shall be completed by inserting “shall”, “shall be”, “the Contractor shall”, and similar mandatory phrases by inference. The words “shall be” shall be supplied by inference where a colon (:) is used within product specifications.

### C. Drawings And Specifications

1. Contractor shall be provided **three (3)** sets of the Drawings and Specifications for his use. Additional sets, if requested by Contractor, shall be furnished to the Contractor for the actual cost of reproduction.
2. Contractor shall carefully study the Drawings and Specifications, and shall at once report any error, unforeseen circumstances, inconsistency or omission he may discover.
3. The [CLIENT] Project Manager shall be the interpreter of the requirements of the Drawings and Specifications, subject to the final approval of [CLIENT]. All interpretations and opinions of the Security Consultant shall be made in writing or in the form of drawings.

### D. Intent And Correlation

1. The intent of the Project Drawings and Specifications is to include all items necessary for the proper execution and completion of the Work.
2. The Project Drawings and Specifications are complementary, and what is required by any one shall be as binding as if required by both.

## 1.06 REFERENCES

- A. The Biometric ICLASS system shall have been tested for compliance with all applicable international standards and shall have the following approvals: FCC, UL294, CSA, cUL, CE under R&TTE. These approvals shall be printed on the labeling located on the rear panel of the reader.
- B. The biometric ICLASS system shall include an embedded GEMPLUS GEMEASYLINK680SL ICLASS contactless smart card reader. This device shall be a radio-transceiver with the following characteristics:
  1. Operating Frequency Range: 13.553 – 13.567 MHz
  2. RF Power Rating: 0.0 Watts

3. RF Output Impedance: 50 Ohms
- C. The biometric ICLASS system shall comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
- D. The Biometric Reader system shall comply with the Standard for Access Control System Units for UL294 and with CSA C22.2 No. 205 for the cUL Mark.
- E. The Biometric Reader shall have the CE mark, for compliance with CISPR22, EN 55022 and EN 50082-1 requirements. For European Union (EU) countries, the Biometric Reader shall be compliant with CE under the R&TTE Directive, related to the radio transceivers that are part of its design. The Biometric Reader shall be compliant with this directive if, and only if, the user installs the manufacturer's specified Filter Installation Kit. This filter kit shall be included with any Biometric Reader product if it was shipped to a country within the EU.
- F. The Filter Installation Kit shall consist of two filters: a line filter used to minimize conducted emissions from power supply lead lengths greater than 3 meters and a DB15 "Pass-Thru" filter used to minimize radiated emissions.
- G. The biometric reader shall be in compliance with European Certification and meet the essential requirements and other relevant provisions of Directive 1999/5/EC.
- H. Declarations of Conformity shall include:
  1. R&TTE Directive 1999/5/EC
  2. EMC Directive 89/336/EEC
  3. Low Voltage Safety Directive 73/23/EEC

#### 1.07 DEFINITIONS

- A. Words that are in common use are used throughout the Drawings and Specifications, except:
  1. Words which have well-known technical or trade meanings are used in accordance with such recognized meanings.
  2. Whenever the following listed words and phrases are used, they shall be mutually understood to have the following respective meanings:
- B. The words "as indicated." means: as shown on the Drawings, and in accordance with the Specifications.
- C. The words "as required." means: as required to provide a complete and satisfactory Work in full conformance with the Drawings and Specifications.
- D. The word "New" means: new Work to be provided by Contractor.

- E. The word “Provide” means: furnish, install, connect, test and make ready for use.
- F. The words “Relocate existing” means: remove existing item from present location. Reinstall, re-connect, and test existing item and make ready for use at new location as shown on the Drawings.
- G. The words “Remove existing “ means: remove existing item and return item to [CLIENT].
- H. The word “Replace” means: remove existing item and return item to [CLIENT]. Provide new item as indicated.
- I. The word “Work”: The Work is the completed construction required by the Drawings and Specifications, and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.
- J. The word “Furnish” means: supply item as specified. Item to be installed by others.

#### 1.08 CONTRACTOR DESIGN REQUIREMENTS

- A. The Project Drawings represent the level of system design to be provided by [CLIENT]. Contractor shall provide all additional system design work required, including:
  - 1. Conduit layout and sizing.
  - 2. Wire and cable layout and sizing.
  - 3. Point-to-point wiring and equipment hook-up information.
  - 4. Equipment mounting details.
  - 5. Design of equipment cabinets.
  - 6. Other detailed design work required.
- B. Contractor’s design shall conform to all applicable codes and ordinances. All electrical design, including the sizing and placement of conduit, raceways and conductors, shall be in accordance with NFPA 70: National Electrical Code, current version, unless local codes establish more stringent requirements.
- C. Contractor’s design work is subject to review and approval by [CLIENT]’s Project Manager.
- D. Contractor’s design shall also include:
  - 1. The addition of all wire, cable, conduit, connectors and junction boxes required for system operation.
  - 2. Install conduit between the processor and all equipment at each door, as necessary.
  - 3. Complete “as-built” documentation of all security systems, including documentation of existing equipment, wiring, conduits, and raceways.
  - 4. Other Work as defined within the Project Drawings and Specifications.

#### 1.09 SYSTEM DESCRIPTION

- A. The biometric ICLASS reader system shall provide a one-to-one (1:1) fingerprint verification utilizing an embedded numeric keypad and Gemplus ICLASS™ contactless smart card reader that negate the need for external Wiegand input. The Biometric Reader

shall prevent unauthorized access via loaned, lost or stolen cards or PINs by requiring that the SiteKey stored on the card matches that of the reader and that the fingerprint of the person seeking entry match the identity of the cardholder. The Biometric Reader shall also include the ability to implement triple authentication: smart card (what you have), fingerprint (who you are), and numeric password (what you know).

## B. Configurations

1. **Basic Operation.** The Biometric Reader is a complete stand-alone system. The reader shall provide a Line Trigger output when biometric authentication is verified. Enrollment shall be accomplished using a serial interface with a laptop computer with biometric software. Once all user have been enrolled, the laptop may be disconnect and the reader perform full functions off-line.
2. **Advanced Operation.** The Biometric Reader shall provide a Wiegand output to an existing or new card access control system to provide higher security at selected doors. The reader shall provide various Wiegand outputs, from 1-64 bits.
3. **Optimal Operation.** The Biometric Reader shall provide a serial (RS232/RS485) and network interface to communicate with a desktop computer running the biometric software to add to delete biometric templates in real time. The biometric software shall be able to run on the same desktop computer as the card access software program and not require a separate computer.

## 1.10 SUBMITTALS

### A. Product Data

Product Data submittal shall only be required if the Contractor requests a substitution or a particular brand product is not specified or recommended.

### B. Procedures

1. Provide submittals to [CLIENT]'s Project Manager.
2. Submit **three (3)** copies of each submittal.

### C. Shop Drawings

1. General Shop Drawings for the project as described elsewhere.
2. Provide other Shop Drawings only if specifically requested by [CLIENT]'s Project Manager.

### D. Manufacturers Installation and Programming Instructions

Provide Manufacturers Installation and Programming Instructions as requested in the various Specification Sections.

### E. PROJECT RECORD DRAWINGS

1. Definition: Project Record Drawings are drawings that completely record and document all aspects and features of the Work. (Also known as "as-built" drawings.)

