

**APPENDIX A – DEPARTMENT OF HOUSING DESIGN STANDARDS**

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*Not a Specification*

## 010000 – Architectural - General

### 1. General Requirements

- A. Appendix A lists exceptions and additions to the Architecture and Engineering Design Standards for Building Technology (GT-Yellow Book) that have been adopted by the Georgia Tech Department of Housing. Appendix A was developed in coordination with the Georgia Tech Offices of Auxiliary Services, Facilities Management Design and Construction, and the Department of Housing. These standards are for the guidance of Architects, Engineers, and Builders in the technical design of new buildings and additions to buildings; and, is to be used in conjunction with the GT Yellow Book. As in the Yellow Book, the Standards herein are minimum standards. Actual design should be consistent with the overall program, building quality, and scope of project. The design should be in context with, and in harmony with, the existing buildings on campus with sensitivity to the surrounding pallet of materials and colors.
- B. If the Architect and/or the Engineer desire to make any exceptions to the Design Standards, written approval from **both** the Office of Facilities Management Design and Construction and the Department of Housing must be obtained. Electronic mail communication to request the exceptions is acceptable.
- C. Basis-of-Design Product: Where Basis-of-Design products are indicated, intent is to identify products that meet the requirements of GT Housing for the specific use identified. A/E to identify comparable products in project specifications to meet the procurement requirements for the specific project.

### 2. Typical Program Requirements

- A. Custodial Closets:
  1. Provide a custodial closet, sized per GT Yellow Book Standards, at each resident floor:
    - a. At traditional dormitory housing, with shared restroom / shower facilities, custodial closet to be accessed separate from restroom / shower area.
  2. Provide a centralized storage room at each residence building, sized appropriately for bulk storage of maintenance supplies and equipment.
  3. Where custodial supplies are stored, provide mechanical exhaust, discharging to exterior.
- B. Restroom Facilities:
  1. For laundry rooms, study rooms, administrative areas, and spaces used by persons not resident to the building, provide access to public restroom facilities, sized appropriately for the occupant load.
  2. In residence halls served by shared restroom / shower facilities, provide single occupant restroom facilities at each floor to accommodate transgendered residents, and visitors of the opposite sex. At least one restroom per building to include shower facilities.
  3. Lighting: At lavatories and along toilet/urinal rows, provide linear fluorescent lighting within a gypsum wallboard cove, located at the wall/ceiling intersection. Cove to be

configured so that light source is shielded by either the profile of the cove itself, or ½”x1/2” white plastic egg crate grille.

4. Lavatory:
    - a. At shared restroom facilities, lavatory to be comprised of solid surface counter and apron with integral solid surface sink bowls. Counter to be supported by steel tubes, angles, and/or bracket framing adequate for the load and span. Wood or light gauge framing for lavatory counters is not allowed. Lavatory counter to be open below, with pipe socks installed at drains per requirements of current State Accessibility Code and ADAAG.
    - b. At Apartment and Suite Style Housing, provide solid surface counter with integral solid surface sink bowl. Counter to be supported on steel angle frame comprised of 4”x3”x1/4” angle support frame continuous at front, back and sides. Provide solid surface apron at face of angle frame. Anchor frame to wall directly to structure or to solid blocking secured to framing.
  5. Resident Supply Storage: In each shared restroom/shower room, provide open shelving, cubbies, or other approved storage configuration for resident’s use to store personal care products. Storage to be fabricated from solid surface material, consistent with the lavatory, toilet partition, and shower enclosure.
  6. Shower Bench: Within the shower area, provide a bench, length sufficient for the number of shower stalls. Bench to be supported from wall with steel tubes, angles, and/or brackets adequate for the load and span. Provide one coat/towel hook for each shower stall above the bench.
  7. Shower Stalls: Shower facilities to be construction in conformance to the current State Accessibility Code, ADAAG, and Fair Housing Standards where applicable.
    - a. At shared restroom facilities, provide individual shower stalls. Where space permits, provide partition walls to enclose stall, finished with ¼” solid surface paneling. Shower floor to be either 2”x2” porcelain mosaic tile with waterproof membrane on sloped mortar bed, or one-piece preformed solid surface shower pan.
    - b. At apartment and suite style housing, provide one of the following, per specific project requirements:
      - 1) Bathtub: ¼” 3-piece solid surface surround. Acrylic construction bathtub units not allowed.
      - 2) Shower: One-piece pre-manufactured solid surface shower pan with ¼” solid surface panel surround.
  8. At all restrooms, including single occupant facilities, floor drains are to be provided.
- C. Student Life Storage: Where feasible, provide a minimum 5’ x 5’ storage closet at each residential floor for use by Student Life staff.
- D. Access Control:
1. See Voice Data and Door Hardware Sections for typical access control requirements.
  2. Provide proximity card access control at main mechanical, electrical, data rooms, and roof access doors and hatches.

