

TAB C-6

KEYLESS ACCESS AND SECURITY SYSTEM GUIDELINE

The University of Arizona has implemented a Keyless Access and Security System program to provide a cost effective, efficient, and maintainable means of providing and managing access into campus buildings for the university community, contractors and visitors. The focus of the system is to address issues of loss prevention, personal safety, and convenience through the use of this standardized technology. The system utilizes the University's CatCard as the "key" since it is universally deployed to all campus constituencies.

The principle focus of the program addresses **building perimeter access points**. Most University facilities are unlocked during normal (and sometimes extended) business hours, during which time keys are not required to enter the building. However, when the buildings are supposed to be closed and locked, it is the program's intent to provide entry through the use of the University of Arizona CatCard rather than with the use of a physical key.

In order to equip new university building with this system, project consultants will need to provide a design and produce construction documents that have the following accommodations for a keyless access and security system:

- **RISER** - A riser for the building's Keyless Access/Security System. This riser is required to be stacked vertically within a building to permit the Keyless Access/Security System to be wired from floor to floor
- **HEAD END EQUIPMENT** - Space and some utilities for the Keyless Access/Security System head end equipment directly adjacent to the riser. This particular equipment exists on only one floor of the building. This equipment also needs to be provided with three duplex 120VAC electrical outlets and one voice/data jack.
- **FIELD DOOR CONTROLLER PANELS** - Space and power for Keyless Access field door controller panels at various locations throughout the building as determined by the keyless access system design. These panels will require hardwired, 120VAC power.
- **RACEWAYS** - Conduit and junction boxes will need to be provided for routing certain portions of the Keyless Access/Security System local area network. Not all of the keyless access and security system wiring is required to be located in conduit. In very general terms, conduit is required between the equipment that is installed on walls up to accessible, above ceiling space or the building's cable tray.
- **DOOR HARDWARE** – Designated doors will have hardware that needs to interface and/or be controlled by the Keyless Access system. Doors that have keyless access hardware requirements may either have their hardware specified and provided under the general construction contract (for example – in the door hardware package) or have their hardware provided by Amer-X as part of the Keyless Access/Security System installation.
- **DOOR FRAMES** - Doorframes - pre-prepared from the manufacturer that can easily accommodate the addition of equipment for electronic operation. These frames typically include a handy box at the top of the doorjamb and a latch strike mud pocket that is deep enough for an electronic strike.

Consultant shall coordinate door frame requirements during the design phase of a project.

All the Keyless Access/Security System wiring is low voltage; only the head end equipment and field door controller panels require 120VAC. As such, most of the wiring is not required to be located in conduit. The Keyless Access/Security System is not required to be provided with emergency power; each building's system is provided with sufficient battery backup to provide at least four hours of standby operation. In the event a particular installation calls for longer standby power capability, the 120VAC power could be on an emergency circuit. The building Keyless Access/Security System communicates with the main server through phone and data lines; no connection to a hardwired network is necessary.

The following information is intended to explain the detailed requirements of each portion of the Keyless Access/Security System infrastructure that will need to be provided by under the general construction contract.

RISER

- A minimum 2" riser for each major wing of the building. The riser must serve every occupied floor of a building.
- One 12"x12"x4" box at each floor (see Notes below).
- A 1" conduit from the riser box to the building's cable tray

Notes:

- A building may only have one riser, but larger, more complex buildings may have more than one.
- Amer-X will provide the riser boxes for each floor of the building

HEAD END EQUIPMENT

Security Control Panel

- One 16"x16"x4" box for security control panel (see Notes below)
- One, duplex 120VAC receptacle for panel power. This receptacle is not required to be on emergency circuit. The circuit for this receptacle is not required to be dedicated.
- One, voice/data jack with an RJ31X jack. The data side of this jack is used by the keyless access system panel.

Notes:

- Installation of security system wiring and the phone line cord between control panel and voice/data jack is provided by Amer-X.
- 120VAC-24VDC transformer and transformer cover for the power receptacle will be provided and installed by Amer-X.
- Amer-X receives the box for security panel from the equipment manufacturer. Amer-X will provide this box to the electrical contractor for installation during building construction.

Keyless Panel and Network Connection

- One 16"x22"x6" box for keyless access panel and net connection (see Notes below)
- Two, duplex 120VAC receptacles - one for keyless access panel power, one for the network connection power. This receptacle is not required to be on emergency circuit. The circuit for this receptacle is not required to be dedicated.
- One, voice/data jack with an RJ31X jack. The voice side of this jack is used by the security system panel.

Notes:

- Installation of keyless access system wiring and the network connection cord between control panel and voice/data jack is provided by Amer-X.
- 120VAC-24VDC transformers and transformer covers for the power receptacles will be provided and installed by Amer-X.
- Amer-X receives the box for keyless access panel from the equipment manufacturer. Amer-X will provide this box to the electrical contractor for installation during building construction.

