

Basis of Design

The section applies to the design, rough-in, and installation of an "access control" system for building entrances/exits and for specified access control zones within a building. Campus Automated Access Management System (CAAMS) is not a building "security" system.

Background

CAAMS is a standardized system for gaining access to University facilities using an access card rather than a brass key. This section establishes guidelines for the design and installation of CAAMS in all new buildings and major remodel projects.

Primary functions of CAAMS are:

- Tailor access privileges for each building user
- Cancel access privileges in case of a lost or stolen access card
- Monitor and document building access activities
- Lock and unlock doors

The University CAAMS Manager will work with clients, project managers, and shops to establish scope for all capital improvements and facilities alterations.

Additional services of a CAAMS consultant may be obtained directly by the University for the purposes of assisting with design and construction reviews.

Programming

CAAMS is used to control access at all exterior (zone) doors and at certain interior access control zones, such as computer labs, office suites, audio/visual equipment rooms, and other zones with specific access concerns. To facilitate CAAMS, certain programming issues need consideration during design. These include:

- Physical separation between public/non-public areas
- Physical separation between different departments/operating units in the same building
- Access to the public after hours
- Conflicts between access control and life safety, i.e., egress, latching of fire doors.
- Conflicts between access control and ADA accessibility

At a minimum, all exterior zone openings (doors) shall receive rough-in for CAAMS installation based on requirements determined during project Programming and Schematic phases.

University vendors furnish and install some CAAMS equipment and wiring. Other equipment shall be by Contractor. The status of this equipment shall be determined during program conferencing.

Design Criteria

CAAMS equipment consists of the following items:

- CAAMS Micro control panels
 - 1) Each micro control panel can service up to 8 card reader doors.
 - 2) Design to 75% capacity to allow for future expansion.

- Access cards
- Card readers
- Local door items (see door functions below and drawings a, b, & c)
- Conduit and raceway systems
- Equipment backboards (see drawing "d")
- Power booster
- Support pedestals for card reader may be required at some doors.

Other related equipment

- CAAMS central computer
- Central monitoring terminal
- Central programming terminal
- Building administrator's PC

Door access control is defined by function. The four major functions of access controlled doors and the devices required are the following:

- Card reader door
 - 1) Magnetic swipe or proximity card reader
 - 2) Door contact
 - 3) REX (request to exit motion detector)
 - 4) Sounder
 - 5) Electric lock or electric exit device
 - 6) Power transfer hinge
- Auto lock door
 - 1) Door contact
 - 2) REX (request to exit motion detector)
 - 3) Sounder
 - 4) Electric lock or electric exit device
 - 5) Power transfer hinge
- Exit-only door
 - 1) Door contact
 - 2) REX (request to exit motion detector)
 - 3) Sounder
- Emergency exit-only door
 - 1) Door contact
 - 2) Sounder or horn

These door functions may be applied to single doors and pairs of doors, with or without center dividing mullions. See drawings at end of section:

- Typical Card Reader Controlled Single Door
- Handicap Exit Device Card Reader Controlled Double Door
- Typical Exit Device Card Reader Controlled Double Door
- Typical Equipment Arrangement

Space Requirements

There shall be at least one dedicated closet for the location CAAMS related equipment. In multi-story buildings where CAAMS equipment is located above grade, there shall be a closet on each floor where CAAMS controlled doors are located. Each closet shall have a minimum dimension from the panel board(s) of 3' 0" clear. This closet shall contain the following for each Micro Control Panel needed.

- CAAMS Micro Control Panel(s) and associated equipment
- One plywood "backboard" measuring 4' 0" x 8' 0"
- Minimum of one 120V, 20A 4-plex outlet
- Minimum of one Ethernet connection port

Design Evaluation

The following information is required to evaluate the design:

- Programming Phase: Statement of intent to use CAAMS, or to rough-in only for control of access to facility and/or portions of the facility. Identify unique access zones under either scenario. Determine relationships with University CAAMS consultant(s) and vendor(s).
- Schematic Design Phase: Plan showing boundaries of access control zones. Outline specification identifying basic access control function for each zone. Locate and size CAAMS closets.
- Design Development Phase: Plan drawing showing access control zones, the location of controlled doors and other wall openings, an elevation view of doors showing locations of CAAMS equipment and other hardware. Show location of CAAMS closets and draw elevation of equipment backboard. Draft specification listing specific functions for each controlled opening (see opening "functions" above). List proposed products. Coordination with the hardware schedule. Note "points-of-connection" for power and signal. Prepare "sequence of operations" diagrams for each CAAMS function. Status Matrix.
- Contract Document Phase: In addition to the DD requirements, prepare a schedule of doors and openings receiving CAAMS, listing all related equipment. Provide diagrams of conduit and raceway systems, power supply, data circuits, and show "points of connection" between work by University forces and work by Contractor. Final specification for the system.

Construction Submittals

The following minimum submittals are required from the Contractor:

- Refer to attached guide specification Access Control System section.

Related Sections

- Facilities Services Design Guide - Interior Doors
- Facilities Services Design Guide - Exterior Doors
- Facilities Services Design Guide - Finished Hardware
- Environmental Health & Safety Design Guide - Fire Alarm System
- Facilities Services Design Guide - Elevators
- University of Washington CAAMS Manual
- UW Technology Design Guide

Products, Materials and Equipment

- The A/E shall work with University CAAMS Manager and their consultant, designing each individual building system to insure system compatibility with University CAAMS. The A/E shall design the complete system.
- Equipment furnished under this section may be by any manufacturer who is approved by CAAMS Manager prior to completion of Contract Documents. The A/E shall submit a list of proposed equipment and vendors to the CAAMS Manager for approval.
- Refer to the attached guide specification Access Control System section.

Installation, Fabrication and Construction

- Some equipment will be installed by University CAAMS vendor.
- Design must clearly show “points of connection” between University and Contractor forces.
- Refer to attached guide specification section Access Control Systems and Details 1 – 3.

END OF DESIGN GUIDE SECTION

GUIDE SPECIFICATIONS

The following guide specification is intended to be modified and included in the Contract Documents. Items to be modified should be done in consultation with the University Project Manager, Campus Engineering and CAAMS Manager.