2. The purpose of Project Record Drawings is to provide factual information regarding all aspects of the Work, to enable future service, modifications, and additions to the Work.
3. Project Record Drawings are an important element of this Work. Contractor shall accurately maintain Project Record Drawings throughout the course of this project. Project Record Drawings shall include documentation of all Work, including the documentation of existing equipment, wiring, conduits, and raceways that are to be reused in the Work.
4. [CLIENT] Project Manager shall furnish Contractor with two (2) sets of site plans for Contractor's use in preparing Project Record Drawings. One set shall be used as a working set, the other shall be used to prepare the final record set.
5. Contractor shall maintain the working set of Project Record Drawings at the project site throughout the course of the Work. The working set shall be updated on a daily basis as the Work progresses.
6. Project Record Drawings shall accurately show the physical placement of the following:
  - a. Equipment and devices.
  - b. Conduit and raceways.
  - c. Junction and pull box locations.
  - d. End-of-line resistor locations.
  - e. Interfaces to external equipment.
  - f. Connections to power and telephone circuits.
- F. Project Record Drawings shall show the physical placement of each device and conduit or aerial center line, to be accurate to within one foot (1') of the nearest landmark. Where the site plan furnished by [CLIENT] Project Manager conflicts with actual conditions, Contractor shall amend site plan as required. Indicate exact description of conduit runs (above ground, two foot trench, along outside wall of building, etc.).
- G. Project Record Drawings shall show wire and cable runs, zone numbers, tamper circuit configuration, panel/circuit breaker numbers from which equipment is powered, and splice points. Such information may be shown on the site plans.
- H. Project Record Drawings shall be available for inspection by [CLIENT] Project Manager on a daily basis. Incomplete or inaccurate Project Record Drawings may be cause for delay of Contractor's payment.
- I. Upon completion of Work, and prior to Final Acceptance, Contractor shall prepare and submit to [CLIENT] Project Manager a final record set of Project Record Drawings. This set shall consist of all data transferred from the working set, supplemented by Riser Diagrams and other information. The final record set of Project Record Drawings shall be drafted by a skilled draftsman, under the supervision of Contractor. All final Project Record Drawings shall be provided to [CLIENT].

## J. System Documentation

1. Definition: System Documentation is a complete collection of all installation, programming, operation, and maintenance manuals and work sheets relating to the equipment provided as part of the Work.
2. Contractor shall maintain a file of System Documentation at the project site throughout the course of the Work. Such file shall be updated with new information as equipment is received and installed. System Documentation shall be available for inspection by [CLIENT] Project Manager on a daily basis.
3. Upon completion of Work, and prior to final Acceptance, Contractor shall prepare and submit to [CLIENT] Project Manager **three (3)** sets of System Documentation.

## K. Closeout Submittals

1. Provide a set of as-built drawings and manuals to the [CLIENT] Project Manager  
As-Built Drawings  
Mounting Details  
Product Data  
Installation Manuals  
Operating Manuals  
Maintenance/Service Manuals
2. Provide the [CLIENT] Project Manager- with all programming sheets, keys to the equipment cabinets, as-built drawings, operating manuals, maintenance/repair manuals, spare fuses, all programming sheets and keys to the equipment cabinets, tools for tamper-resistant enclosures and tools for manual resetting devices.

## 1.11 QUALITY ASSURANCE

### A. Qualifications Of Contractor

1. Contractor shall be an installation and service contractor regularly engaged in the sale, installation, maintenance and service of biometric access control systems.
2. Contractor shall have **five (5)** years experience with the installation, start-up and programming of systems of a similar size and complexity to the one proposed.
3. Contractor shall be a factory authorized dealer of the system proposed for at least **two (2)** years.

### B. Supervision Of Work

1. Contractor shall employ a competent Foreman to be in responsible charge of the Work. Foreman shall be on the project site daily during the execution of the Work.
2. Contractor's Foreman shall be a regular employee, principle, or officer of Contractor, who is thoroughly experienced in projects of a similar size and type. Contractor shall not use contract employees or Subcontractors as Foremen.

### C. Qualifications Of Technicians

1. All electronic systems Work shall be performed by electronic technicians thoroughly trained in the installation and service of specialty low-voltage electronic systems.
2. Journeyman Wireman electrical workers may be used to install conduit, raceways, wiring, and the like, provided that final termination, hook-up, programming, and testing is performed by a qualified electronic technician, and that all such Work is supervised by the Contractor's Foreman.
3. All incidental Work, such as cutting and patching, lock hardware installation, painting, carpentry, and the like, shall be accomplished by skilled craftsmen regularly engaged in such type of work. All such Work shall comply with the highest standards applicable to that respective industry or craft.
4. All 120 VAC power wiring and connections are to be performed by a qualified Journeyman Wireman, licensed to perform such Work in the [CLIENT].

### D. Subcontractors

1. Definition: A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site.
2. Use of any Subcontractor is subject to the approval of [CLIENT]. The Contractor shall identify all Subcontractors on the Bid Form. The Contractor shall make no substitution for any Subcontractor previously selected without approval from [CLIENT].
3. Contractor's Foreman shall be on the project site daily during all periods when Subcontractors are performing any of the Work. Contractor's Foreman shall be in responsible charge of all Work, including any Work being performed by Subcontractors.
4. By an appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Drawings and Specifications, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these documents, assumes toward [CLIENT].

### E. Supervision And Construction Procedures

1. The Contractor shall supervise and direct the Work, using his best skill and attention. Contractor is solely responsible for all construction means, methods, and techniques.
2. The Contractor shall employ a competent foreman who shall be in attendance at the project site during the progress of the Work. The foreman shall represent the Contractor and all communications given to the foreman shall be as binding as if given to the Contractor.

F. Regulatory Requirements

1. All Work is to conform to all building, fire, and electrical codes and ordinances applicable in the [CLIENT]. In case of conflict between the Drawings/Specifications and codes, the codes shall govern. Notify [CLIENT] Project Manager of any such conflicts.
2. Contractor shall secure and pay for all licenses, permits, plan reviews, engineering certifications, and inspections required by regulatory agencies. Contractor shall prepare, at Contractor's expense, any documents, including drawings, that may be required by regulatory agencies.

G. Permits

The Contractor shall make application for and obtain any and all permits required by federal, state, county, city, or other authority having jurisdiction over the work.

1.12 DELIVERY, STORAGE, AND HANDLING

Security of Contractor's Tools and Equipment: [CLIENT] is not responsible for the care, storage or security of any of the Contractor's tools or equipment.

1.13 PROJECT/SITE CONDITIONS

A. Environmental Conditions

1. Power: Electrical power will be supplied by [CLIENT] to the extent that the usage is compatible with available facilities in the vicinity of the work.
2. Telephone: Contractor may use a telephone designated by [CLIENT] for local and toll-free calls. The costs of long distance calls are the responsibility of the Contractor and shall not be charged to [CLIENT].
3. Rest room Facilities: Contractor may use existing Rest room facilities designated by [CLIENT].
4. Parking: [CLIENT] reserves the right to limit or restrict Contractor parking based upon the daily requirements of the other contractors on site.
5. Dust Control: Make provisions to control all dust, dirt, and foreign material caused by the performance of the Work.
6. Use of explosive type fastening equipment is prohibited.
7. Notify [CLIENT] immediately of any damage or possible damage to any other equipment.

B. Clean-Up

1. Contractor shall clean-up, on a daily basis as the Work progresses, all dirt, dust and debris caused by Contractor's operations. Clean-up shall be completed by the end of each workday to the satisfaction of [CLIENT]'s on-site representative.
2. In the event that Contractor fails to clean-up, [CLIENT] may elect to have clean-up performed by others, with the costs of such clean-up being charged to the Contractor.

C. Construction Aids

1. Definition: Construction Aids are facilities and equipment required by personnel to facilitate the execution of the Work. Construction Aids include scaffolds, staging, ladders, platforms, hoists, cranes, lifts, trenchers, core drillers, protective equipment, and other such facilities and equipment.
2. Contractor shall provide all Construction Aids required in the execution of the Work. Construction Aids that are the property of [CLIENT] or other contractors shall not be used without permission.
3. Storage of Construction Aids shall be coordinated with [CLIENT]'s on-site representative.

D. Safety

1. The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.
2. Contractor shall comply with all local, state, and federal regulations and laws for the safety of the work place.