FIELD DOOR CONTROLLER PANELS

Depending on the number and location of controlled doors, keyless access field door controller panels will need to be installed at various locations in the building. At each of these locations, the following equipment is required:

- One 16"x22"x6" box for the field door controller panel (see Notes below)
- 120VAC power hardwired into the box. This circuit is not required to be dedicated or on emergency power.

Notes:

- The panels can be installed above ceilings, in equipment rooms, or other similar areas.
- The 16"x22"x6" holds the largest field controller panel. This size box may not be installed at every location, but space should be provided to accommodate the "worst case" box.
- Amer-X receives the boxes for the field controller panels the equipment manufacturer. Amer-X will provide these boxes to the electrical contractor for installation during building construction.

RACEWAYS

All of a building's perimeter access points will need to be provided with wiring pathway that will permit the doors to be controlled electronically. Each building perimeter access point shall be provided with the following equipment:

- Door Contacts
- Electronic Locking (either electric strikes or latches, or magnetic locks)
- Request to Exit Device

In addition, certain, designated building entries (as determined by the Keyless Access/Security System design) shall be provided with the following additional keyless access equipment:

- Card reader
- PIN pad

Raceways will need to be provided from accessible, above-ceiling spaces to this equipment at each door where this equipment is located.

Notes

- If magnetic locks are used on a door, a keyed bypass switch will be required. This is an additional piece of equipment that will also require conduit to the accessible, above-ceiling space.
- For storefront-type entries, the Keyless Access/Security System wiring can be routed through the storefront mullions. This is a field installation coordination issue that Amer-X addresses with the storefront installers during construction.
- For all glass entries, a post or bollard will be required to mount some of the keyless access equipment (card reader, PIN pads). This type of installation requires greater consideration during the project's design phase.

DOOR HARDWARE

Electronic locking requires special hardware for the doors designated to be controlled by the Keyless Access/Security System. In general terms, there are three types of electronic locking hardware: electric strikes, electric latches, and magnet locks. Until the building's design reaches a point where the door types are well defined, it cannot be determined which type of electronic locking hardware will be used. However, the following should be considered:

- Magnetic locks are generally the most costly way to electronically lock a door. They should only be used when the other two alternatives are not feasible (i.e. double doors that require panic hardware and cannot have a mullion).
- Electric strikes can be installed in almost all doorframes or mullions and are the most economical way to electronically lock a door.
- Electronic latches are typically used where the door is required to remain positively latched (i.e. fire doors) in the event of a Keyless Access/Security System failure.

DOOR FRAMES

Installation of electronic locking on doors is facilitated by having doorframes pre-prepared from the manufacturer for electronic hardware and controls. This entails the following

- A handy box provided at the top of the door frame, located 6 inches off the latch side of the frame

KEYLESS ACCESS/SECURITY SYSTEM INSTALLATION

As the University's sole source, keyless access and security systems vendor, Amer-X performs the following installation tasks associated with the keyless access and security system:

- Installation of head end and field panels in boxes installed by the electrical contractor
- Installation of 24VDC transformers and transformer covers on duplex receptacles installed by the electrical contractor
- Connection of power source to panels
- Connection of phone/data lines to jacks installed by the electrical contractor
- Coordination with construction trades, such as window and door installers, to facilitate installation of peripheral devices
- Installation of peripheral devices (door contacts, card readers, PIN pads, electric strikes, etc.)
- Installation of the low voltage Keyless Access/Security System wiring - both in conduits provided by electrical contractor (in walls and vertically through the building) and the data loop local area network wiring between panels and devices (routed similar to telecommunication lines through above ceiling spaces).

DESIGN PHASE INVOLVEMENT

Please refer to the following process descriptions and flow chart for how Amer-X should be involved in the design process.

DESIGN PHASE INVOLVEMENT, PROCESS AND FLOW CHART

Schematic Design

- Consultant, User group, and Amer-X meet
- Introduction of keyless access/security system
- Review building layout, functions, different building constituencies, and expected building operation. See Note (1) below.

Design Development

- Amer-X develops preliminary system design and budget. Submits copy to Project Coordinator, Consultant, and User group
- Consultant, User group, and Amer-X meet. Review preliminary design with user and consultant. Make modifications/deletions/additions as determined by refined understanding of building operations
- Amer-X develops final system design and budget. Submit copy to Project Coordinator, Consultant, and User group. Provides standard door details, riser diagram, door hardware requirements to consultants

Construction Documents

- Amer-X verifies coordination of consultant documentation with final system design

Construction Phase

- Electrical Contractor installs pathways (riser and door conduit) according to specifications
- Door contractor preps doors and jambs for equipment, according to specifications
- University establishes purchase order with Amer-X for system installation
- Amer-X coordinates field device installations with affected contractors

Schematic Design Note (1):

Amer-X meets with consultants and user group(s) after schematic design to introduce the keyless access/security system program, and describe the system's capabilities and options. This is where the dialog on how the users expect the building to operate from an access point of view begins. A review of the functions that take place in the building, the different user groups/constituencies, and any special concerns about asset protection, special activities (cash handling, pharmaceutical storage, etc.) and access management should also take place at this time.