ARCHITECTURAL - ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.01 SECTION CONTENTS

- A. Building access control system including intelligent field panels, input modules, output modules, power supplies, communications devices, and related equipment
- B. Card readers, detection devices, request-to-exit devices, and related equipment

1.02 RELATED SECTIONS

- A. Division 1 - General Provisions
- B. Division 1 – Overhead Doors
- C. Division 1 - Hardware

1.03 RELATED WORK PROVIDED IN OTHER SPECIFICATION SECTIONS

- A. Unless noted otherwise, the following work is to be provided under other specification sections:
 - 1. Electric door lock hardware
 - 2. Automatic door openers, including actuator buttons
 - 3. Door position switches on pedestrian doors
 - 4. Conduits, raceways, and electrical back boxes
 - 5. 120 VAC power wiring to power supplies

1.04 BASIC DESCRIPTION OF SYSTEM

- A. The University of Washington has an existing campus-wide access control system.
 - 1. This system is known as the “Campus Automated Access Management System” (CAAMS).
 - 2. The CAAMS system is manufactured by the Casi-Rusco company.
- B. The access control system at existing buildings shall be an extension to the existing CAAMS.
- C. The system shall consist of an “Intelligent Controller” installed at a building which is connected to existing CAAMS host computer via the University’s existing TCP/IP network.

- D. All card readers, detection devices, signaling devices, lock hardware and other such devices at building are to be wired to building's Intelligent Controller.
- E. Control and management of the building's access control system to be accomplished using one or more "operator terminals" at the building.
 - 1. Operator terminal shall be an Owner-provided personal computer which is connected to CAAMS via the University's existing TCP/IP network.

1.05 CONTRACTOR

- A. The University of Washington has an exclusive purchase agreement with a security system contractor for all work related to the CAAMS. Contractor performing the work of this section shall be the security contractor who currently has an exclusive agreement with University of Washington.
- B. Current University of Washington security systems contractor is: RFI Electronics, 19219 W. Valley Highway, Suite M103, Kent, WA 98032. Contact: Brian Lund, (206) 251-8899.

1.06 SUBMITTALS

- A. Provide submittals in accordance with Division 1.
- B. Shop drawings
 - 1. Provide shop drawings showing equipment locations and routing of cables and wiring in conduits, raceways, and cable trays.
 - 2. Shop drawings shall indicate cable types and sizes, routing, splice and connection points, equipment locations, point numbers, and equipment addresses, and other such information.
 - 3. Shop drawing floor plans shall be prepared using a standard architectural scale. Preferable scale of floor plans for shop drawings shall be $\frac{1}{8}'' = 1'$. Smallest scale allowable for shop drawings shall be $\frac{1}{16}'' = 1'$.
 - 4. Approved shop drawings shall be used as plan for system installation.
- C. Point-to-point wiring diagrams
 - 1. Provide point-to-point wiring diagrams; indicating terminal-to-terminal connections between system components, type of connections, and other information necessary to make final terminations.
 - 2. Point-to-point wiring diagrams may be included within shop drawings instead of as a separate submittal.
- D. Product data
 - 1. Provide product data submittals on all products proposed for use under this section.

1.07 FINAL ACCEPTANCE

- A. After 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 UW CAAMS Manager using an approved "Request For Security Systems Acceptance Test" form, a copy of which is provided on the following page.
 - 1. This request shall be submitted to UW CAAMS Manager no less than 21 days prior to the requested test date.
 - 2. The request for Acceptance Test shall constitute a certification from Contractor that all work is complete and in compliance with the Contract Documents, all systems have been tested, and all corrections have been made.
- C. Acceptance Test shall be scheduled during a period when the building is unoccupied and a complete system test can be accomplished.
- D. Contractor shall provide the services of no fewer than 2 technicians to perform the Acceptance Test.
 - 1. Technicians performing the Acceptance Test shall have been involved in the installation of this project and shall be thoroughly familiar with all aspects of the work.
 - 2. Technicians shall be equipped with portable two-way radios for use during the test.
- E. Contractor shall provide all ladders, tools, test equipment, and other facilities needed to accomplish the Acceptance Test.
- F. During Acceptance Test, Contractor shall demonstrate all equipment and system features to UW CAAMS Manager.
 - 1. Contractor shall fully cooperate with the UW CAAMS Manager and provide assistance with the inspection and test.
 - 2. Contractor shall remove and reinstall covers, open and restore wiring connections, operate equipment, and perform other reasonable work as requested by the UW CAAMS Manager.
- G. Any portions of the work found to be deficient or not in compliance with the Contract Documents will be rejected.
 - 1. UW CAAMS Manager will prepare a list of any deficiencies observed during the Acceptance Test.
 - 2. A copy of this list will be provided to the Contractor, who will promptly correct all deficiencies.

UNIVERSITY OF WASHINGTON
REQUEST FOR SECURITY SYSTEMS ACCEPTANCE TEST

Building: _____

Contractor: _____

I hereby certify that:

1. The security management system at the above mentioned building is complete and has been provided in accordance with the Contract Documents.
2. That all systems and devices have been thoroughly pre-tested, and that all necessary corrections have been made.
3. That all project documentation, including Project Record Drawings, System Documentation, Panel Program Sheets and other such information, has been submitted in accordance with the Contract Documents.
4. That all systems have received final inspection and acceptance by the regulatory bodies having jurisdiction at the project location, and that copies of "signed-off" permits have been submitted in accordance with the Contract Documents.

I request that a Security Systems Acceptance Test be conducted

on the _____ day of _____, 20____.

By: _____

Title: _____

Date: _____

1.08 PROJECT RECORD DRAWINGS

- A. Submit project record drawings in accordance with Division 1.
- B. The purpose of project record drawings is to provide factual information regarding all aspects of the access control system to allow for future service, modifications, and additions.
- C. Project record drawings shall include documentation of all work, including the documentation of equipment, wiring, conduits, cable trays, and raceways that are related to the work but are provided under other sections.
 - 1. Contractor shall maintain the working set of project record drawings at the project site throughout the course of the work.
 - 2. The working set shall be updated on a daily basis as the work progresses.
- D. Project record drawings shall accurately show the physical placement of the following:
 - 1. Equipment and devices
 - 2. Wire and cable runs
 - 3. Conduits, cable trays, and raceways
 - 4. Junction and pull box locations
 - 5. End-of-line resistor locations
 - 6. Interfaces to external equipment
 - 7. Connections to power and telephone circuits
- E. Project record drawings shall show the physical placement of each device or conduit centerline, to be accurate to within 3 inches on scaled drawings.
 - 1. Show dimensions from finished walls or floors if location cannot be accurately portrayed by scale.
 - 2. Show, by symbol or note, the vertical location of the item ("under slab," "in ceiling space," "exposed," etc.)
- F. Project record drawings shall show wire and cable runs, point and door numbers, tamper circuit configuration, panel/circuit breaker numbers from which equipment is powered, and splice points.
 - 1. Such information may be shown on the floor plans, or may be documented on separate Riser Diagrams that will supplement the floor plans.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Access control intelligent controllers, input modules, output modules and card readers shall be manufactured by Casi-Rusco. No substitutions are acceptable.
- B. Power supplies shall be manufactured by Alarm-Saf. Acceptable substitutions: Securitron, Altronix.