E. Accident Reports

Serious or fatal accidents shall be reported immediately by telephone or radio to the [CLIENT]'s Project Manager.

F. Existing Conditions

1. [CLIENT] does not warrant the condition of any portion of the existing wiring, conduit or raceway systems. Prior to submitting his proposal, Contractor shall examine all existing conditions and determine to what extent the existing wiring, conduit, and raceway systems may be reused.
2. Contractor's proposal price shall include the cost of replacing existing wiring, conduit, and raceways as required.

## 1.14 SEQUENCING

A. Description

This implementation plan describes the general approach that shall be followed in order to minimize the time for the biometric access control systems to be operational.

## B. Approach

Contractor shall plan and schedule all work in such a sequence as to minimize the time before the system is operational. The following is a suggested work sequence:

1. Order all equipment needed and notify any subcontractors to schedule their participation.
2. Perform all system layout work.
3. Insure there are an adequate number of power receptacles available to operate all security equipment and coordinate with [CLIENT] as to where power is available.
4. Provide shop drawings to verify location of all equipment, conduit runs, power connections, etc. Submit shop drawings to [CLIENT] Project Manager.
5. Coordinate with [CLIENT] to provide space in each building's Communications Room for mounting of processors.
6. Provide training on how to fill out the programming sheets for access levels.
7. Prepare and pre-test all equipment to the greatest extent possible.
8. Install all equipment.
9. Provide training on the programming other various options.
10. Test and inspect all systems.
11. Perform all other Work as required.
12. Perform the Acceptance Test.
13. Provide training.
14. Provide as-built drawings.

### 1.15 SCHEDULING

The Contractor, within five (5) days after being awarded the contract, shall prepare and submit for [CLIENT]'s information, an estimated progress schedule for the Work. The progress schedule shall be related to the entire project, and shall indicate start and completion dates.

### 1.16 WARRANTY

- A. Contractor warrants that all Work furnished (material and labor) under this Contract will be of good quality, free from faults and defects, and in conformance with the Project Drawings and Specifications.
- B. Contractor shall provide a parts and labor guarantee on all Work. Unless otherwise specified herein, Contractor's guarantee shall be for a period of **two (2)** years from date of Acceptance, except where any specific guarantees from a supplier or equipment manufacturer extends for a longer time.
- C. Contractor's guarantee shall cover all costs associated with troubleshooting, repair, and replacement of defective Work, including costs of labor, transportation, lodging, materials, and equipment.
- D. Guarantee shall not cover any damage to material or equipment caused by accident, misuse, unauthorized modification or repair by [CLIENT], or acts of god.

- E. Contractor shall promptly respond to [CLIENT]'s requests for service during the guarantee period. Contractor shall provide repair service as soon as reasonably possible upon request from [CLIENT], but in no case shall service response exceed **eight (8)** hours from time of request.

#### 1.17 SYSTEM STARTUP

Power shall only be applied to the system after re-checking for proper grounding of the system and measuring all loops for lack of shorts, grounds, and open circuits.

#### 1.18 OWNER'S INSTRUCTIONS

##### A. Coordination With [Client]

1. Contractor shall closely schedule and coordinate his activities with designated [CLIENT] representatives.
2. Contractor shall provide [CLIENT]'s Project Manager with a work plan on a weekly basis. Such work plan will describe locations of intended activities, types of activities, and potential conflicts to facility operations.

##### B. [CLIENT]'s Representatives

The following are [CLIENT]'s designated representatives:

###### PROJECT MANAGER

John Doe  
Telephone (123) 456-7890

###### PROJECT ARCHITECT

Jane Doe  
Telephone (123) 456-7890

###### PROJECT ENGINEER

Donald Doe  
Telephone (123) 456-7890

###### PROJECT CONSULTANT

Fred Doe  
Telephone (123) 456-7890

##### C. [CLIENT]'s Right To Carry Out The Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Project Drawings and Specifications and fails within seven days after receipt of written notice from [CLIENT] to commence and continue correction of such default or neglect with diligence and promptness, [CLIENT] may, after seven days following receipt of an additional written notice and without prejudice to any other remedy [CLIENT] may have, make good such deficiencies. In such case, an appropriate Change Order shall be

issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies.

D. Minor Changes In The Work

[CLIENT] shall have the authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Project Drawing and Specifications. Such changes shall be provided by written order.

### 1.19 COMMISSIONING

- A. After all Work is completed, and prior to requesting the Acceptance test, Contractor shall conduct a final inspection, and pre-test all equipment and system features. Contractor shall correct any deficiencies discovered as the result of the inspection and pre-test.
- B. Contractor shall submit a request for the Acceptance test in writing to the [CLIENT] Project Manager, no less than fourteen days prior to the requested test date. The request for Acceptance test shall be accompanied by a certification from Contractor that all Work is complete and has been pre-tested, and that all corrections have been made.
- C. During Acceptance test, Contractor shall demonstrate all equipment and system features to [CLIENT]. Contractor shall remove covers, open wiring connections, operate equipment, and perform other reasonable work as requested by [CLIENT].
- D. Any portions of the Work found to be deficient or not in compliance with the Project Drawing and Specifications will be rejected. [CLIENT] Project Manager will prepare a list of any such deficiencies observed during the Acceptance test. Contractor shall promptly correct all deficiencies. Upon correction of deficiencies, Contractor shall submit a request in writing to [CLIENT] Project Manager for another Acceptance Test.
- E. If, at the conclusion of the Acceptance Test, all Work is found to be acceptable and in compliance with the Project Drawings and Specifications, [CLIENT] Project Manager will issue a letter of Acceptance to Contractor and [CLIENT].

### 1.20 MAINTENANCE

- A. Provide full procedures for all database back-ups.
- B. Provide full procedures for server/workstation hard drive maintenance, such as defrag, etc.
- C. Provide full procedures for maintaining physical and software firewalls.
- D. Provide full procedures for upgrading software.
- E. Provide full procedures for testing battery condition on all field panels for adequate back-up time.
- F. Provide full procedures for any other tasks that must be performed to ensure the warranty remains intact.

## PART 2 PRODUCTS

## 2.01 GENERAL

- A. All products not provided by [CLIENT] shall be new and unused, and shall be of manufacturer's current and standard production.
- B. Where two or more equipment items of the same kind are provided, all shall be identical and provided by the same manufacturer.
- C. Drawings and Specifications indicate major system components, and may not show every component, connector, module, or accessory that may be required to support the operation specified. Contractor shall provide all components needed for complete and satisfactory operation.
- D. Product Availability
  - 1. Contractor, prior to submitting a proposal, shall determine product availability and delivery time, and shall include such considerations into his proposed Contract Time.
  - 2. Certain products specified may only be available through factory authorized dealers and distributors. Contractor shall verify his ability to procure the products specified prior to submitting a proposal.
- E. Wire And Cable
  - 1. General: Provide all wire and cable required to install systems as indicated. Wire and cable shall be sized to provide minimum voltage drop and minimum resistance to the devices being supplied.
  - 2. All cables shall be specifically designed for their intended use (direct burial, aerial, etc.).
  - 3. Comply with equipment manufacturers recommendations for wire and cable size and type.
  - 4. Comply with all applicable codes and ordinances.
- F. Conduit And Raceway Systems
  - 1. General: The placing of surface mounted conduit on the exterior of any building shall be approved by [CLIENT] prior to its installation.
  - 2. Interior Conduit:
    - a. Electrical Metallic Tubing (EMT)
    - b. Flexible Metal Conduit
    - c. Provide fittings and connectors as required for installation of EMT or flexible conduit.
  - 3. Surface Raceways:
    - a. Sheet metal channel with fitted cover, suitable for use as surface metal raceway, WIREMOLD or approved equal.
    - b. Provide fittings, elbows, and connectors designed for use with raceway system.