User groups will be asked to think about how they need and/or want the building to be accessed

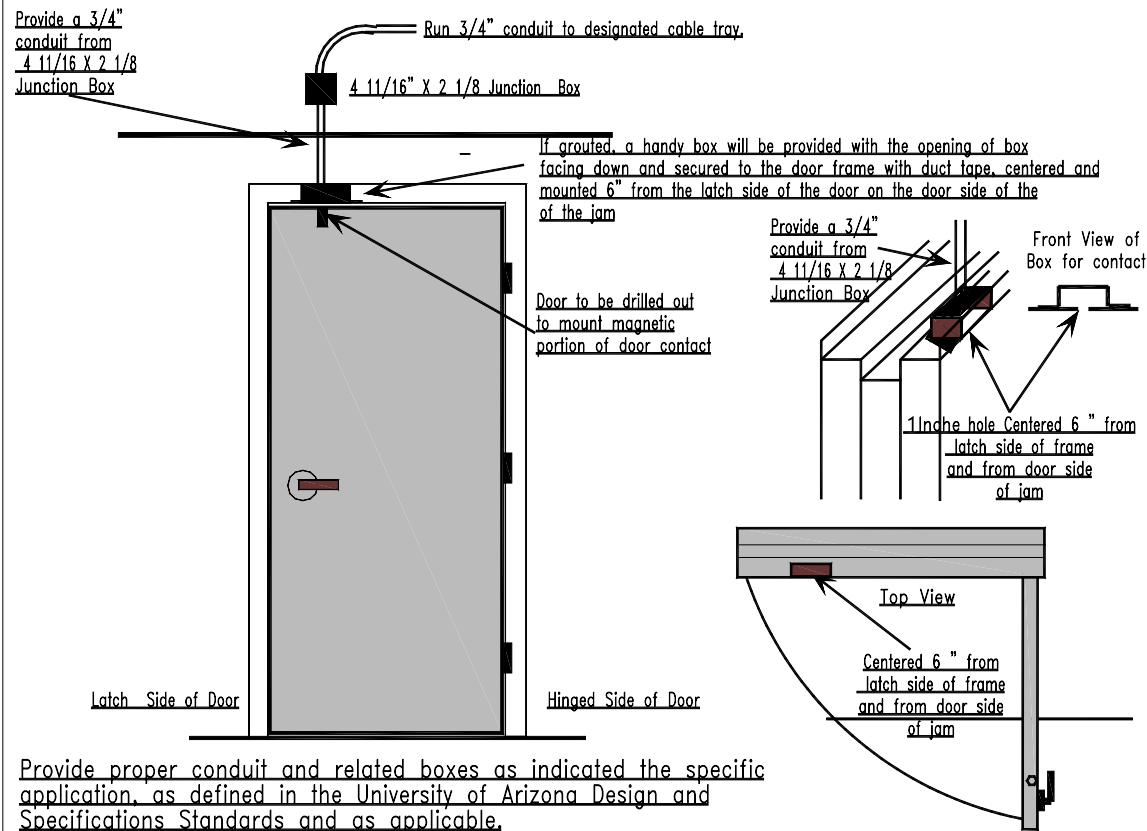
During normal business hours
After normal business hours
For special events

User Groups will also be asked to think about who they need and/or want to be able to access the building when the building is:

Normally open
Supposed to be closed

University of Arizona Security System Door Details and Illustrations
Single Exterior Door

All wire runs not in conduit must be supported from approved hangers, installed not less than 3 ft on center