2.02 INTELLIGENT CONTROLLER

- A. Intelligent Controller to be Casi-Rusco Micro5-PXN
- B. Each Intelligent Controller shall be provided with locking metal cabinet and circuit board back plane.
- C. Intelligent Controller for this project shall be equipped with the following circuit boards as a minimum:
 - 1. 1 each, CPU Board: Network compatible central processor board, Casi-Rusco M/5PXN
 - 2. 1 each, Communication/Power Supply Board
 - 3. 1 each, Eight Supervised Card Reader Board, Casi-Rusco 8RP
 - 4. 2 each, 20 Digital Input Board, Casi-Rusco 20DI
 - 5. 2 each 16 Relay Output Board, Casi-Rusco 16DOR
- D. Provide all wiring harnesses, connectors, and cabling required to properly interconnect Intelligent Controller boards and accessories.

2.03 12 VDC POWER SUPPLY

- A. 12 VDC Power Supply with 9 ampere minimum capacity and integral battery charger
- B. To be used to power Intelligent Controller as well as card readers, REX detectors, audible sounders, door alarm horns, and other such devices
- C. UL listed
- D. Power supply shall provide dry-contact power fault output
- E. Voltage regulation, ripple current, and other such tolerances shall be in accordance with Casi-Rusco manufacturer's guidelines.
- F. Provide one 12 VDC 9 ampere power supply for each Intelligent Controller.
 - 1. Provide each 12 VDC power supply with two 12 VDC 33 ampere hour gelled electrolyte, sealed lead acid batteries.
- G. Provide battery wiring harness as needed to properly connect batteries to power supply. Wiring harness shall provide in-line fuse or other type of overcurrent protection.

- H. Provide NEMA Type 1 screw cover metal enclosure for use as external battery cabinet. Enclosure shall be as manufactured by Hoffman or approved equal.

2.04 24 VDC LOCK POWER SUPPLY

- A. Lock power supply: 24 VDC power supply to be used exclusively to power electric lock hardware
 - 1. 3 amperes minimum continuously usable output
 - 2. UL listed
 - 3. Power supply to be as manufactured by Alarm-Saf or approved equal
- B. When primary power is present, power supply shall continuously maintain a charge on standby batteries. Power supply shall be capable of recharging batteries while providing full lock output.
- C. Provide two 24 VDC 3 ampere power supplies for each Intelligent Controller.
 - 1. Provide each 24 VDC power supply with two 12 VDC 7 ampere hour gelled electrolyte, sealed lead acid batteries.
- D. Provide battery wiring harness as needed to properly connect batteries to power supply.
- E. Provide with relay to supply dry-contact power fault output.
- F. Where space within power supplies is not adequate to contain batteries, provide NEMA Type 1 screw cover metal enclosure for use as external battery cabinet.
- G. Enclosure shall be as manufactured by Hoffman or approved equal.

2.05 ENCLOSURES

- A. All control equipment, relays, modules, circuit boards, and other such devices shall be contained within enclosures of all-metal construction.
- B. Contractor shall provide NEMA type 1 enclosures for all equipment that is not provided by manufacturer in a suitable enclosure.

2.06 CARD READERS - GENERAL

- A. Provide card reader types as indicated on the drawings and schedules.
- B. Provide card readers with all necessary accessories, including mounting brackets, mounting kits, connectors, cables, installation tools, and other such components necessary for a complete installation.
- C. Contractor shall provide trim plates, adapters, or back boxes for card readers as needed to mount to electrical back boxes provided under other sections. The color and finish of all trim plates, adapters or back boxes used shall closely match that of card reader.

2.07 MAGNETIC STRIPE CARD READERS

- A. It is the intention of the University to utilize the existing University Identification Card (ID) as the standard access card on campus.
- B. The ID card has been pre-encoded with a standard American Banking Association (ABA) track two identification number consisting of 14 digits.
- C. Magnetic stripe card readers shall be capable of reading, and the Intelligent Controller shall be capable of processing, the existing ID card without requiring any modification to the existing card or encoding scheme.
- D. Each magnetic stripe card reader shall be "intelligent".
 - 1. Each reader shall be a single stage reader (read head, keypad and all electronics in one package) that will communicate directly back to the Intelligent Controller.
 - 2. The reader must operate over maximum of 4-conductor wire, 22-AWG, shielded cable up to 2,000 feet from the Intelligent Controller without any additional power supplies.
 - a. If magnetic stripe PIN keypad readers are used, they must communicate over the same 4-conductor wire.
 - b. The readers shall communicate through the 4-conductor wire to the Intelligent Controller using a bi-directional data link which carries keypad, magnetic stripe data, command responses, door contact status, tamper switch status, and reader supervision messages.
 - 3. The card reader shall communicate to the Intelligent Controller in a supervised (poll and acknowledge) mode of communications every second.
 - a. In the event of a reader malfunction, the malfunction shall be capable of being detected by the Intelligent Controller and an alarm must be generated at the host computer.
 - b. A built-in tamper switch within the reader is required.
 - c. Full error checking shall be provided within each reader prior to sending the information to the Intelligent Controller.
 - 4. All readers are to be weather resistant, suitable for indoor or outdoor use, and use tamper screws for installation.
 - a. The operating temperature of the readers is to be a minimum of 32° to 140° F and humidity range of 0% to 95%, non-condensing.
 - 5. All readers shall be compact and of sturdy metal housing (not plastic), and are to produce an audible sound when a card is being read. Also, they must include three visual indicators (LEDs) that indicate (1) reader power, (2) access granted, (3) access denied.
 - 6. Magnetic stripe readers shall be Casi-Rusco Model #430. Provide with appropriate version of firmware to make compatible with existing UW ID card.