3. At stair wells used by residents to circulate between floors, where locking of doors is allowed by Life Safety Code and Authorities Having Jurisdiction, provide lockset with key access per floor to allow re-entry by residents.

### **3. Typical Interior Finishes**

- A. Typical Finishes: The following schedule lists finishes typically specified for residential facilities. A/E team to review finish selections with GT Housing as well as the Campus Interior Designer / GT Facilities Management Design and Construction. Refer to Division 9 guidelines herein for specific product requirements.
- B. General Note: In flat slab concrete structures, where finished ceiling is the bottom surface of the floor slab above, skim coat with paint can be substituted for painted Gypsum Wallboard Ceilings.

**TYPICAL FINISH SCHEDULE**

Room Type	Finish Material				Remarks
	Flooring	Base	Wall	Ceiling	
<b>Residential Areas:</b>					
Residence Rooms	Carpet	Carpet	GWB or match existing in renovations	GWB	
Corridors	Carpet	Carpet	GWB or match existing in renovations	GWB	Provide abuse-resistant paint at walls. Provide bumper rails and corner guards. Provide abuse resistant GWB at stud-framed partitions.
Lobbies – Primary	Seamless Resilient Flooring, Carpet, or a combination.	Contingent on floor finish selected	GWB or match existing in renovations	GWB / ACT	Provide abuse-resistant paint at walls. Provide bumper rails and corner guards. Provide abuse resistant GWB at stud-framed partitions. Provide Walk-off mat insert at entrance.
Lobbies – Secondary	Walk-Off Mat Carpet Tile	Rubber Cove	GWB or match existing in renovations	GWB / ACT	Provide abuse-resistant paint at walls. Provide bumper rails and corner guards. Provide abuse resistant GWB at stud-framed partitions. Provide Walk-off mat insert at entrance.
Stair - Discharge level	Walk-Off Mat Carpet Tile	Rubber Cove	GWB or CMU  (CMU preferred)	GWB / ACT	Provide Acoustical Wall Panels. Provide abuse-resistant paint. Provide abuse resistant GWB at stud-framed partitions.



Room Type	Finish Material				Remarks
	Flooring	Base	Wall	Ceiling	
Stair – Typical	Rubber (Treads, risers, landings)	Rubber Cove	GWB or CMU  (CMU preferred)	GWB / ACT	Provide Acoustical Wall Panels. Provide abuse- resistant paint. Provide abuse resistant GWB at stud-framed partitions.
Restrooms / Shower Rooms – Shared	Porcelain Tile	Porcelain Tile – Coved	Ceramic tile	GWB  (Epoxy Paint)	Floor sloped to drains; provide continuous waterproofing membrane at wet areas.
Restrooms – Single Occupant	Porcelain Tile	Porcelain Tile – Coved	Ceramic tile	GWB  (Epoxy Paint)	Continuous waterproofing at wet areas. Slope to floor drain where feasible.
Restrooms – public	Porcelain Tile	Porcelain Tile – Coved	CMU/GWB and/or Ceramic Tile	GWB	Use Epoxy coating system for all painted wall and ceiling finishes. Provide abuse resistant GWB at stud-framed partitions.
<b>Common Areas:</b>					
Learning Centers(Access not limited to building residents)	Carpet	Carpet	CMU/GWB	ACT	Abuse-resistant paint at walls. Provide abuse resistant GWB at stud- framed partitions.
Study Rooms / Lounges  (Access limited to building residents)	Carpet	Carpet	CMU/GWB	GWB	Abuse-resistant paint at walls. Provide abuse resistant GWB at stud- framed partitions.

Room Type	Finish Material				Remarks
	Flooring	Base	Wall	Ceiling	
Student Kitchens	Porcelain tile	Porcelain Tile, coved	GWB  Or match existing in renovations	GWB	Floor tile minimum 8"x8". Abuse-resistant paint at walls. Provide abuse resistant GWB at stud-framed partitions. Provide floor drain.
Laundry	Seamless Resilient	Seamless Resilient Cove	GWB  Or match existing in Renovations	GWB / ACT	Provide abuse resistant GWB at stud-framed partitions.
<b>Apartment / Suite Style Units (Staff and Student Occupied):</b>					
Living Room	Carpet	Carpet	GWB	GWB	
Entry / Kitchen	Solid Vinyl Plank / Tile	Rubber Cove	GWB  Or match existing in Renovations	GWB	
Bedroom/Closet	Carpet	Carpet	GWB GWB  Or match existing in Renovations	GWB	
Bathrooms	Porcelain Tile	Porcelain tile- Coved	GWB  Or match existing in Renovations	GWB	Use Epoxy coating system for all painted wall and ceiling finishes.  Provide Solid surface surround at tub/shower.
Laundry/Utility	Solid Vinyl Plank / Tile	Rubber cove	GWB  Or match existing in Renovations	GWB	