4. Exterior Conduit: (any of the following as determined by local code requirements):
  - a. Rigid Steel Conduit
  - b. Rigid Aluminum Conduit
  - c. Rigid Nonmetallic Conduit (only if buried 18" below ground surface).
  - d. Intermediate Metal Conduit
  - e. Provide rain-tight fittings and connectors as required for installation of exterior conduit.
5. Exterior Flexible Conduit:
  - a. Liquidtight Flexible Conduit: Flexible metal conduit with PVC jacket.
  - b. Provide rain-tight fittings and connectors as required for installation of Liquidtight Flexible Conduit.

G. Junction And Pull Boxes

1. Interior Boxes: Sheet Metal Outlet Boxes: Sizes to be determined in accordance with code requirements for conductor fill. No box shall be smaller than a single gang 1-1/2 deep. Provide box covers as required.
2. Exterior Boxes: All exterior boxes shall NEMA 4 or NEMA 3R, watertight and dust-tight
3. All interior and exterior boxes shall have their covers fastened using security screws.

H. Lightning Protection

1. The Contractor shall provide suitable lightning protection for all processors/controllers.
2. All lightning protection equipment shall be UL listed.

## 2.02 BIOMETRIC ACCESS CONTROL SYSTEM

A. Biometric Reader Hardware

1. Dimensions  
The Biometric Reader shall measure 5.32 inches x 4.69 inches x 2.52 inches (135 x 70 x 64 mm) and shall arrive disassembled. The Biometric Reader shall be comprised of:
  - a. A wall plate that mounts directly to the wall or a triple-gang box mounted in the wall.
  - b. A fingerprint verification module that mounts to the wall plate.
  - c. A smart card interface module that mounts to the wall plate.
2. Material  
The Biometric Reader shall be made of Polylac PA-765A, a high flow grade, flame retardant material to a UL94 V-0 standard. This material shall be used for the case body and the wall mounting plate and shall be an ABS plastic. The "finger mask" that surrounds the fingerprint sensor itself shall be a carbon fiber conductive plastic.

3. **Fingerprint Sensor**

The Biometric Reader shall incorporate the Authentec, Inc. sensor model AF-S2. The AF-S2 sensor shall be manufactured of silicon and shall be capacitive-based. The sensor surface area shall measure 24 x 24 x 3.5 mm. The sensor shall additionally incorporate Authentec's TruePrint technology, which utilizes a patented radio frequency (RF) imaging technique that allows the sensor to generate an image of the shape of the live layer of skin that is buried beneath the surface of the finger.
4. **Color**

The Biometric Reader case shall have a charcoal gray body (ABS Gray – Pantone 426C).
5. **Weight**

The Biometric Reader shall not weigh more than fifteen (15) ounces.
6. **Mounting**
  - a. The wall mounting plate shall be designed to mount to a single gang electrical box using four (4) #6-32 screws in the centerline holes, or to mount directly into a door mullion, wall anchor, wood or sheet metal using #4 flat head screws (thread diameter of less than 0.125 inch and a head diameter of less than 0.250 inch) in the 4 outer holes.
  - b. The access hole in the wall for wiring should be less than 4.5 inches wide so that the wall plate will cover it. It should also be less than 2.5 inches tall if mounting onto dry wall so that there is enough material to hold the anchor. The recommended size is 3.5 inches x 2.5 inches to match the opening in the wall mounting plate.
  - c. The two Biometric Reader modules (fingerprint verification and smart card interface) must be connected behind the wall plate. Once the cables are connected, the wall plate may be mounted to the wall.
  - d. The Biometric Reader body case shall have two tabs that slide into slots on the wall plate. The body shall be secured to the wall plate by a single #4-40 inch screw.
  - e. The two Biometric Reader modules (fingerprint verification and smart card interface) must be connected behind the wall plate. Once the cables are connected, the wall plate may be mounted to the wall. The modules shall have two tabs that slide into slots on the wall plate. Each module shall be secured to the wall plate by a single #4-40 inch screw.
7. **Mounting Position**
  - a. The Biometric Reader should be mounted on the wall or structure to be in compliance with all American Disabilities Act (ADA), local and federal laws as they apply to the installation. The reader should also be mounted at a height that is comfortable to use. In general, the reader should be mounted such that the height of the sensor (top of the device) is between 48 and 54 inches from the ground. Should the reader be installed below this mounting height (i.e., on a turnstile), installation of a wedge piece shall be required between the mounting surface and the Biometric Reader wall mounting plate.
  - b. Furthermore, the reader shall require free space above the reader such that the user has room to place their finger on the sensor. Roughly, 2-3 inches (or

- more) of free space is recommended depending on if there is any obstruction interfering with the view of the Biometric Reader. The reader shall also be provided with free space (roughly 3-4 inches recommended) below the device for convenient access to the bottom RJ11 RS-232 port.
- c. If connecting an external card reader to the Biometric Reader for enrollment purposes, the two devices should be placed in close proximity to one another to make it simple for the enrollment administrator to first present the card at the external card reader and then prompt the user to place their finger on the sensor for enrollment.
8. Environmental Specifications  
The Biometric Reader shall be manufactured for indoor use, and if placed outdoors must be installed within a complete manufacturer's certified enclosure to protect the reader against direct contact with the elements, including rain, sun, snow, or excessive moisture. Failure to place Biometric Reader readers installed outdoors within such an enclosure will void the warranty.
  9. Reader Enclosure  
The manufacturer's certified enclosure shall be required for outdoor installations and shall optionally include a heater that shall trigger on when temperatures reach below 24 degrees C (75° F). For further information on the manufacturer's certified enclosure, including power requirements and schematics.
  10. Temperature  
The electronics and mechanical parts that make up the Biometric Reader shall be rated to operate in a temperature range of 0 degree C to 60 degrees C (32° F to 140° F). However, the extremes of this temperature range will not be a comfortable operating range for users of the system. The temperature range for the environment in which the reader will be installed should be limited to 10 degrees C to 50 degrees C (50° F to 120° F). Additionally, the reader should not be placed in direct sunlight or in uncontrolled environments (indoors or out).
  11. Humidity  
The Biometric Reader shall be rated to operate within a humidity range of 0% to 95% non-condensing.
  12. Vibration  
The environment in which the Biometric Reader shall be installed should not subject the reader to vibration.
  13. Electrical Specifications  
All electrical devices shall be U.L. listed.
  14. Pigtail Connections  
The Biometric Reader shall include a 15-pin DB15M connector for external connections to power and other devices. A 15-conductor color-coded pigtail cable shall be provided with each Biometric Reader to facilitate connecting the reader to other wiring.
  15. Power Requirements
    - a. The Biometric Reader shall operate on DC power between 9 and 24 volts, however, operation at 12 VDC is recommended. The Biometric Reader shall consume approximately a maximum of 5 watts of power (At 12 VDC the

- device shall have an inrush current of 1 amp for 10mS and shall require continuous current up to 400 mA during operation).
- b. The Biometric Reader shall require an isolated power supply (not provided with reader). This power supply may be optionally purchased from The manufacturer. The power supply should be:
    - Isolated from other equipment including card reader power, lock power, Access Control System power and other interference-causing or non-manufacturer approved electro-mechanical devices (i.e., power supply should be dedicated to the Biometric Reader(s)).
    - Regulated and filtered.
    - Protected by means of an uninterruptible power supply (UPS) or battery backup.
    - A UL-Listed Class II power supply at 12 VDC, 500 mA continuous.
  - c. Additionally, the power supply should NOT be connected to any device that may put transients on the power supply line or cause the power supply to behave improperly. If transients are an issue in the installation, a transient voltage suppression device is also recommended.
  - d. If power is to be distributed to various Biometric Reader readers over some distance, then it is important to take into consideration the resistance of the cable used for power distribution. Since the reader shall require significant power levels, the cable should be of appropriate gauge (18AWG or better is recommended).