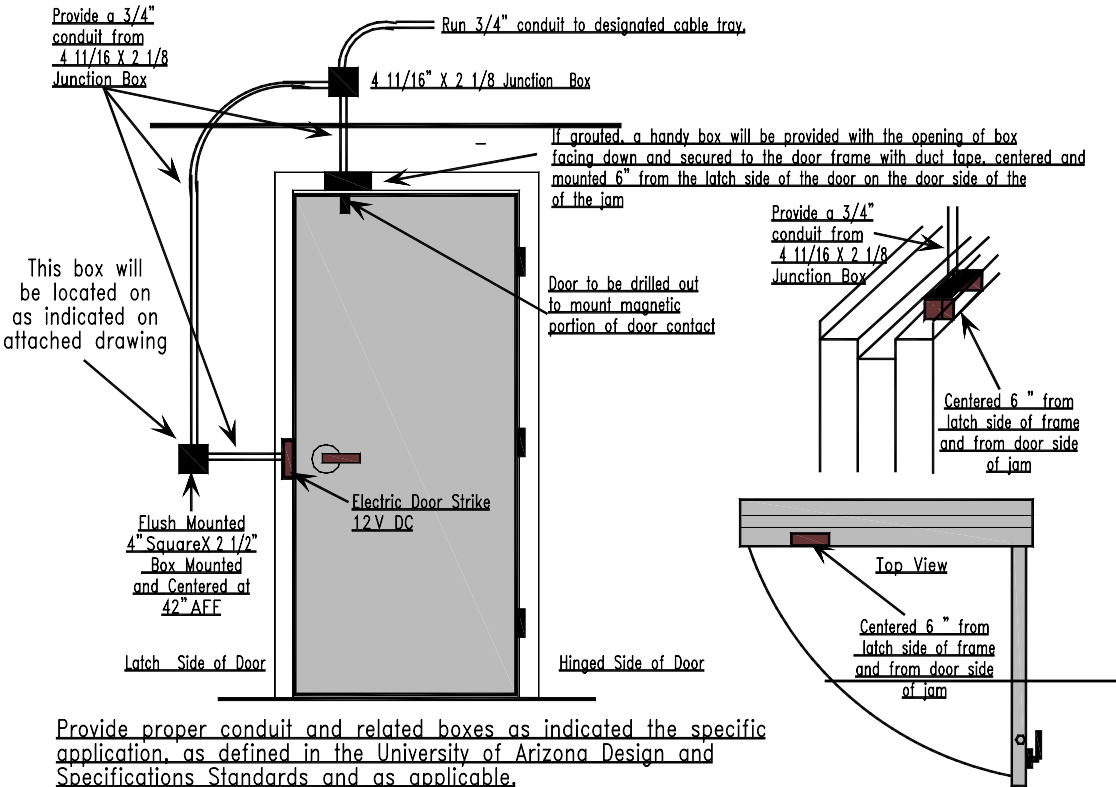
Keyless Access Security Cable	Wire Size	Approvals	Belden Cable Number or Equal
Security Data Loop	18/2	UL, NEC, Type CMP, CL2P	6300 FE

Door Details and Illustrations
Single Exterior Door
Security System Only

UNIVERSITY OF ARIZONA MANUAL OF DESIGN SPECIFICATION STANDARDS		
STANDARD DETAIL: SINGLE EXTERIOR DOOR, SECURITY SYSTEM ONLY		
DRAWN BY: KML	DETAIL NO.	REVISIONS
APPROVED BY: FD&C	C6-D1	
ACAD: C6-D1		

University of Arizona Keyless Access Security Systems Door Details and Illustrations
Single Exterior Door

All wire runs not in conduit must be supported from approved hangers, installed not less than 3 ft on center



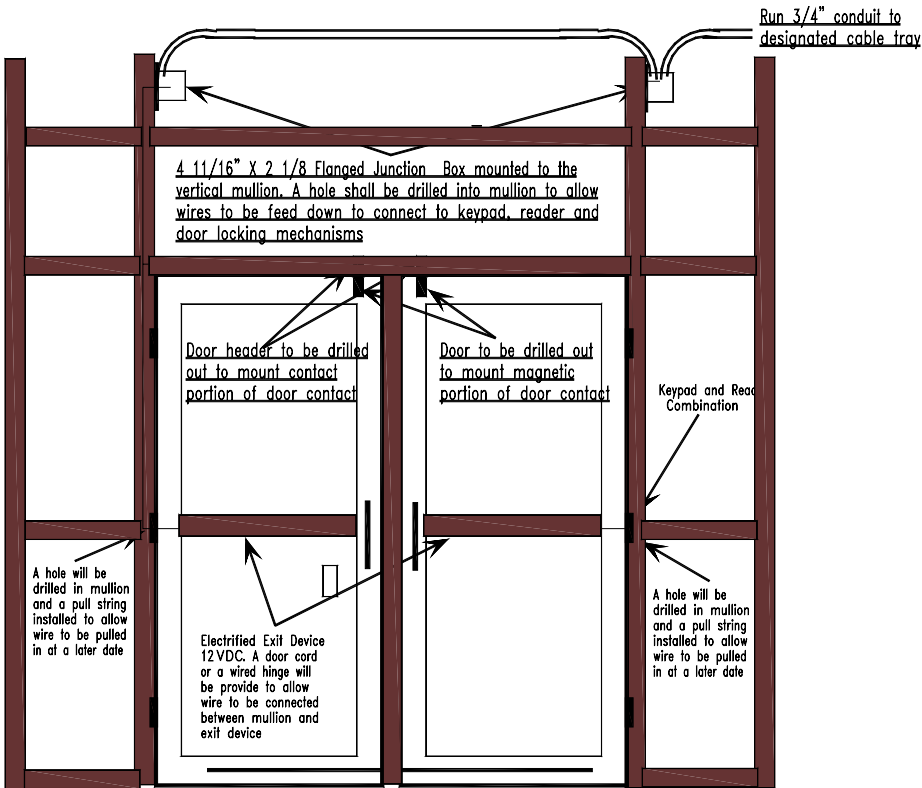
Keyless Access Security Cable	Wire Size	Approvals	Belden Cable Number or Equal
Keypad	22/12 Shielded	UL, NEC, Type CMP, CL2P	6509 FE
Card Reader	18/6 Shielded	UL, NEC, Type CMP, CL2P	6304 FE
Electric Strike	18/2	UL, NEC, Type CMP, CL2P	6300 UE
Magnetic Lock	18/2	UL, NEC, Type CMP, CL2P	6300 UE
Door Contact	22/4	UL, NEC, Type CMP, CL2P	6502 UE
485 Data Loop	24/2	UL, NEC, Type CMP, CL2P	6600 FE
Security Data Loop	18/2	UL, NEC, Type CMP, CL2P	6300 FE