Room Type	Finish Material				Remarks
	Flooring	Base	Wall	Ceiling	
<b>Administrative Areas:</b>					
Offices	Carpet	Rubber cove	GWB	ACT	
Conference Rooms / Seminar Rooms	Carpet	Rubber cove	GWB	ACT	
Corridors	Carpet	Rubber cove	GWB	ACT	
Copy / Break	Solid Vinyl Plank / Tile	Rubber cove	GWB	ACT	
Reception	Solid Vinyl Plank / Tile or Porcelain Tile	Rubber Cove or Porcelain Tile	GWB	ACT	Provide walk-off mat carpet insert at exterior doors / entrances.
<b>Support Spaces:</b>					
Electrical / Data Closets / Mechanical Rooms	Sealed Concrete	Rubber cove	CMU / GWB	Open to Structure	
Storage Rooms	Sealed Concrete	Rubber cove	CMU / GWB	ACT / Open to Structure	Ceiling finish requirements vary with storage type. Confirm with GT Housing.

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## **013515 LEED and Sustainable Design**

### **1. DESIGN REQUIREMENTS**

- A. Coordinate recycling storage areas with GT Department of Housing.
- B. Refer to Mechanical, Electrical and Plumbing sections of Appendix A for sub-metering requirements specific to Housing projects.
- C. Bicycle Storage – Documentation for LEED NC, Sustainable Sites credit 4.2 – Indoor Bicycle Storage, is encouraged.

**END OF SECTION**

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## 064000- Architectural Woodwork

- A. Plywood Substrates shall be APA B-D, Group 1 faces as follows:
  - 1. Grades:
    - a. Provide exterior grade plywood substrate for all base cabinets, with or without sinks.
    - b. Provide Exposure 1 Grade (Type 2 adhesive) for all wall cabinets.
  - 2. Faces:
    - a. Provide “B” face for exposed and semi-exposed surfaces to receive plastic laminate, melamine or paint finish.
    - b. Provide “D” face for unexposed surfaces.
  - 3. Plywood and plywood adhesive shall be made with no added urea formaldehyde.
  - 4. Particleboard, Medium Density Fiberboard (MDF) and other similar composite panel products are not acceptable substrates for Architectural Millwork.
  
- B. Hardware:
  - 1. Drawer Pulls: Satin Stainless steel, U-shaped wire pull, 4” centers.
  - 2. Drawer Slides:
    - a. Mounting: Side Mount
    - b. Type: Full extension, steel ball bearing
    - c. Capacity: 100 lb capacity or Heavy Duty, whichever is greater.
  - 3. Hinges: Concealed European-style, self closing.
  
- C. Cabinet Construction:
  - 1. Quality Grade: AWI Custom
  - 2. Cabinet Doors and Drawer Fronts: Flush Overlay
  - 3. Drawer Construction: Dovetail joints
  
- D. Solid Surface Fabrications:
  - 1. Solid acrylic or polyester and acrylic resin, ½” thickness.
    - a. Approved Manufacturers:
      - 1. Corian
      - 2. Transolid
      - 3. Wilsonart
  - 2. Tensile Strength (ASTM D 638): 6,000 PSI minimum.
  - 3. Flexural Strength (ASTM D 790): 8,000 PSI minimum
  - 4. At restroom lavatory counters:
    - a. Fabricate backsplash with cove integral with counter top.
    - b. Sink bowls to be integral with counter top, of the same material and finish. (Note, bowl colors may not be available in same color and pattern as counter, bowl color to be compatible with surrounding counter).
  - 5. Shower Wall Panels:
    - a. Thickness: ¼” minimum
    - b. Substrate: Cementitious backer board, or other approved substrate for wet areas, with waterproofing system installed continuous with floor waterproofing, compatible with panel adhesive.
  - 6. Shower Pans: Solid Surface of same material as wall panels, one-piece construction.
  - 7. Restroom Partitions: Refer to Division 10 section for additional requirements for partitions assemblies fabricated with solid surface material.

**END OF SECTION**



### **076000 – Flashing and Sheet Metal**

- A. Material: Exposed sheet metal fabrications, including copings, fascia, hanging gutter and downspout assemblies, conductor boxes, scuppers and other flashing exposed to public view to be fabricated out of Aluminum. Copper is not to be used unless approved by GT Housing.
- B. Finish: Two Coat, shop applied Fluoropolymer finish.