#### 16. Grounding

The Biometric Reader shall have various grounding requirements:

- a. Power GND: the return for the input power supply. Power GND shall be connected to the negative on the power supply.
- b. Wiegand GND: the reference ground for the Wiegand Data 0 and Data 1 interface. Wiegand GND shall be connected to the reader GND terminal of the Access Control System.
- c. Signal GND: the reference for serial communications. Signal GND shall be connected to the GND on the serial port or RS-485/RS-232 converter (dependent on communications protocol selected).
- d. Safety GND: protects the Biometric Reader (sensor and internal electronics) from electro-static discharge (ESD) by providing a safe discharge path to an earth ground.

#### 17. Communications

- a. The Biometric Reader shall include support for RS-232 and RS-485 serial communications. This is primarily intended for use with a PC running the Administration software, which allows for template management (enrollments, deletions, editions, distribution) and reader configuration. If RS-232 and RS-485 communications are desired for use with an application other than the software provided with the hardware, the hardware manufacturer's software development kit (SDK) shall be required to integrate Biometric Reader support into a custom application.
- b. The Biometric Reader shall provide three serial communications ports:
  - RS-485 accessible through the pigtail (DB15)
  - RS-232 accessible through the pigtail (DB15)
  - RS-232 accessible through the bottom RJ11 port

- c. Only two of the three ports may be activated at a time. By default, the Biometric Reader shall be configured for Port Mode 1 (Host RS-485 DB15 / Aux RS-232 RJ11), which activates the RS-485 port accessible from the pigtail and the RS-232 port accessible from the bottom RJ11 port.
18. RS-485 DB15 Port
  - a. The Biometric Reader shall support RS-485 serial communications protocol accessible from the DB15 port. The Biometric Reader shall require configuration by means of an active port (RS-232 RJ11 since RS-232 DB15 is dedicated to connection to smart card interface module) to activate the RS-485 DB15 port. To activate the RS-485 DB15 port, a Port Mode of 2 (Host RS-232 DB15 / Aux RS-485 DB15) must be selected. Note that if Port Mode 2 is selected, the bottom RJ11 RS-232 port will be de-activated.
  - b. For RS-485 protocol support, an external converter must be utilized. The converter shall be tested and qualified by the manufacturer such as the B&B Electronics 485TBLED RS-485/RS-232 converter for use with the Biometric Reader (must be purchased separately). The B&B Electronics converter connects directly to both the Host PC and to the Biometric Reader. This converter shall support “sense data,” also referred to as “send data”. This is necessary since the Biometric Reader shall utilize a half-duplex (2-wire) RS-485 signal with no RTS/CTS control on the RS-232 line.
  - c. The RS-485 communications protocol should be chosen if a network of more than one Biometric Reader is being installed or if a single reader is being installed more than 150 feet from the PC or other host. The maximum cable distance for a RS-485 network is 4,000 feet (1200 meters), over which no more than 31 Biometric Reader readers can be added. The Biometric Reader readers must be connected as follows:
    - Use Category 5 rated cable (shielded is recommended). This cable should be dedicated to the RS-485 network connection between the RS-485 converter and the Biometric reader readers and should not be used for any other purpose.
    - The converter shall require 12VDC/100mA power from an external supply.
    - Connect the converter to the PC’s DB9 COM Port using a DB25-to-DB9 cable.
    - Connect the Biometric Reader readers in a daisy-chain configuration (i.e. Converter → Reader 1 → Reader 2 → Reader 3, etc.). Do NOT use a star or other multi-drop configurations.
19. RS-232 DB15 Port

The RS-232 DB15 port shall be dedicated to communications between the fingerprint verification module and smart card interface module of the Biometric Reader and therefore, shall not be available for PC communications.
20. RS-232 RJ11 Port
  - a. The Biometric Reader shall provide a RS-232 RJ11 port on the bottom of the device for convenient access. This shall be the default configuration for the reader. This RJ11 port is implemented as a 6p6c (6-position, 6-conductor) jack. This port shall be physically protected by means of a pin-in-hex security screw. Additional security shall be provided through a password

- protection feature, which may be activated through the Administration software.
- b. Additionally, an RJ11-to-DB9 programming cable shall be provided with each Biometric Reader. This cable shall be a 6-foot, 6p6c straight-thru cable with an RJ11-to-DB9 adaptor. This cable should be used to configure the reader and may optionally be used for template management and other functions desired via a local connection.
  - c. The RS-232 protocol does not run on a differential pair of wires like the RS-485 protocol, and shall therefore be less immune to EMI and other noise sources. The tradeoff for RS-232 shall be speed versus distance. RS-232 communications distances are dependent on the baud rate (bps). For example, at 9600 baud, a distance of 150 feet is possible using shielded cable, but at 57600 baud, a maximum of 20 feet is recommended. By default, this port will be configured for 57600 baud.
  - d. To create your own RJ11-to-DB9 cable the following is required:
    - Use Category 5 rated cable (shielded is recommended). This cable should be dedicated to the RS-232 connection between the Biometric Reader and the PC or host device.
    - Use a female DB9 connector.
    - Use a 6p6c RJ11 jack.
    - Orient the jack so that the 6 gold pins are facing upward and the jack (or clip) is facing the user. Pin 1 would be on the far left and Pin 6 would be on the far right.
    - Connect the RJ11 Pin 1 (RS-232 Tx) to the DB9 Pin 2.
    - Connect the RJ11 Pin 2 (RS-232 Rx) to the DB9 Pin 3.
    - Connect the RJ11 Pin 5 (Signal GND) to the DB9 Pin 5.

## 21. Connections to External Equipment

- a. Power  
The Biometric Reader shall require an isolated power supply (not provided with reader). This power supply may be optionally purchased from The manufacturer. Two conductors shall be required for this connection. Since the reader requires significant power levels, the cable should be of appropriate gauge (18 AWG or better is required).
- b. Earth Ground  
The Biometric Reader shall require a homerun connection to Earth Ground. This connection shall help to protect the Biometric Reader (sensor and internal electronics) from electro-static discharge (ESD) by providing a safe discharge path to an earth ground. The reader must be connected to a proper earth ground such as a cold-water copper pipe or building ground. The connection chosen for Earth Ground should measure less than 4 ohms resistance when measured against a known local Earth Ground. **DO NOT CONNECT THE GROUND PIN TO POWER GROUND.** At a minimum, this connection should be made with a low-resistance, single-conductor cable (14 – 18 AWG is recommended). Internally, GND Pin is connected to the finger mask (conductive plastic surrounding the fingerprint sensor) and should be used in conjunction with the Ridge-Lock.
- c. External Wiegand Reader

1. The Biometric Reader shall include an embedded Gemplus ICLASS contactless smart card reader. The Biometric Reader shall NOT have the ability to read proximity Wiegand sequences directly. The reader by default shall generate a Wiegand output sequence based on the fingerprint template ID number. If using dual-technology contactless smart cards (such as Gemplus ICLASS Prox cards), the designated Biometric Reader enrollment station may optionally capture the Wiegand sequence as provided by the proximity portion of the card by means of an external proximity card reader. Once captured, the sequence may be written to the smart card along with the enrolled fingerprint template where the two items are linked together. When the dual-technology cards are used in this fashion, Biometric Reader readers used for access control shall simply send the Wiegand sequence from the smart card to the Access Control System. In this case, the Wiegand output sent by Biometric Reader shall be identical to the Wiegand output sent by the proximity card reader when the same card is presented to both devices. Any Biometric Reader readers used for access control shall NOT require the connection to the external card reader.
  2. To enroll cards in this manner, a direct connection shall be required from the proximity card reader to the Wiegand input lines of the Biometric Reader that has been designated as the enrollment station using the following three conductors:
    - Wiegand In Data 0 (Pin 2) connected to the card reader Data 0
    - Wiegand In Data 1 (Pin 4) connected to the card reader Data 1
    - Wiegand GND (Pin 6) connected to the card reader Power GND\*
  3. An 18 – 22 AWG cable should be used for this connection. The Biometric Reader by default shall have the Wiegand input activated for Standard 26-bit Wiegand format. The reader shall support other formats. Refer to Appendix B: Wiegand Protocol for further information
- d. Access Control System
1. The Biometric Reader shall support Wiegand protocol output for connection to an Access Control System (ACS). This system may provide advanced access control features such as audit trails, user-defined access scheduling, anti-passback, etc.
  2. An 18 – 22 AWG cable should be used for this connection. At 18 AWG, a distance of 500 feet is possible. For Wiegand output the Biometric Reader shall require a homerun connection to the ACS using three conductors:
    - Wiegand Out Data 0 connected to ACS Data 0
    - Wiegand Out Data 1 connected to ACS Data 1
    - Wiegand GND connected to ACS reader power GND
  4. The Biometric Reader shall by default have the Wiegand output activated for Standard 26-bit Wiegand format. The reader shall support other formats.
- e. Line Trigger