Door Details and Illustrations
Single Exterior Door

UNIVERSITY OF ARIZONA MANUAL OF DESIGN SPECIFICATION STANDARDS		
STANDARD DETAIL: SINGLE EXTERIOR DOOR, ACCESS AND SECURITY		
DRAWN BY: KML	DETAIL NO.	REVISIONS
APPROVED BY: FD&C	C6-D2	
ACAD: C6-D2		

University of Arizona Keyless Access Security Systems Door Details and Illustrations
Double Exterior Door with Mullion

All wire runs not in conduit must be supported from approved hangers, installed not less than 3 ft on center

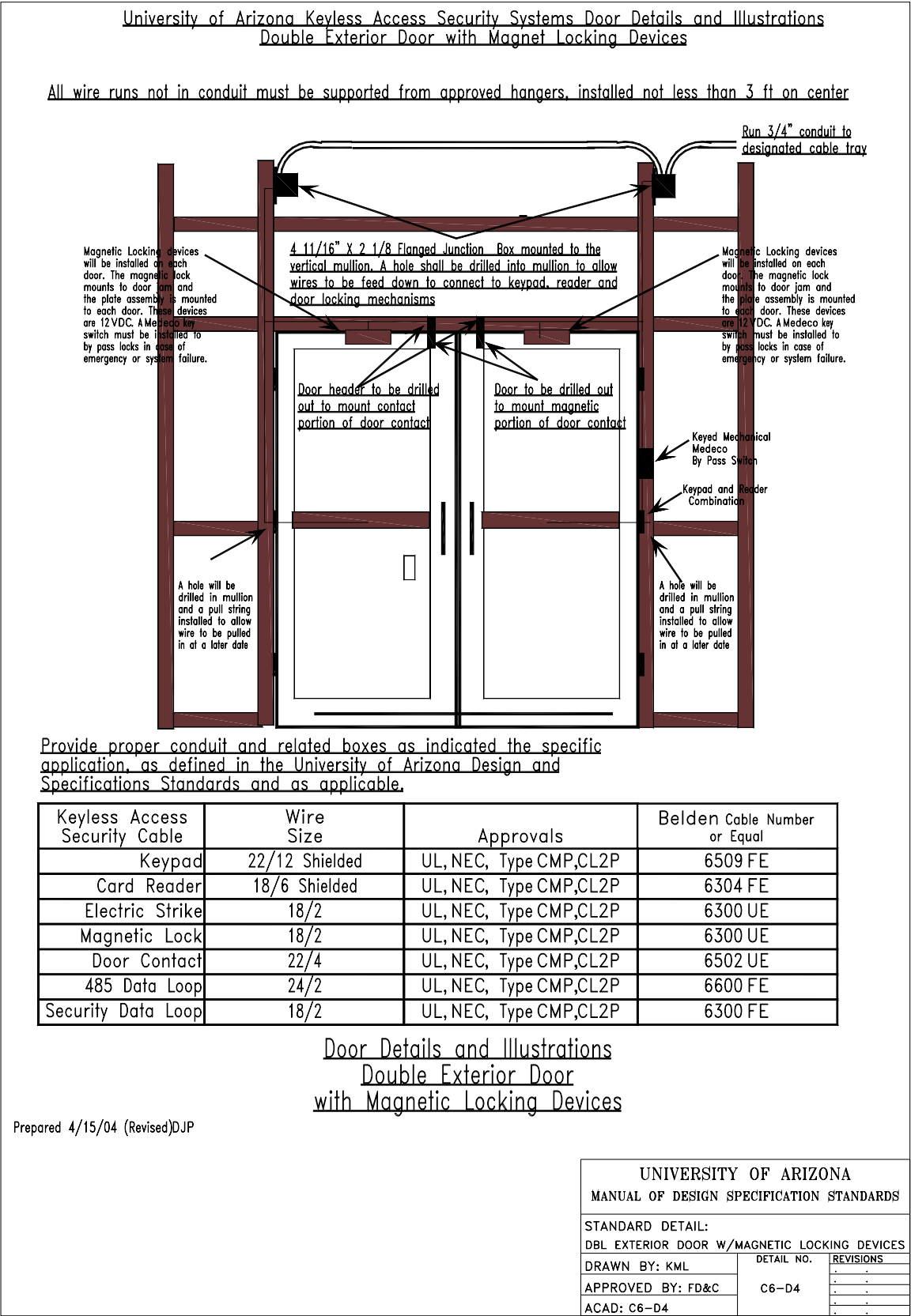


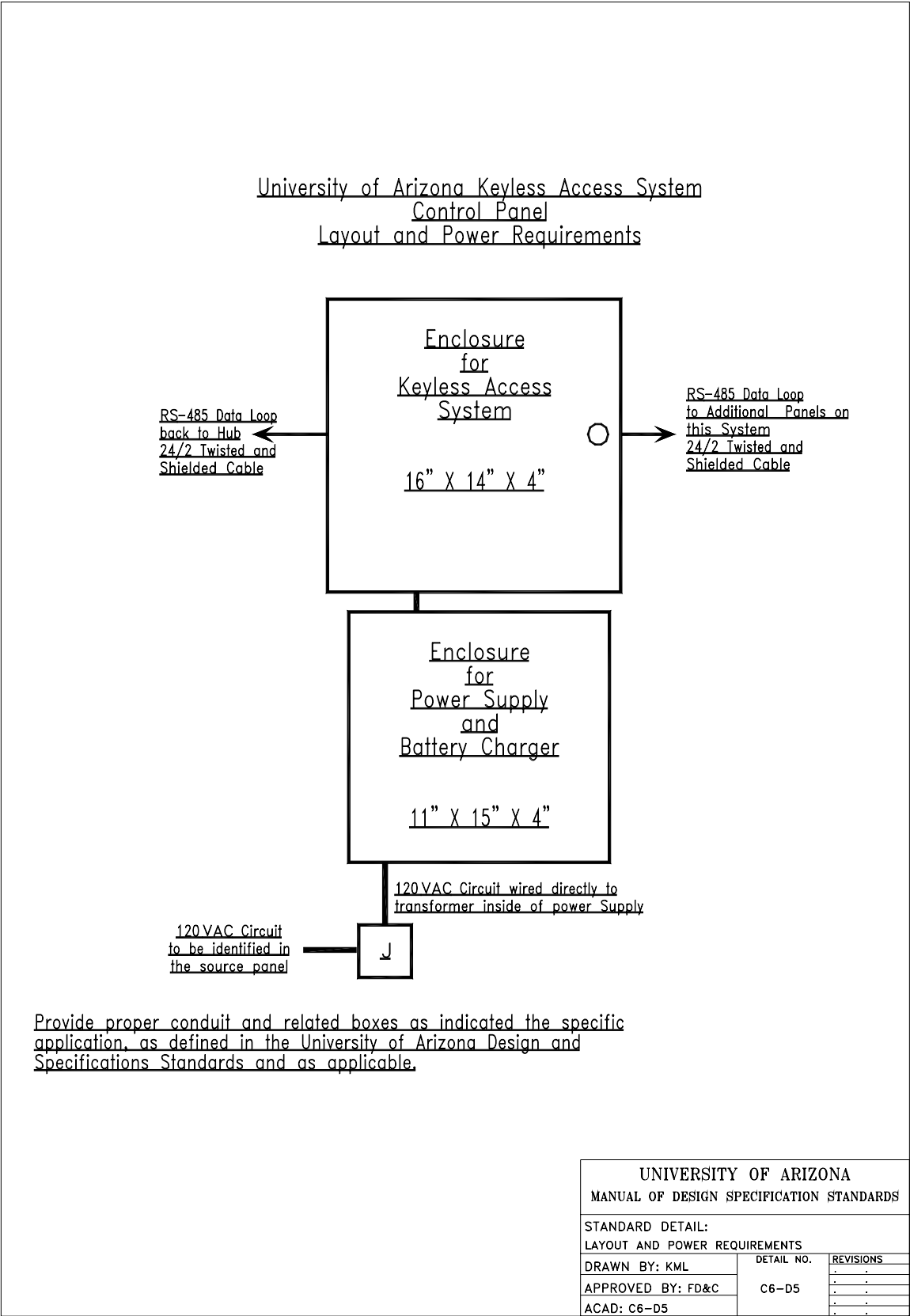
Provide proper conduit and related boxes as indicated the specific application, as defined in the University of Arizona Design and Specifications Standards and as applicable.