**END OF SECTION**

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**077233 – Roof Hatches**

- A. Where stair access to roof is not practical, provide insulated aluminum hatch for access to roof.
- B. Where hatch is not in an area accessible to students, provide either a fixed wall-mounted or ship's ladder. Provide side rails and safety cages per requirements of Authorities having Jurisdiction.
- C. Hardware: Prep hatch to accept electronic lock hardware

**END OF SECTION**

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## **081000- Doors & Frames**

- A. Hollow Metal Doors: Level III, 16 Gauge, Extra Heavy Duty.
- B. Hollow Metal Door Frames: 14 Gauge, welded frames. Knock-down construction not allowed.
- C. Wood Doors:
  - 1. Finish: Clear Finish, stained
  - 2. Grade: Premium
  - 3. Veneer: Plain Sliced White Birch
- D. Storefront Entrance Doors:
  - 1. Top Rail: 8"
  - 2. Bottom Rail: 10"
  - 3. Side Stiles: 5" Widestile

**END OF SECTION**

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**083000- Access Doors & Panels**

- A. Type: Flush with exposed flanges.
- B. Locking: Prepare door to receive cylinder lock, specified in Hardware Section.
- C. Locations: Coordinate locations with Architectural and Engineering drawings, and indicate on Reflected Ceiling Plans.

**END OF SECTION**

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## **085000- Windows**

- A. Windows:
  - 1. Type: Aluminum windows to be provided. Vinyl or clad wood window units are not allowed unless approved by GT Housing.
  - 2. Style: Style to be appropriate to the building Architecture. In renovations and additions to buildings of historical significance, extruded exterior-applied muntin grids and panning trims to match / replicate existing window and casing assemblies.
  - 3. Openings: Where windows are operable, select Double Hung, Single Hung, Casement or Awning based on building architecture. Provide hardware to limit opening to 4' maximum.
  
- B. Screens: Provide security screens at all ground level windows:
  - 1. Basis of Design Manufacturer: Kane Screen, Kane Sterling
  - 2. Model: Narrowline Operable
  - 3. Security Level: 5
  - 4. Access: Emergency egress from interior (where required by code), and key access from exterior for maintenance.

**END OF SECTION**

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## 087000 – Door Hardware

### 1. General

#### A. Cylinders:

1. Acceptable manufacturers:
  - a. Stanley-Best.
2. Characteristics:
  - a. Provide housings to accept Best cylinder cores that are provided by the owner. Coordinate with Housing for procurement of permanent cores and housings. Base bid is to include housings by hardware vendor.
  - b. Install construction cylinders and housings as scheduled in the Hardware Sets. Note: all access panels and electrical panel boards are to have a keyed cylinder. Coordinate mortise cylinder with access panel manufacturer. Permanent cores by owner.
  - c. Provide temporary keyed construction cylinders for all doors. Furnish 10 construction master keys and 3 construction control keys.

#### B. Locksets, Latchsets, Deadbolts:

1. Acceptable manufacturers: (Basis of design. Alternate manufacturers to be approved by Housing)
  - a. Schlage\* L9000 series x 07L trim. (verify design for each project)
2. Mortise Locksets and Latchsets: as scheduled.
3. Manufacturer: Schlage\* L9000 Series
4. Characteristics:
  - a. All locksets and latchsets shall have barrier free lever handles #07L design. (edit for each project)
  - b. Offices, conference rooms, work rooms, and classrooms, use Classroom function, L9070.
  - c. Janitor's closets, electrical, mechanical spaces, and storage rooms, use Storeroom function, L9080.
  - d. Apartment or Dorm Bedroom entries off of common corridor, use Storeroom function with deadbolt, L9480.
  - e. Interior individual bedroom doors within an apartments, use L9456.
  - f. Bathrooms within apartments use privacy function with deadbolt L9440.
  - g. ADA rooms on corridors use Storeroom function with deadbolt, L9480 with one piece latch bolt and use with HES 1006 series electric strike. Coordinate with ADA door operator.
  - h. When low rise building stairs are locked use L9060 function. When high rise stairs are locked use L9060 function and coordinate unlocked floors with Housing and fire codes.
5. Mortise Locksets and Latchsets: as scheduled.
  - a. Chassis: cold-rolled steel, handing field-changeable without disassembly.
  - b. Latchbolts: 3/4-inch throw stainless steel two-piece mechanical anti-friction type. Nylon inserts are not acceptable. Use one piece latch bolt at doors with electric strikes.
  - c. Lever Trim: through-bolted, accessible design, cast or solid rod lever as scheduled. Spindles: independent breakaway.
  - d. Thumbturns: accessible design not requiring pinching or twisting motions to operate. (Schlage EZ thumbturn)
  - e. Deadbolts: stainless steel 1-inch throw.
  - f. Electric operation: Manufacturer-installed continuous duty solenoid.