The Biometric Reader shall include a Line Trigger, a low-level signal that is triggered following a successful verification. By default, this line shall be inactive and must manually be activated through use of the Administration management software provided with the reader. When the Line Trigger is activated, the user must also specify the duration (in seconds) the trigger should be set high. This source output is an open-drain drive capable of 50 mA with a maximum voltage drop of 1 VDC from a 5 VDC source. This drop is load-dependent.

- f. PC or other Host Device
  1. The Biometric Reader shall support RS-232 and RS-485 serial communications protocols for connection to a PC or other host device. Each Biometric Reader shall include a Administration software CD. This software allows for reader configuration and template management. If connecting to a PC, it should have the following characteristics:
    - Operating System: Windows 98, ME, NT4.0, 2000, or XP (not compatible with Windows 95)
    - 486-compatible
    - 16 MB RAM
    - 30 MB Disk space
    - DB9 Serial communications port (do not support USB ports)
  2. Although the Biometric Reader does not have built-in Ethernet support, it may be connected to a Lantronix UDS-10 Serial Device Server for this purpose.

22. Operation

The Biometric Reader shall be designed to integrate easily into most access control systems. To function, a fingerprint must be enrolled and stored on an ICLASS contactless smart card and this can be done through the Administration software included with the reader. Once a fingerprint is enrolled, authentication may be performed any number of times. After authentication, the Biometric Reader shall send a Wiegand string to the Access Control System or other host equipment for appropriate action.

23. Fingerprint Template Capacity

The Biometric Reader shall support an unlimited number of users since the fingerprint template file is stored on the smart card itself rather than on the Biometric Reader reader's internal memory. A maximum of two fingerprint templates may be stored per contactless smart card.

24. Supported Cards

The Biometric Reader shall support the following ICLASS contactless smart cards:

- HID Corp. iCLASS 16kbits (2kBytes) 2-Application Area cards
- HID Corp. iCLASS 16kbits (2kBytes) 16-Application Area cards
- Honeywell Access Systems 16kbits (2kBytes) OmniSmart cards

25. Reader Memory

The Biometric Reader shall utilize non-volatile flash memory to store all templates and data configurations and shall therefore not lose any templates or configuration information if the reader is powered down.

26. SiteKey
  - a. The SiteKey shall be a password used by the Biometric Reader, the smart cards, and the Administration software to communicate and transfer information. If the SiteKey stored in the Biometric Reader does not match the SiteKey stored in the smart card, the Biometric Reader will be unable to read or write to the card. This key shall ensure that only authorized smart cards are used at a specific installation. Additionally, the SiteKey shall act as the administrator password so that only authorized personnel may perform read/write functions on the Biometric Reader, such as enrollments, deletions, and Biometric Reader security configuration.
  - b. By default, each Biometric Reader shall contain an empty-string for the SiteKey that should be configured prior to enrollment. Each installation must set their own SiteKey to distinguish their Biometric Reader contactless smart cards from every other Biometric Reader installation. The SiteKey shall be stored within the internal memory of the Biometric Reader and shall be encrypted and stored on the smart card itself. For security purposes, the SiteKey shall not be stored within the Administration software or PC, and may NOT be retrieved by the Biometric Reader.
27. User Interface

The Biometric Reader shall have a common user interface. A green LED on the front of the reader shall indicate that power is on. A bi-color LED on the top of the reader shall display green, red, or amber (green and red together). The top LED may display in an off or solid state. The color and state of the top LED may also be customized through the use of the Administration software. By default, the color and state of the top LED shall have particular meanings to indicate system status.
28. Fingerprint Placement: Lock, Drop & Hold
  - a. A Ridge-Lock shall be provided as part of the fingerprint sensor mask as a fingerprint placement guide and a means to discharge ESD. To properly place the finger on the sensor, the user should slide their finger across this Ridge-Lock, parallel to the sensor. Once the Ridge-Lock locks into place under the first joint, the user should then lower the finger evenly onto the sensor and apply moderate pressure. The user should hold the finger on the sensor until the top LED turns off and returns a green LED.
  - b. The Ridge-Lock shall be designed as a guide to help the user to properly and consistently position their finger on the sensor so as to fully capture the fingerprint core, the unique information-rich area of the fingerprint. When used properly during enrollment and identification, the Ridge-Lock shall help to reduce false rejections and false acceptances.
  - c. As the end user's first point of contact with the reader, the Ridge-Lock shall also be designed as means of discharging ESD through the Earth Ground connection, which is manufactured using a carbon fiber conductive plastic. This shall help to protect the sensor from damage by ESD. This requires that the reader have a proper connection to Earth Ground.
29. Enrollment
  - a. Enrollment is the process of adding users to the fingerprint reader system. The Biometric Reader shall incorporate a one-touch enrollment process.

- Enrollment shall be initiated at a PC running the Administration software and may not be performed directly at the reader without the use of the software. The Enrollment PC should be located in close proximity to a Biometric Reader. When initiated, the template that is created through the enrollment process may be stored either on the PC or the smart card itself. When saved to the PC, the fingerprint template shall not be usable on the Biometric Reader for authentication until the template is transferred to the smart card.
- b. When enrollment is initiated, the reader shall display a solid amber LED to indicate to the user to place a finger on the sensor. When the fingerprint is captured, the LED shall turn off. Once the processing is completed, the LED shall turn red or green depending on the result. The reader shall also produce an audible tone when enrollment is successful.
  - c. The software shall provide feedback regarding the image capture which allows the enrollment administrator to validate that the fingerprint core was fully captured and properly centered in the field of view. Additionally, quality and content scores will be returned rating the enrollment; however, the image capture should act as the ultimate deciding factor in accepting the enrollment.
  - d. A Wiegand sequence may optionally be written to the smart card at the time of enrollment. This sequence shall be linked to the fingerprint template and shall be released to the access control panel upon successful authentication. This sequence is not required as the Biometric Reader may generate a Wiegand output based on the template ID number.
  - e. When a template is stored on the smart card after enrollment is complete, the template shall reside on the smart card until deleted, and the user shall be able to authenticate on this particular reader as long as the template is resident on the card and the SiteKey is identical between the Biometric Reader and the smart card.
  - f. During the enrollment process, the Biometric Reader shall not be available for access control functions. This, however, shall not affect other readers on the network (if a network is in place). An additional reader may be designated for use as an Enrollment Station if shown on the drawings.
30. **Fingerprint Template Format**  
During the enrollment process, the Biometric Reader shall create a fingerprint template approximately 348 bytes and shall be compatible with other biometric devices by the same manufacturer. This template size shall be smaller than the identification templates and may not be converted to verification templates for use on searching devices.
31. **Template Distribution**  
The Biometric Reader shall utilize a portable database - the fingerprint templates are stored on the smart card itself rather than on the Biometric Reader reader's internal memory. Thus, template distribution shall not be necessary.
32. **Authentication**  
Authentication is the process of providing the Biometric Reader with an ID number representing one or more templates stored on the reader, presenting a candidate fingerprint to the sensor, and getting a result of pass, fail, or invalid ID.