2.08 MAGNETIC CONTACT SWITCHES

- A. All magnetic contact switches to be furnished under Division 8

2.9 TAMPER SWITCHES

- A. Provide tamper switches at every control panel, power supply, and equipment enclosure and at all junction boxes containing splices or connections.
- B. Tamper switches shall cause activation of alarm point when door on panel or enclosure is opened.
- C. Tamper switches shall be recessed plunger switches with closed-loop contacts.
- D. Provide with mounting brackets as required to mount to sides of panels and within junction boxes.
 - 1. Provide Sentrol Model #3015, #3012, #3025 or equivalent switches as manufactured by Ademco, George Risk Industries, C&K, or approved.
 - 2. Tamper switch type to be selected as required to suit conditions

2.10 REQUEST-TO-EXIT MOTION DETECTORS (REX)

- A. Passive infrared (PIR) detection technology with normally-open contact output, integral walk-test indicator, 12 VDC operation
- B. Detector shall be specifically designed for use as REX detector.
- C. REX detector coverage pattern shall provide positive REX detection of person at exit side of door, but shall be adjustable to avoid unwanted detection in other areas.
- D. Acceptable manufacturers: Detection Systems
- E. REX detector housing color: Select color that complements wall and door frame on which REX detector is being installed.
- F. Provide trim plate to enable mounting of REX detector to single-gang electrical box (mounted horizontally).
 - 1. Trim plate shall completely cover rough-in opening.
 - 2. Trim plate color and finish to match REX detector.

2.11 PILOT RELAYS

- A. Provide pilot relays connected to 8RP boards for dry-contact lock outputs.
- B. Provide relays as indicated for interface to automatic door openers.
- C. Relays shall be heavy-duty industrial grade equal to "KUP" series as manufactured by Potter-Brumfield, or approved.
 - 1. Provide 12 VDC or 24 VDC coil as indicated.
 - 2. Relay contacts rated at no less than 5 amperes at 28 VDC.
- D. Provide screw-terminal relay sockets for each relay.

2.12 TIME DELAY RELAYS

- A. Provide time-delay relay for interface to automatic door openers. Time delay relay shall be 24 VDC, interval-on function, with time-delay period knob-adjustable from 1 to 10 seconds.
- B. Provide Potter-Brumfield CHD-38-30021 or approved.
- C. Provide screw-terminal relay socket for each time delay relay.

2.13 AUDIBLE SOUNDERS USED AT DOORS

- A. Piezo electronic sounder mounted to single-gang stainless steel plate
- B. 12 VDC operation shall provide audible output of not less than 85 db at 12 VDC.

2.14 WIRE AND CABLE

- A. Provide cabling between all security management system equipment in accordance with manufacturer's requirements. All cabling shall be shielded unless otherwise specified by manufacturer.
- B. Wire and cable shall be sized to provide minimum resistance and minimum voltage drop to the devices being supplied. Voltages delivered to all devices shall be within the tolerance specified by the device manufacturer.
- C. No conductor shall be smaller than #22 AWG gauge.
- D. Wire to speakers, electric lock hardware, and transformers shall be no smaller than #16 AWG gauge unless otherwise noted.
- E. All wire and cable installed within ceiling plenums and other air handling spaces shall be UL listed for such use.
- F. All wire and cable installed within cable trays shall be specifically UL listed for such use.
- G. Comply with equipment manufacturer's recommendations for wire and cable.

PART 3 - EXECUTION

3.01 GENERAL

- A. Provide all labor, tools, supplies, materials, and equipment required for the design, installation, configuration, programming, and testing of a complete and operational building access control system.
- B. Install all equipment in accordance with manufacturer's instructions and approved shop drawings.

3.02 INTELLIGENT CONTROLLER PANEL INSTALLATION

- A. Install each panel in equipment closet locations as indicated.

- B. Install each panel at a location and height to facilitate ease of service.
- C. Identify the software and hardware address of each panel with a permanent metal marking label installed on the exterior of the cabinet.
- D. Neatly dress and tie all wiring within panel. Do not obstruct access to terminal strips and configuration jumpers with wiring.
- E. Provide terminating resistor on all unused input connections.
- F. Label all inputs and outputs with a permanent marking label.
- G. Ground all shielded cables in accordance with manufacturer's instructions.
- H. Trim and wrap all unused shield wires to prevent shorting or inadvertent grounding.

3.03 CONNECTIONS TO CAMPUS NETWORK

- A. University will provide data outlet at each backboard location, and will provide network cabling from backboard to the nearest network connection point.
- B. Provide connection between data outlet and Intelligent Controller.

3.04 POWER SUPPLY INSTALLATION

- A. Install all system power supplies at Intelligent Controller panel backboard locations as indicated. Do not install power supplies at other locations.
- B. Provide adequate clearance around all power supplies to permit dissipation of heat.
- C. Install wiring harness between batteries and power supplies.
- D. Connect power fault output from each power supply to input point on Intelligent Controller.
- E. Unless otherwise noted, power all electric lock hardware from 24 VDC lock power supply located at equipment backboard.
- F. Unless otherwise noted, all system accessories, such as REX motion detectors, card readers, door alarm horns, piezo-sounders and the like shall be powered from 12 VDC power supply located at equipment backboard.
- G. 120 VAC input connections to power supplies to be provided under other sections.

3.05 CARD READER INSTALLATION

- A. Securely mount all card readers using tamper-resistant fasteners.
- B. Card readers shall completely cover any electrical back box. Provide trim plates at locations where required.
- C. Completely seal all exterior openings of outdoor mounted card readers to make weather-tight.

- D. Completely seal openings in exterior walls for outdoor mounted card readers to make weather-tight.

3.06 CONNECTION TO ELECTRIC LOCK HARDWARE

- A. Provide wiring and final connection to electric strikes, electric locks, transfer hinges, electric exit devices, and other such devices furnished under other specification sections.
- B. Verify operating voltage and current requirements of each piece of hardware provided. Thoroughly test all electric lock hardware for proper operation.
- C. Install pilot relay to control lock hardware where current requirements of hardware exceeds relay contact rating of Intelligent Controller or where electrical isolation is required.

3.07 CONNECTION TO MAGNETIC CONTACT SWITCHES FURNISHED UNDER OTHER SECTIONS

- A. Provide cabling and connection to magnetic contact switches (door position switches) furnished under other sections.
- B. Install end-of-line resistor at each contact switch. End-of-line resistors shall be connected to flexible wire leads and protected with heat-shrink tubing or equivalent.
- C. Test all contact switches for proper operation.