- g. Strikes: 16 gage curved stainless steel, bronze or brass with 1" deep box construction, lips of sufficient length to clear trim and protect clothing.
  - h. Certifications:
    - 1. ANSI A156.13, 1994, Grade 1 Operational.
    - 2. ANSI/ASTM F476-84 Grade 30 UL Listed.
- C. Exit Devices:
- 1. Acceptable manufacturers:
    - a. Von Duprin\*, 99, and 33 Series (Basis of design. Alternate manufacturers to be approved by Housing)
  - 2. Characteristics:
    - a. Electronic access point operated by Owner's electronic access control system shall have functions as follows:
      - 1. Double doors shall have a removable mullion with Von Duprin RX EL98 electric panic hardware
      - 2. Single doors shall have a Von Duprin RX98 panic hardware with a Von Duprin 6112 for new construction or a HES 9600 series electric strike for retrofit.
    - b. All exit devices shall be of one manufacturer.
      - 1. Exit devices shall be of modular design and assembly, allowing updated and/or replacement parts to be added to existing product in the field to bring product up to current design standards.
      - 2. Exit devices shall be able to be field modified and updated with specified "kits" necessary to upgrade for product electrification to accommodate future expansion of existing access control system, including, but not limited to request to exit, latch bolt monitoring and electric latch retraction.
    - c. EL devices shall use a 16-amp solenoid to activate a mechanical linkage to retract the latch.
    - d. Power supplies shall be Von Duprin PS914-2RS x BBK Series.
    - e. Exit devices on exterior doors shall be equipped with "request to exit" (RX) switches and "latchbolt monitor" (LX) switches connected to the alarm panel and monitored as part of the owners access control system.
    - f. The nearest Emergency Power Control Panel in the school will power the PS914-2RS power supplies.
    - g. Provide "surge suppression" for electrified door hardware. Coordinate with the system integrator, the electrical contractor, the low voltage sub contractor, the door hardware manufacturer's representative and the owner's representative to confirm the surge suppression unit to be used and where it shall be installed.
    - h. Conduit and necessary wiring shall be provided under Division xxx.
    - i. All exit devices shall have US32D touchpads. All finished parts that are not US32D shall be US26D finish.
    - j. All exit devices shall be flush mounted. Provide manufacturer's standard shim kit to accommodate moldings for glass and vision lites. Exit devices that are not flush mounted must provide a filler bar on those doors where conflict with moldings for glass vision lites is not an issue.
    - k. Exit devices shall be attached with sex nuts and bolts on all doors. Finish on all exposed fasteners shall match devices.
    - l. On exterior pairs of doors, provide keyed removable mullions. . (KR) Refer to the drawings and door schedule for locations of keyed movable mullions. All mullions shall have 2 each stabilizers #154.

- m. Exit devices shall be "UL" listed for life safety. All exit devices for fire rated openings shall have "UL" labels for "Fire Exit Hardware."
- n. All exit devices mounted on labeled wood doors shall be mounted on the door per the door manufacturer's requirements. (Owner prefers exit devices to be thru-bolted even on non-rated doors.)
- o. Dogging mechanism shall be "hook and eye" type. No plastic dogging cams or friction type dogging mechanism shall be allowed.
- p. Equip rim exit devices with a roller strike. Owner insists that the third locking screw is installed.
- q. All exit devices shall be non-handed.
- r. Touchpad shall extend a minimum of 1/2 of the door width. Touchpad height shall exceed height of mechanism case or rail assembly to eliminate pinch points. If touchpad height does not exceed height of mechanism case/rail assembly provide factory-installed insert/filler on top and bottom of touchpad along mechanism case/rail assembly to prevent pinch point. Plastic touchpads are not acceptable.
- s. All latchbolts to be the deadlocking type. Latchbolts shall have a self-lubricating coating to reduce wear. Plated or plastic coated latchbolts are not acceptable.
- t. Exit devices are to be equipped with a fluid dampening device to reduce noise associated with the operation of the exit device.
- u. Exit devices to include impact resistant, flush mounted end cap design to avoid damage due to carts and other heavy objects passing through an opening. End cap shall be of heavy-duty metal alloy construction and provide horizontal adjustment to provide alignment with device cover plate. When exit device end cap is installed, no raised edges will protrude.