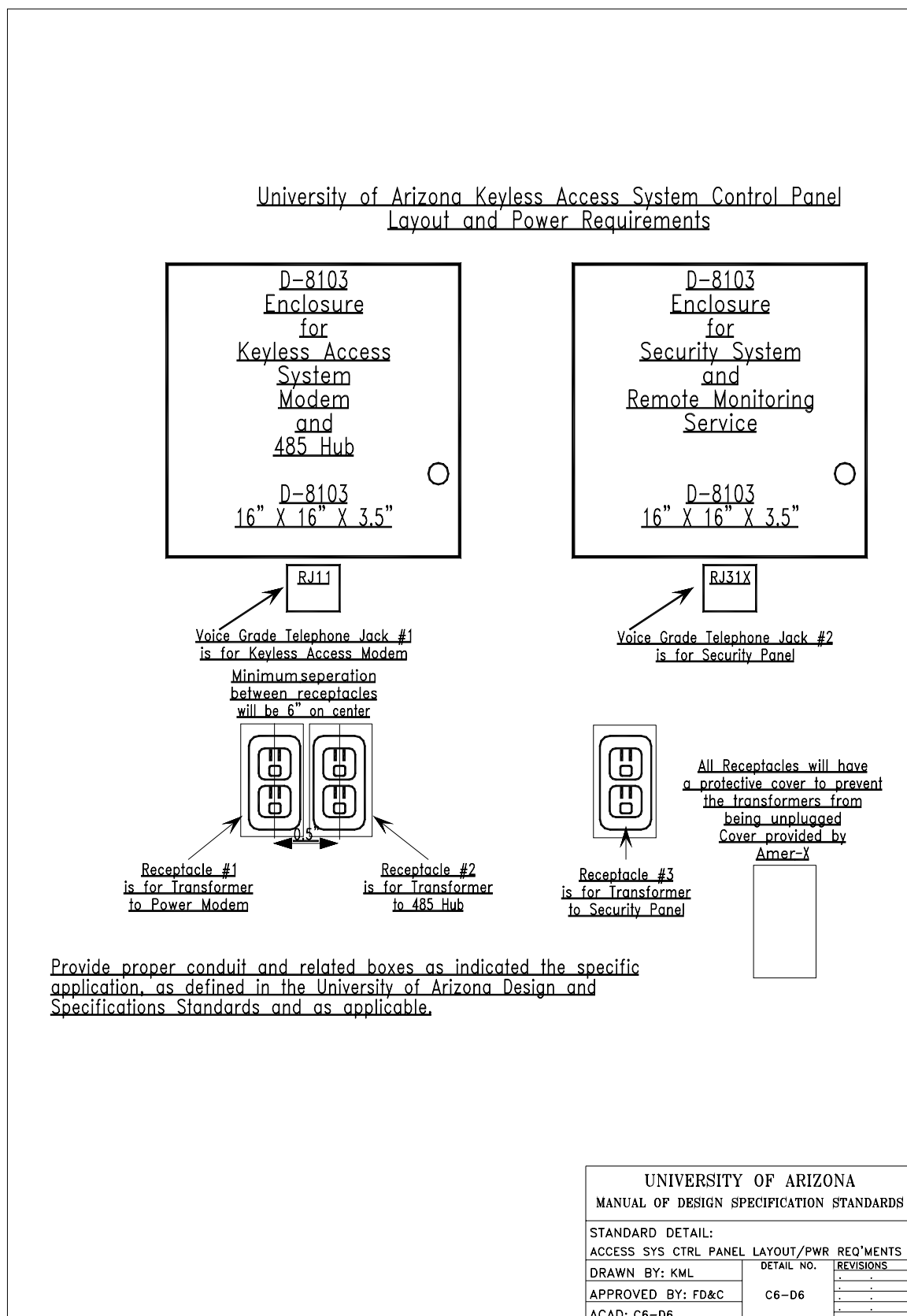
Keyless Access Security Cable	Wire Size	Approvals	Belden Cable Number or Equal
Keypad	22/12 Shielded	UL, NEC, Type CMP,CL2P	6509 FE
Card Reader	18/6 Shielded	UL, NEC, Type CMP,CL2P	6304 FE
Electric Strike	18/2	UL, NEC, Type CMP,CL2P	6300 UE
Magnetic Lock	18/2	UL, NEC, Type CMP,CL2P	6300 UE
Door Contact	22/4	UL, NEC, Type CMP,CL2P	6502 UE
485 Data Loop	24/2	UL, NEC, Type CMP,CL2P	6600 FE
Security Data Loop	18/2	UL, NEC, Type CMP,CL2P	6300 FE