The Biometric Reader shall be based on a digital signal processor (DSP) that utilizes a fingerprint sensor to capture an image of the presented finger. The authentication process on the Biometric Reader is as follows:

- a. The user presents a proximity card to the belly of the smart card interface module of the Biometric Reader.
- b. The Biometric Reader shall return an amber LED to indicate that the SiteKey and template data were successfully passed from the smart card to the reader and stored in a buffer. If the data was not successfully passed, or an invalid SiteKey was stored on the card, the Biometric Reader shall instead return a flashing red LED to indicate failure.
- c. The user will present their finger to the sensor
- d. The Biometric Reader sensor shall capture the fingerprint
- e. The Biometric Reader DSP shall perform a one-to-one verification between the captured image and the stored template.
- f. The Biometric Reader shall return a red or green LED indicating failure or pass.
- g. On a pass, the Biometric Reader shall perform one of the following actions:
  - Generate and release a Wiegand sequence to the Access Control System based on the template ID number and a pre-configured site code (the default action)
  - Release the Wiegand sequence from buffer to an Access Control System (if a Wiegand sequence was provided and stored during the enrollment process).
  - Activate the Line Trigger (depending on the reader's configuration).

Due to the nature of the 1:1 (one-to-one) algorithm utilized by the Biometric Reader, the smart card input shall be required in order to initiate the biometric authentication.

### 33. Granting Access

- a. When used in conjunction with an Access Control System (ACS), physical access shall not be granted by the Biometric Reader directly. The Biometric Reader shall simply send a Wiegand data signal to the ACS. That system is responsible for logging and making the decision to release door locks, etc.
- b. When the Line Trigger feature is used, any user fingerprint template stored on the Biometric Reader shall have the ability to perform a biometric identification and access the Biometric Reader. The Biometric Reader itself does not support advanced access control features (such as audit trails, user-defined access scheduling, anti-passback, request to exit buttons, etc.). For these features, an ACS shall be required.

### 34. Biometric Authentication

By default, the Biometric Reader shall require that users present a candidate fingerprint for authentication. However, biometric authentication may be globally disabled on the Biometric Reader. In this mode, the reader shall act simply as a proximity card reader and output a Wiegand string after a valid Card ID has been presented.

### 35. Performance Terminology

- a. Biometric systems typically state performance in terms of False Rejection Rates (FRR) and False Acceptance Rates (FAR).

- b. The FRR is the expected rate at which the system would incorrectly reject (fail) the correct fingerprint.
- c. The FAR is the expected rate at which the system would incorrectly accept (pass) the wrong fingerprint.

36. Authentication Algorithm

- a. The authentication algorithm allows for two different performance-tuning parameters: Global Security Threshold and individual Template Security Threshold. The Biometric Reader shall use the lower of either the Global Security or individual Template Security Threshold when performing the authentication.
- b. The Biometric Reader by default shall be configured to a Medium Global and Template Security Threshold. This threshold level is referred to as the Equal Error Rate (EER) or the point at which the FRR is equal to the FAR. The EER for the Biometric Reader shall be 1/1000.

B. Biometric Reader Software

- 1. Each Biometric Reader shall include a CD-ROM containing the Administration software. The software shall support Windows 98, Windows NT4.0, Windows ME, Windows 2000, and Windows XP.
- 2. The Administration Software may be used to perform the following functions:
  - a. Manage a network of Biometric Reader readers
  - b. Enroll new user fingerprint templates
  - c. Edit existing user fingerprint templates
  - d. Delete user fingerprint templates
  - e. Distribute the user templates from the Biometric Reader or PC to other biometric readers in the installation
  - f. Create Command Cards – proximity cards with the privilege to enroll or delete other user cards locally at the reader (without necessity of software)
  - g. Adjust the parameters (communications, biometrics, Wiegand, line trigger, etc.) of an individual reader or all readers connected on a network
  - h. Configure the operation of the Biometric Reader top LED
  - i. Perform firmware updates
- 3. Duress Signals  
The Biometric Reader ICLASS reader shall support a Duress Finger Mode which offers users a way to indicate a duress situation (such as being forced to open a door) by authenticating with a specially designated “duress finger”. An individual fingerprint template may be specified as such by selecting the “Make Duress Finger” option during enrollment. One ID number or card may be used for both duress and non-duress templates by assigning unique index numbers. When a successful authentication occurs with such a template, the reader shall send the Wiegand sequence to the access control panel in reverse bit order. The Access Control System shall then respond with the appropriate action (alerting security personnel, sounding alarms, etc.). To fully support this feature, the access control panel must also support reverse-bit Wiegand sequence duress signals.

C. ICLASS Class Smart Cards

- 1. HID model ICLASS class Smart Cards

D. Power Supply

1. xxxxxxxxxx model xxxxxxx Power Supply to Biometric Reader

E. Wiring

1. Two twisted pairs of stranded 22AWG wires with an overall shield for biometric reader to remote work station
2. Six stranded conductors of 22AWG wires with an overall shield for biometric reader to Wiegand input reader
3. One pair of 18AWG or better parallel conductors to the power supply
4. One 16AWG conductor or better to earth ground

PART 3 EXECUTION

3.01 ACCEPTABLE INSTALLERS

- a. The system shall only be provided by Contractors who are factory authorized to install, service and maintain the system by the access control manufacturer.
- b. The Contractor must have been a factory authorized dealer with the proposed manufacturer for a period of at least **two (2)** years before the Bid Opening Date.
- c. The Contractor's installers and technicians shall also be factory trained and certified to perform such tasks.

3.02 EXAMINATION

- A. The Contractor shall be required to visit the installation site prior to bidding the job.
- B. The Contractor shall report any discrepancies between the Specifications, Drawings, and Site Examination prior to the Bid Opening Date.

3.03 PREPARATION

- A. The Contractor shall order all required parts and equipment upon notification of award of the Work.
- B. The Contractor shall bench test all equipment prior to delivery to the job site.
- C. The Contractor shall verify the availability of power where required. If a new source of power is required, a licensed electrician shall be used to install it.
- D. The Contractor shall arrange for obtaining all programming information including access times, free access times, door groups, operator levels, etc.

3.04 INSTALLATION

- A. The Contractor shall coordinate with the [CLIENT]'s IT Department if connecting to their network.
- B. The Contractor shall carefully follow the instructions in the manufacturers' Installation Manual to insure all steps have been taken to provide a reliable, easy to operate system.

- C. The Administrator Terminal shall be connected to the remote terminals before connecting to any card reader processors.
- D. The Contractor shall coordinate with the [CLIENT]'s locksmith if converting from mechanical to electric locks.
- E. Perform all Work as indicated in the Drawings and Specifications.
- F. The Contractor shall install the appropriate cable from the CPU to readers, door contacts, request-to-exit devices, and electric locks at each door and/or gate.
- G. All communications cables shall be kept away from power circuits.
- H. The Contractor shall install the power supply(s) for electric locks in locations where they won't interfere with other operations.
- I. The Contractor shall also execute adequate testing of the system to insure proper operation.
- J. The Contractor shall provide adequate training of the system users to insure adequate understanding to prevent operating errors.

### 3.05 WORKMANSHIP

- A. Comply with highest industry standards, except when specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform Work with persons experienced and qualified to produce workmanship specified.
- C. Maintain quality control over suppliers and Subcontractors.
- D. Quality of workmanship is considered important. [CLIENT] Project Manager will have the authority to reject Work which does not conform to the Drawings and Specifications.

### 3.06 EQUIPMENT PRE-TEST

All equipment shall be bench tested prior to delivery to job site and prior to installation. Bench test per manufacturer's installation instructions.