D. Closers and Door Control Devices:

- 1. Acceptable manufacturers:
- 2. LCN Closers\*, 4040 XP series (Basis of design. Alternate manufacturers to be approved by Housing)
- 3. Characteristics:
  - a. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder.
  - b. Closers utilizing pressure relief valves (PRV) are not acceptable.
  - c. All closers shall be attached using sex nuts and bolts only.
  - d. All closers shall utilize a stable fluid withstanding temperature range of 120°F to -30°F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UBC 7-2 (1997) and UL 10C.
  - e. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force for the physically handicapped. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed and back check.
  - f. All closers shall have solid forged steel main arms (and "EDA" forearms for parallel arm closers) and where specified shall have a cast-in solid stop on the closer shoe ("CNS"). Where door travel on out-swing doors must be limited, use "S-CNS" type closers. Auxiliary stops are not required when Cush type closers are used.
  - g. All surface closers shall be certified to exceed ten million (10,000,000) full load cycles by a recognized independent testing laboratory. All closers (overhead, surface and concealed) shall be of one manufacturer and carry manufacturer's ten year warranty (electric closers to have two year warranty).

- h. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped provide adjustable units complying with ADA and ANSI A-117.1 provisions for door opening force.
  - i. Closers to be installed to allow door swing as shown on plans. Doors swinging into exit corridors shall provide for corridor clear width as required by code. Where possible, mount closers inside rooms. Provide drop plates as dictated by the top rail dimensions. Provide Cush shoe supports and blade stop spacers where required to allow 5<sup>th</sup> screw attachment. Provide special templates and plates where needed for proper installation of closer an overhead holders as detailed in hardware sets.
  - j. Powder coating finish to be certified to exceed 100 hours salt spray testing by ETL, an independent testing laboratory used by BHMA for ANSI certification.
  - k. Magnetic Door Holders to be heavy duty wall or floor mounted with metal housing and complete mounting hardware. Provide 24V holding coils unless otherwise scheduled.
- E. Power Operators:
- 1. Acceptable manufacturers:
    - a. LCN\* 4642 Series (Building entries) (Basis of design. Alternate manufacturers to be approved by Housing)
    - b. Provide LCN SR Swing (9500 series) at interior high frequency doors. (i.e. Laundry rooms and exterior gates) . (Basis of design. Alternate manufacturers to be approved by Housing).
  - 2. Where low kinetic energy, as defined by ANSI Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered operators complying with the 1990 ADA for opening force and time to close standards.
  - 3. Full closing force shall be provided when the power or assist cycle ends.
  - 4. Where operators are used, provide electric strike or electrified exit devices with latch retraction feature.
  - 5. All electrically powered operators shall include the following features or functions:
    - a. When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, then with up to two attempts to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.
    - b. Easily accessible main power and maintain hold open switches will be provided on the operator.
    - c. An electronically controlled clutch to provide adjustable opening force and speed.
    - d. A microprocessor to control all motor and clutch functions.
    - e. An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.
    - f. All input and output power wiring shall be protected by slow blow fuses. These fuses shall be easily replaceable without special tools or component replacement.

6. Actuators shall have a stainless steel touch plate that features a blue filled handicap symbol. The actuator shall be weather resistant and provide normally open momentary contacts. The actuator is designed to mount in a standard single gang box (2" wide, 4" high, and 2" deep).
  7. Installation of the automatic door operators shall be performed by a factory trained and factory certified installer skilled in the installation of automatic door operators and equipment. All low voltage switch hookups are the responsibility of the operator installer, as well as temporary wiring hookup to plug into wall outlet for test of system. Final hookup of 115VAC power will be handled by and coordinated with the general contractor's electrical contractor.
  8. The contractor shall furnish a certificate executed by a representative of the manufacturer of the automatic door operators that all operators have been inspected and adjusted, are operating as designed and have been installed in accordance with the manufacturer's instructions.
- F. Floor Stops and Wall Bumpers:
1. Acceptable manufacturers:
    - a. Glynn Johnson
    - b. Ives\*
    - c. Rockwood Manufacturing
  2. Insure that floor stops will allow full contact with door face. Provide blocking in the wall where wall bumpers are used.
  3. Provide heavy duty stops (FS18S) at exterior doors when out of the path of travel.
- G. Protective Plates:
1. Acceptable manufacturers:
    - a. Trimco
    - b. Ives\*
    - c. Rockwood Manufacturing
    - d. Custom Acrovyn Door Protection 4000 x custom color to be selected.
  2. Characteristics:
    - a. Provide manufacturers standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
    - b. Materials:
      1. Metal Plates: Stainless Steel, .050 inch (U.S. 18 gage).
    - c. Fabricate protection plates not more than 2 inches less than door width on hinge side and not more than 1 inch less than door width on pull side. Provide custom color plates to match architects sample where noted.
    - d. Heights:
      1. Kick plates to be 8 inches in height.
      2. Mop plates to be 8 inches in height. (Provide in wet areas and janitor closets)
  3. Armor plates 34 inches in height. (Provide at loading docks and trash rooms).
- H. Silencers:
1. Acceptable manufacturers:
    - a. Glynn Johnson\*
    - b. Ives
    - c. Rockwood Manufacturing

2. Three for each single doors; four for pairs of doors. (Omit at doors with seals or weatherstrip)

I. Security Equipment:

1. Acceptable manufacturers:
  - a. Von Duprin\*
  - b. Schlage
  - c. HES
2. Characteristics:
  - a. Provide items as found in Hardware Headings.
3. Coordinate security equipment with Electrical.