3.08 CONNECTION TO AUTOMATIC DOOR OPENERS

- A. Provide interface circuit between access control system and automatic door openers provided under other sections.
- B. Provide relay interface package as indicated on detail drawings.
- C. Provide cabling and connections between electric lock hardware, automatic door openers, and door actuator buttons as indicated.
- D. Coordinate work with installer of automatic door openers.

3.09 DEVICE WIRING, GENERAL

- A. Use standard and consistent wire conductor color-coding for device wiring. Use the same colors for each function throughout the project; for example, red and black-colored wires are always used for power; green and yellow-colored wires for detection circuit, etc.
- B. Install end-of-line resistors at detection device.
 - 1. End-of-line resistors shall be connected to flexible wire leads and be protected with heat-shrink tubing or equivalent.

3.10 INSTALLATION OF CONTACT SWITCHES: OVERHEAD DOORS

- A. Securely fasten magnet and bracket to door using machine screws, lock washers, and other hardware required to prevent fastener loosening due to vibration.

- B. Locate contacts to prevent interference with overhead door and door operation. Contact and magnet shall not reduce door clearance.
- C. Adjust contact and magnet placements to provide a minimum of 2-inch gap without contact activation, with positive activation when door is opened greater than 4 inches.

3.11 INSTALLATION OF TAMPER SWITCHES

- A. All junction boxes that contain splices or connections shall be equipped with a tamper switch.
 - 1. This requirement includes all boxes used for access control system wiring even if provided under other sections.
 - 2. Boxes used exclusively as pull boxes (with no connections) do not require a tamper switch.
- B. Tamper switches at or near detection devices shall be wired to cause a “trouble” condition on the point associated with the detection device.
- C. Tamper switches on equipment at backboards shall be connected to Intelligent Controller tamper input if provided, or to an auxiliary monitor point input.
- D. Tamper switches at all other locations shall be wired to a “tamper loop” circuit connected to one or more dedicated points at each Intelligent Controller. Each tamper loop may consist of up to 8 tamper switches.
- E. The location and point number of all tamper switches shall be shown on the project record drawings.

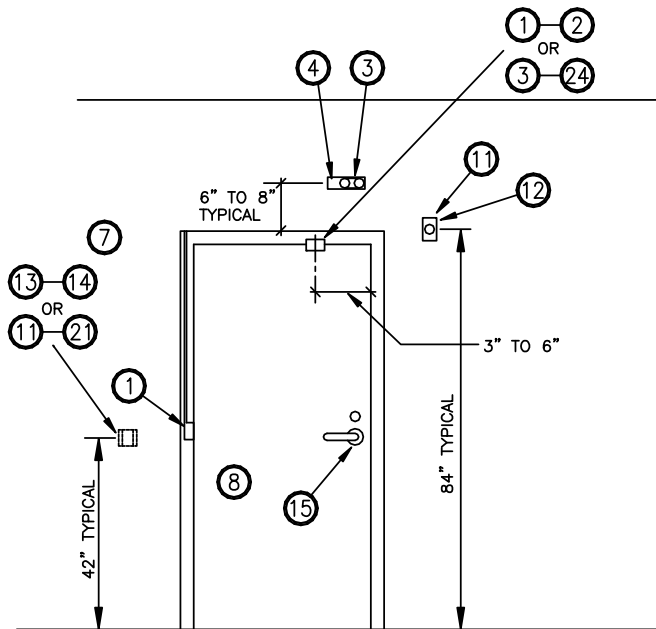
3.12 INSTALLATION OF REX MOTION DETECTORS

- A. Install detector to provide positive detection of person approaching door to exit. Direct detector to minimize unwanted detection in halls, corridors, rooms, etc. Carefully adjust to provide trouble-free REX operation.

3.13 PROGRAMMING AND CONFIGURATION

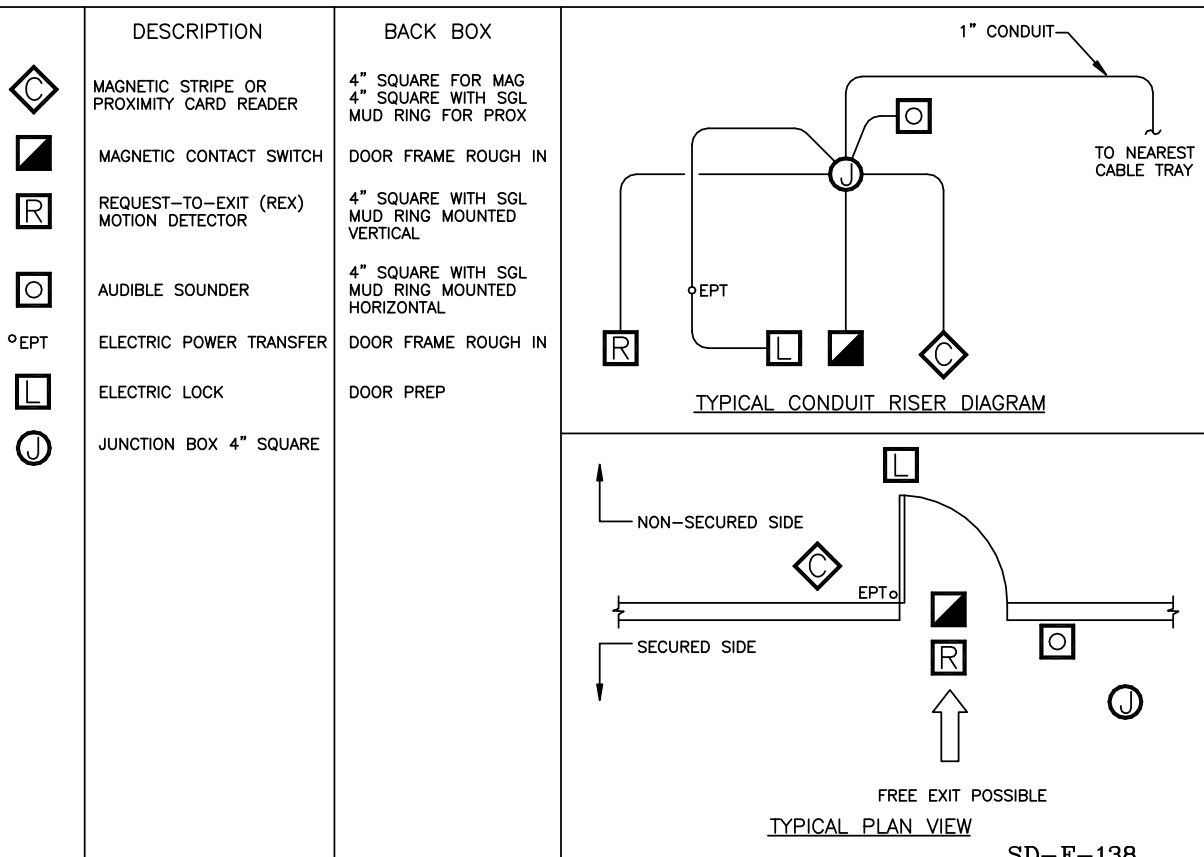
- A. Contractor shall provide initial programming and configuration of the access control system. This shall include configuration of existing host computer software as necessary to accommodate addition of this building to the campus system.
- B. Programming shall include defining doors, door groups, inputs, input groups, outputs, output groups, maps, map groups, alarms, alarm groups, and other such system parameters. Input of all program data shall be by Contractor. Contractor shall consult with University CAAMS Manager to determine operating parameters.