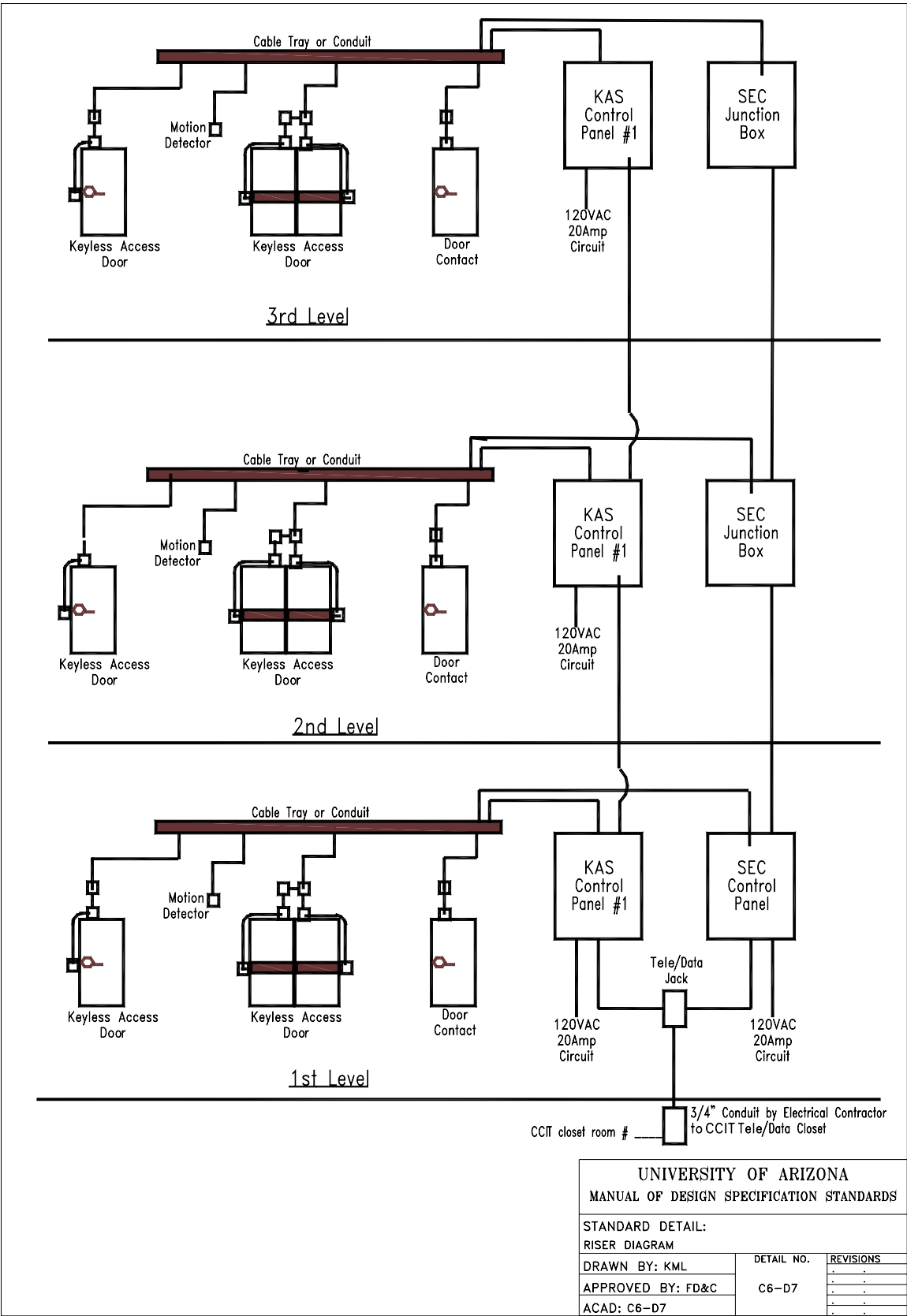
Door Details and Illustrations
Double Exterior Door
with Mullion

UNIVERSITY OF ARIZONA MANUAL OF DESIGN SPECIFICATION STANDARDS		
STANDARD DETAIL: DOUBLE EXTERIOR DOOR WITH MULLION		
DRAWN BY: KML	DETAIL NO.	REVISIONS
APPROVED BY: FD&C	C6-D3	
ACAD: C6-D3		









University of Arizona Keyless Access and Security Systems Symbol List	
<div>KAS Control</div>	Keyless Access Control with Hub and Modem
<div>CR</div>	Cat Card Reader
<div>CRPP</div>	Cat Card Reader with Pin Pad for PIN
<div>ES</div>	Electric Strike or Locking Device
<div>ML</div>	Magnetic Locking Device
<div>SEC Control</div>	Security Control Panel with Communicator
<div>KP</div>	Security System Keypad
<div>C</div>	Door Contact
<div>MD</div>	Motion Detector
<div>M</div>	Medical Assistance Call Device
<div>P</div>	Duress Assistance Call Device
<div>T</div>	Temperature Monitor
<div></div>	CCTV Camera Location

UNIVERSITY OF ARIZONA MANUAL OF DESIGN SPECIFICATION STANDARDS		
STANDARD DETAIL: ACCESS AND SECURITY SYSTEMS SYMBOLS LIST		
DRAWN BY: KML	DETAIL NO.	REVISIONS
APPROVED BY: FD&C	C6-D8	
ACAD: C6-D8		