2. **Materials and Fabrication:**

- A. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
1. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
  2. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including “prepared for paint” surfaces to receive painted finish.
  3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners.
  4. Use thru-bolts or sex bolts for installation of all exit devices, door closers and overhead stops. Coordinate with wood doors and metal doors and frames. Where thru-bolts are used, as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.



**3. Sample Hardware Schedule:**

EXAMPLE OF HARDWARE SCHEDULE. SCHEDULE TO BE PROVIDED BY ARCHITECT'S  
 HARDWARE CONSULTANT AS REQUIRED FOR EACH PROJECT.

HW SET: AL-01

DOOR: TYPICAL PAIR OF ALUM OR FRP ENTRY DOORS WITH CARD READER AND ADA  
 OPERATOR

EACH TO HAVE:

2	CONTINUOUS HINGES	112HD x EPT	IVE
2	POWER TRANSFERS	EPT-10	VON
1	EXIT DEVICE	RX EL 99NL/OP	VON
1	EXIT DEVICES	RX EL 99 EO	VON
1	REMOVABLE MULLION	KR4954	VON
1	POWER SUPPLY	PS914 X 900-2RS X BBK	VON
1	CYLINDER	80-159	SCH
1	CYLINDER	80-132	SCH
2	CORES	BY OWNER	
2	PULLS	8190-0 BY TYPE O MT.	IVE
2	CARD READERS	BY SECURITY	
2	DOOR POSITION SWITCHES	BY SECURITY	
1	CLOSER	4041 SCUSH X 4040-18PA	
		30/61 AS REQ	LCN
1	ADA CLOSER	4642 X 120VAC (RHR)	LCN
1	FLOOR STOP	FS18S (RHR LEAF)	
1	THRESHOLD	425 X RCE	NGP
1	SET SEALS	BY DOOR MFG	
2	SWEEPS	200SA	NGP
1	ASTRAGAL	BY DOOR MFG	

COORDINATE SECURITY HARDWARE WITH SECURITY AND ELECTRICAL CONTRACTORS  
 ACCESS BY CARD READER. ADA CARDS ACTIVATE OPERATOR.

HW SET: AL-02

DOOR: TYPICAL SINGLE ALUM OR FRP ENTRY DOOR WITH CARD READER AND ADA OPERATOR

EACH TO HAVE:

1	CONTINUOUS HINGES	112HD x EPT	IVE
1	POWER TRANSFERS	EPT-10	VON
1	EXIT DEVICE	RX 99NL/OP	VON
1	CYLINDER	80-159	SCH
1	CORES	BY OWNER	
1	ELECTRIC STRIKE	6112 X 24VDC	VON
1	POWER SUPPLY	PS902 X BBK	VON
1	PULLS	8190-0 BY TYPE O MT.	IVE
2	CARD READERS	BY SECURITY	
1	DOOR POSITION SWITCHES	BY SECURITY	
1	ADA CLOSER	4642 X 120VAC (RHR)	LCN
1	FLOOR STOP	FS18S (RHR LEAF)	
1	THRESHOLD	425 X RCE	NGP
1	SET SEALS	BY DOOR MFG	
1	SWEEPS	200SA	NGP

COORDINATE SECURITY HARDWARE WITH SECURITY AND ELECTRICAL CONTRACTORS  
ACCESS BY CARD READER. ADA CARDS ACTIVATE OPERATOR.

**END OF SECTION**

## **088000– Glazing**

- A. Unframed Mirrors: Provide continuous, unframed mirrors at shared common hall restroom / shower rooms.
  - 1. Product requirements:
    - a. Thickness: ¼”
    - b. Glass Type: Mirror Select Quality plate or float glass with silver coating and electrologically copper-plated back
    - c. Edge Finish: Grind and polish
    - d. Size: Equally spaced modules or as indicated on drawings. No horizontal joints accepted.
    - e. Installation: Apply to wall with mastic adhesive and continuous bottom “J” channel.
    - f. Location: Meet requirements of current State Accessibilty Code and ADAAG.
  
- B. Elevator Shaft Glazing: Where glass back elevators are specified aligned with exterior aluminum framed glazing systems, provide laminate glazing, per the requirements of the current State Elevator Code and Authorities having jurisdiction.