END OF GUIDE SPECIFICATION SECTION

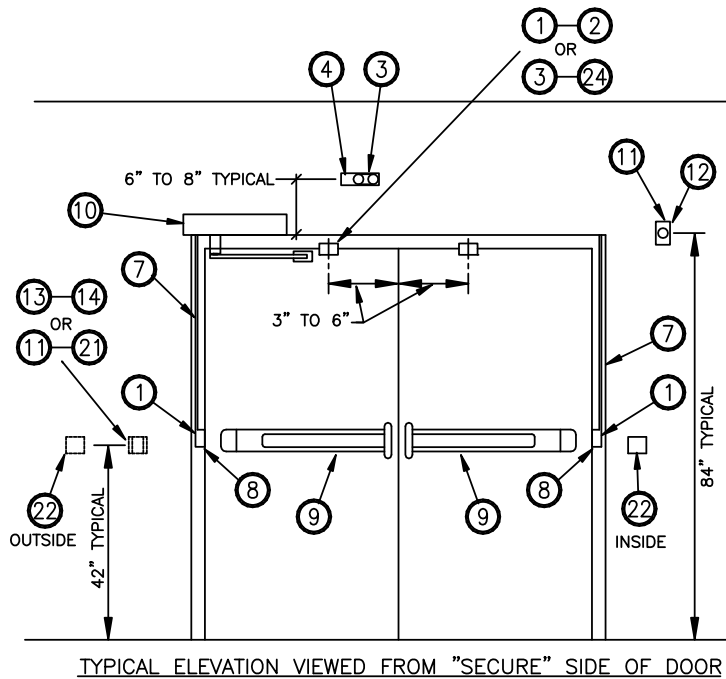


TYPICAL ELEVATION VIEWED FROM "SECURE" SIDE OF DOOR

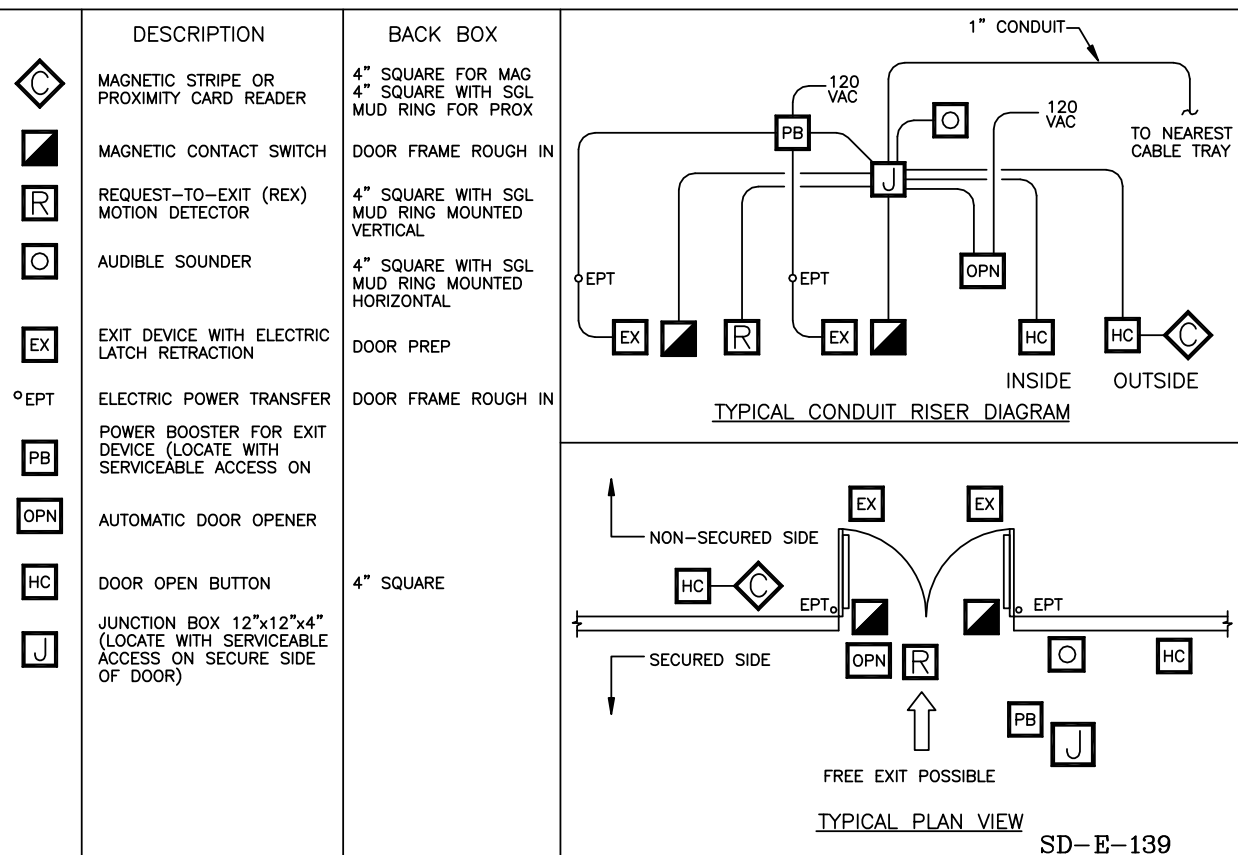
- ① GROUT BOX IN DOOR FRAME
- ② FLUSH-MOUNTED MAGNETIC CONTACT SWITCH - "ANSI STYLE"
- ③ DOUBLE-GANG BACK BOX WITH SINGLE MUD RING MOUNTED HORIZONTAL
- ④ REX MOTION DETECTOR-LOCATE ABOVE DOOR CENTER WITH CLEAR VIEW OF EXIT PATH
- ⑦ 1/2" CONDUIT PREP IN DOOR FRAME STUBBED OUT ABOVE DOOR
- ⑧ ELECTRIC POWER TRANSFER DEVICE
- ⑪ DOUBLE-GANG BACK BOX WITH SINGLE MUD RING MOUNTED VERTICAL
- ⑫ AUDIBLE SOUNDER
- ⑬ DOUBLE-GANG BACK BOX
- ⑭ MAGNETIC STRIPE CARD READER - LOCATE ON NON SECURE SIDE OF DOOR
- ⑮ ELECTRIC MORTISE LOCK
- ⑳ 12x12x4" SECURITY JUNCTION BOX
- ㉑ PROXIMITY CARD READER - LOCATED ON NON SECURE SIDE OF DOOR
- ㉒ SURFACE MOUNTED MAGNETIC DOOR CONTACT SWITCH