### 3.07 WIRE AND CABLE

- A. Design, layout, size, and plan new wire and cable runs as required.
- B. All wire and cable from the processors to all devices at each door shall be "home-run" unless otherwise specified.
- C. All wire and cable, including any wire and cable that is existing and will be reused in the Work, shall be installed in conduit or surface metal raceway, except as follows:
- D. Wire or cable, in lengths of less than ten (10) feet, that is "fished" within walls, ceilings, and door frames.
- E. All wire and cable passing thru metalwork shall be sleeved by an approved grommet or bushing.
- F. Avoid splicing conductors. All splices shall be made in junction boxes (except at equipment). Splices shall be made with an approved crimp connection. Wire nuts shall not be used on any low-voltage wiring.

- G. Identify all wire and cable at terminations and at every junction box. Identification shall be made with an approved permanent label, Brady or equal.

### 3.08 WIRE AND CABLE TERMINATIONS

- A. Identify all inputs and outputs on terminal strips with permanent marking labels.
- B. Neatly dress and tie all wiring. The length of conductors within enclosures shall be sufficient to neatly train the conductor to the terminal point with no excess. Run all wire and cable parallel or normal to walls, floors and ground.
- C. Install connectors as required by equipment manufacturers.
- D. Terminations shall be made so that there is no bare conductor at the terminal. The conductor insulation shall bear against the terminal or connector shoulder.
- E. Do not obstruct equipment controls or indicators with wire or cable. Route wire and cable away from heat producing components such as resistors, regulators, and the like.

### 3.09 CONDUIT AND RACEWAY INSTALLATION

- A. Design, lay-out, size and plan new conduit and raceway systems as required.
- B. Indoor Requirements:
  - 1. Route exposed conduit and raceway parallel and perpendicular to walls and adjacent piping.
  - 2. Maintain minimum six (6) inch clearance between conduit and piping.
  - 3. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps.
  - 4. Use conduit bodies to make sharp changes in direction, as around beams. Fasten conduits and raceways to structural steel using approved spring clips or clamps.
  - 5. Where conduit penetrates fire-rated walls and floors, seal opening with UL listed fire rated sealer or other methods as approved by codes.
  - 6. No exposed conduit, raceway, or junction box shall be installed within any office area.
  - 7. Install all boxes straight and plumb.
  - 8. Do not support conduit from mechanical, plumbing, or fire sprinkler systems.
  - 9. Drill or core drill all holes in walls, ceilings, or floors where required for new conduits. Do not cause damage to any structural steel or other structural support member by drilling or cutting.
  - 10. Do not use flexible conduit in lengths longer than six (6) feet.
- C. Outdoor Requirements:
  - 1. Where conduit penetrates exterior walls, seal opening around conduit in an approved manner to make watertight.
  - 2. Use galvanized straps and fasteners on all exterior conduit.
  - 3. All exterior boxes will only be used to aid in pulling the cable between points.

### 3.10 PENETRATIONS

- A. Do not penetrate any roof, flashing, exterior wall, or parapet without prior approval from [CLIENT]'s designated Construction Project representative.
- B. When penetrating a fire wall for passage of cables and/or conduit, always provide a fire-stop system that complies with code and the local authority having jurisdiction.

### 3.11 FIRE RATED DOORS AND FRAMES

Do nothing to modify a UL. rated door or frame that would void the UL. label or fire rating.

### 3.12 GROUNDING

Provide earth-grounding of equipment as required by equipment manufacturer. Earth ground shall be connected to ground rod or approved cold water pipe. Electrical or telephone ground connections shall not be used as earth grounds. Connections to mounting posts or building structural steel shall not be used as earth grounds.

### 3.13 POWER TO SECURITY EQUIPMENT

- A. Power all equipment from 120 VAC circuit dedicated for security use, except as noted. Mark all panel circuit breakers with labels worded "Security Equipment - Do Not Operate", or equivalent.
- B. All plug-in transformers shall be located at the security control panels. Secure all low-voltage plug-in transformers to outlet with screw or strap. Clearly label all transformers to identify purpose and use.

### 3.14 CUTTING AND PATCHING

The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work.

### 3.15 PAINTING

Not Applicable.

Or

All surface raceway systems shall be painted to match the surfaces they are attached to.

### 3.16 PLYWOOD BACKING

- A. Install the processor(s), power supplies, and all other related equipment on a plywood backboard for testing in the shop. The mounted assembly will then be transported "as is" to the job site for mounting in the Communication Room.
- B. Fasten the plywood backing to the wall using a hanger bolt at the four corners which align with pre-drilled holes in the plywood. Secure with flat washers and a nut.

### 3.17 FIELD QUALITY CONTROL

- A. Upon reaching Substantial Completion, perform a complete test and inspection of the system. If found to be installed and operating properly, notify [Client] of your readiness to perform the formal Test & Inspection of the complete system.

- B. Submit the Record Drawings (as-builts) to [Client] for review prior to inspection.
- C. During the formal Test & Inspection (Commissioning) of the system, have personnel available with tools and equipment to remove devices from their mounts to inspect wiring connections. Provide wiring diagrams and labeling charts to properly identify all wiring.
- D. If corrections are needed, the Contractor will be provided with a Punch-List of all discrepancies. Perform the needed corrections in a timely fashion.
- E. Notify [Client] when ready to perform a re-inspection of the installation.

### 3.18 INITIAL PROGRAMMING AND CONFIGURATION

- A. Contractor shall provide initial programming and configuration of the security management system. Programming shall include defining hardware, doors, monitor points, clearance codes, time codes, door groups, alarm groups, operating sequences, camera call-ups, and the like. Input of all program data shall be by Contractor. Contractor shall consult with Security Consultant and Owner to determine operating parameters.
- B. Contractor shall develop and input system graphics, such as maps and standby screens. Owner shall provide floor plan drawings as the basis for the creation of maps. Development of maps shall include the creation of icons for all doors, monitor points, and tamper circuits. Owner shall provide floor plan drawings, in the form of AutoCad .DWG or .DXF files, as the basis for the creation of maps.
- C. Owner, with the cooperation and assistance of Contractor, will input the cardholder data for each access card.
- D. Contractor shall maintain hard copy worksheets which fully document the system program and configuration. Worksheets shall be kept up to date on a daily basis by Contractor until final Acceptance by Owner. Worksheets shall be subject to inspection and approval by Owner. Provide final copies to Owner prior to Project Close-out.
- E. Contractor shall maintain a complete, up-to-date magnetic tape backup of the system configuration and cardholder database. Backup shall be maintained throughout programming period until final Acceptance by Owner. Submit back-up tapes to Owner upon Final Acceptance.
- F. Approximately sixty (60) days after start-up of system, Contractor shall return to project to provide follow-up assistance with system configuration as requested by Owner. Contractor shall include an allowance of forty (40) hours of labor for follow-up assistance in his Base Bid price.

### 3.19 TRAINING

- A. Contractor shall provide complete operator training on the Administer Software System. Training shall consist of **two (2)** hours of classroom instruction for the people selected by Owner, plus **one (1)** hour of individual hands-on training for people selected by Owner. Hands-on training shall include the opportunity for each person to operate the system, and to practice each operation that an operator would be expected to perform.

- B. Training shall cover all operating features of the system, including the following:
  - 1. System set-up and template database configuration.
  - 2. Access control features.
  - 3. Alarm monitoring features.
  - 4. Report generation and searches.
  - 5. Template management.
  - 6. Backup procedures
  - 7. Routine maintenance and adjustment procedures.
- C. Training sessions are to be held at Owner's facility, and are to be scheduled at the convenience of Owner. Contractor shall provide written training outline and agenda for each training session prior to scheduling.
- E. Contractor shall provide **five (5)** copies of written training materials.

END OF SECTION