Typical Card Reader Controlled Single Door

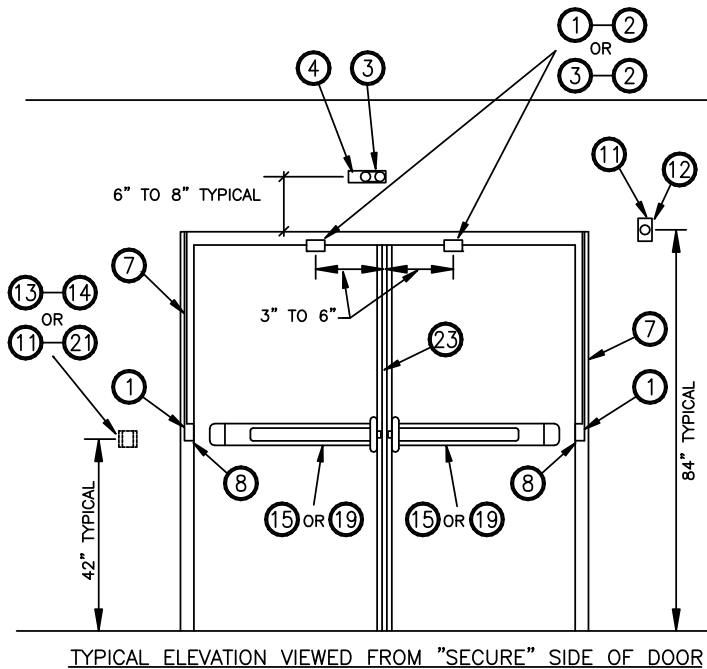


- ① GROUT BOX IN DOOR FRAME
- ② FLUSH-MOUNTED MAGNETIC CONTACT SWITCH - "ANSI STYLE"
- ③ DOUBLE-GANG BACK BOX WITH SINGLE MUD RING MOUNTED HORIZONTAL
- ④ REX MOTION DETECTOR-LOCATE ABOVE DOOR CENTER WITH CLEAR VIEW OF EXIT PATH
- ⑦ 1/2" CONDUIT PREP IN DOOR FRAME STUBBED OUT ABOVE DOOR
- ⑧ ELECTRIC POWER TRANSFER DEVICE
- ⑨ EXIT DEVICE WITH ELECTRIC VERTICAL ROD LATCH RETRACTION
- ⑩ AUTOMATIC DOOR OPENER
- ⑪ DOUBLE-GANG BACK BOX WITH SINGLE MUD RING MOUNTED VERTICAL
- ⑫ AUDIBLE SOUNDER
- ⑬ DOUBLE-GANG BACK BOX
- ⑭ MAGNETIC STRIPE CARD READER - LOCATE ON NON SECURE SIDE OF DOOR
- ⑯ 12"x12"x4" SECURITY JUNCTION BOX
- ⑰ PROXIMITY CARD READER - LOCATED ON NON SECURE SIDE OF DOOR
- ⑱ DOOR OPEN BUTTON (DOOR ACTUATOR SWITCH)

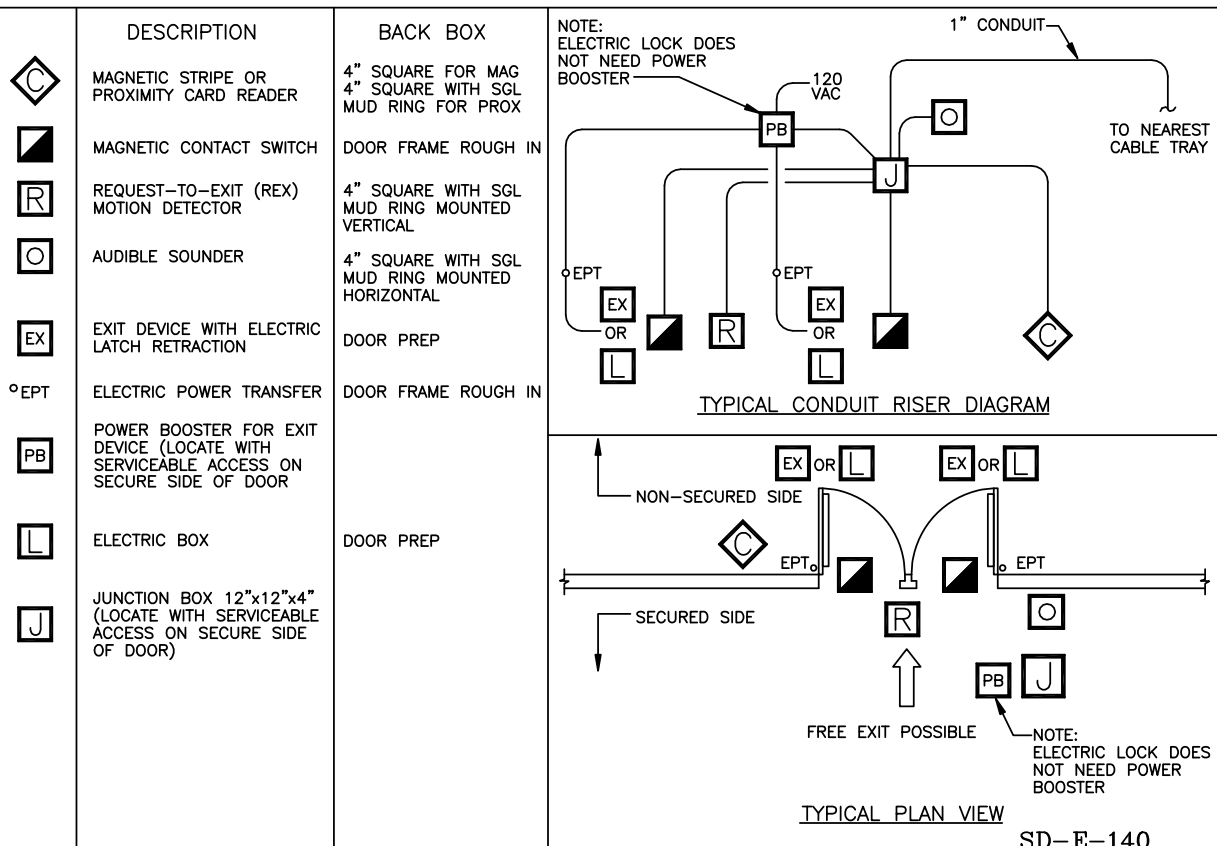


Handicap Exit Device Card Reader Controlled Double Door

Access Control - CAAMS

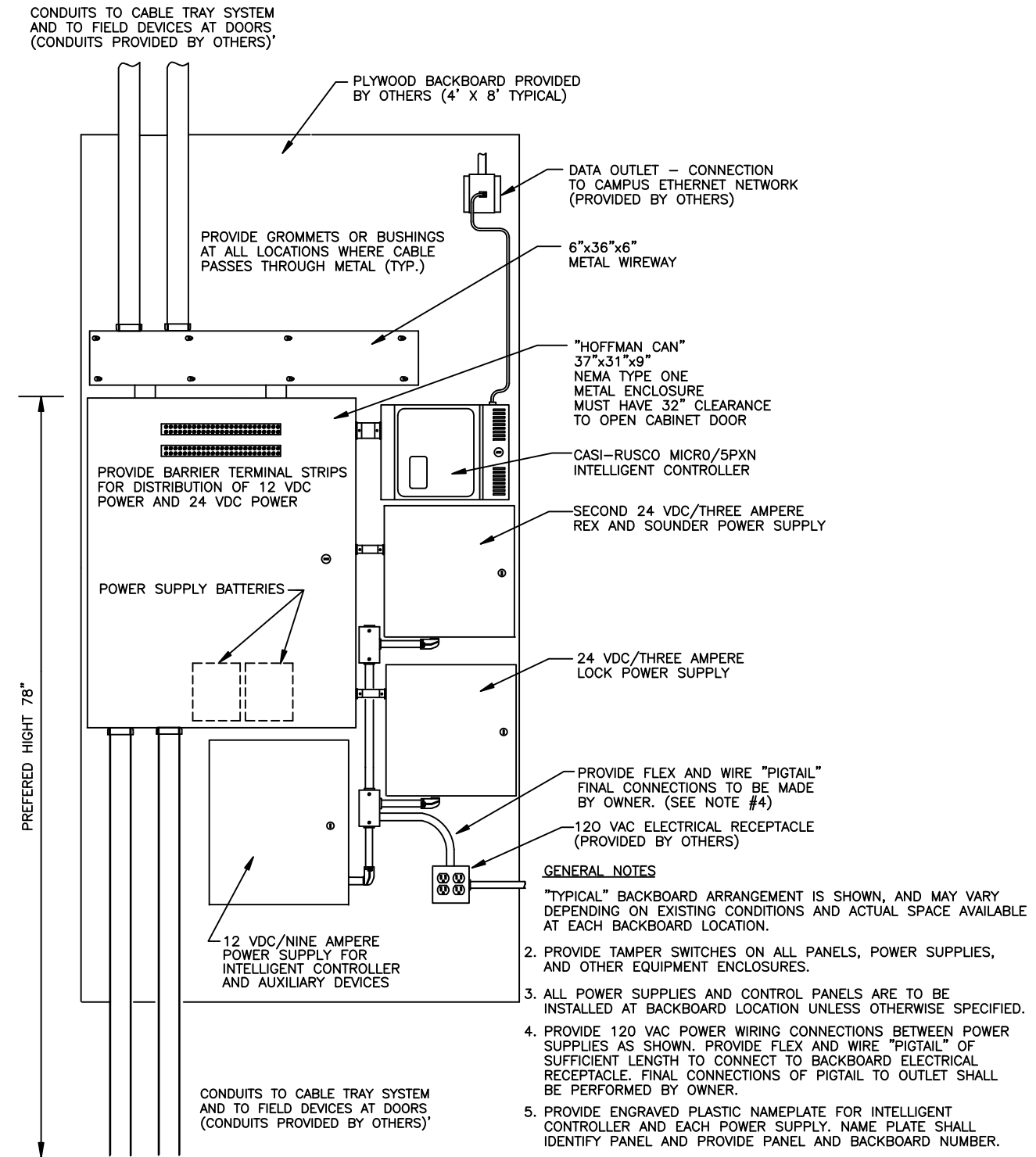


- ① GROUT BOX IN DOOR FRAME
- ② FLUSH-MOUNTED MAGNETIC CONTACT SWITCH - "ANSI STYLE"
- ③ DOUBLE-GANG BACK BOX WITH SINGLE MUD RING MOUNTED HORIZONTAL
- ④ REX MOTION DETECTOR-LOCATE ABOVE DOOR CENTER WITH CLEAR VIEW OF EXIT PATH
- ⑦ 1/2" CONDUIT PREP IN DOOR FRAME STUBBED OUT ABOVE DOOR
- ⑧ ELECTRIC POWER TRANSFER DEVICE
- ⑪ DOUBLE-GANG BACK BOX WITH SINGLE MUD RING MOUNTED VERTICAL
- ⑫ AUDIBLE SOUNDER
- ⑬ DOUBLE-GANG BACK BOX
- ⑭ MAGNETIC STRIPE CARD READER - LOCATE ON NON SECURE SIDE OF DOOR
- ⑮ ELECTRIC MORTISE LOCK
- ⑰ ELECTRIC EXIT DEVICE WITH RIM LATCH RETRACTION
- ⑳ 12"x12"x4" SECURITY JUNCTION BOX
- ㉑ PROXIMITY CARD READER - LOCATED ON NON SECURE SIDE OF DOOR
- ㉒ MULLION



Typical Exit Device Card Reader Controlled Double Door

SD-E-140



SD-D-1.1

Typical Equipment Arrangement