**END OF SECTION**

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## **092000 – Gypsum Board Assemblies**

- A. Abuse-Resistant Gypsum Wallboard: Provide in high traffic areas such as corridors, student lounge/study areas, and lobbies.
  - 1. Basis of Design Product(s)
    - a. National Gypsum Company, Hi-Impact Brand XP Wallboard
    - b. USG Corp., Fiberock VHI Abuse-Resistant Gypsum Panels
- B. Tile Backer Board: Cementitious backer board, ½” nominal thickness.
- C. At the interior face of exterior walls and at shaft enclosures, provide mold resistant gypsum wallboard.
  - 1. Basis of Design Product(s):
    - a. National Gypsum Company, Goldbond XP Gypsum Board.
    - b. USG Corp., Mold Tough Gypsum Panels.

**END OF SECTION**

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## 093000 - Tiling

- A. Refer to Finish Schedule in Section 010001 - General Requirements, for typical room finishes per room type.
- B. Acceptable Materials:
  - 1. At wet areas, where floor is sloped to drains, provide 2"x2" (nominal) porcelain tile on sloped concrete or cured mud bed. See requirements below for description of waterproofing systems.
  - 2. Grout:
    - a. Floors – wet and dry areas: Epoxy Grout
    - b. Walls – wet areas: Epoxy Grout
    - c. Walls – dry areas: Polymer modified unsanded grout for joints up to 1/8". Polymer modified sanded grout for joints greater than 1/8".
  - 3. At walls, provide ceramic tile 4"x4" or larger, unless approved by GT Housing.
  - 4. Wall Base: At tile floors, provide cove base trim. Cove to be flush with floor tile, cove base set on top of floor tile is not acceptable.
- C. Floor Tile at Shared Restroom / Shower Areas: Provide waterproof membrane throughout restroom / shower area:
  - 1. Membrane to be continuous from floor to shower pan.
  - 2. Membrane to be continuous from shower pan to wall at shower enclosure.
  - 3. At walls other than shower enclosures, membrane to extend up walls a minimum of 8".
  - 4. Basis of Design Assembly for Waterproof Membrane: Specify a Tile Council of America (TCA) installation assembly appropriate for the selected waterproofing assembly.
- D. Showers Stalls:
  - 1. Alternate Shower Pan: As an alternate to porcelain tile on waterproof membrane and sloped mortar bed, a one-piece solid surface shower pan is acceptable. Confirm direction per project with GT Housing. Coordinate transition of waterproof membrane from floor to shower pan and from shower pan to enclosure walls.
- E. Flood Test: At all wet areas, perform a flood test of the installed waterproofing assembly prior to installing floor tile.

**END OF SECTION**

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**094000 – Ceilings**

- A. Refer to Finish Schedule in Section 010001 – General Requirements, for typical room finishes per room type.
  
- B. Lay-in Acoustical Tile Ceiling System:
  - 1. Suspension System: 2' x 2' x 15/16" wide intermediate duty standard white finish only.
  - 2. Ceiling Tile: Refer to GT Yellow book for ceiling tile requirements.

**END OF SECTION**

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## 096000 – Flooring

- A. Refer to Finish Schedule in Section 010001 - General Requirements, for typical room finishes per room type.
- B. Carpeting: Carpet tiles, installed with manufacturer’s standard Glue-free adhesive squares, or as directed by selected carpet manufacturer. Basis of Design Manufacturer: Interface FLOR.
  - 1. Yarn weight: 18 oz./sq. yd. minimum
- C. Wall base at carpeted areas: Base to be broadloom, solution dyed carpet of pattern and construction to coordinate with field carpet tile in continuous lengths. Base to be adhered to wall, with top edge yarn bound.
  - 1. Yarn weight: 18 oz./sq. yd. minimum
- D. Walk-Off Mat:
  - 1. Approved Product: Walk-off Mat Carpet Tiles
  - 2. Basis of Design Product / Manufacturer: Triad Mat, Collins and Aikman Floor Coverings.
  - 3. Product Description: Tufted Loop, Nylon Carpet Fiber, Fiberglass reinforced polymer backing, 26 oz./sq. yd. weight minimum.
  - 4. Location: At all exterior doors, extend 10’ minimum.
  - 5. Installation: Mat to be flush with adjacent floor finish. Provide metal transition profile appropriate for adjacent finish.
- E. Stair Treads / Risers / Landings: Basis of Design by Roppe. Treads to have a raised design with a square-edge nosing. Landing (excluding discharge level) to be 20”x20” rubber tile with raised design.
- F. Seamless Resilient Flooring (Lobbies / Public Spaces): At public lobbies, subject to cart traffic during student move-in and move-out periods, provide durable surface with minimal joints.
  - 1. Basis of Design Product / Manufacturer: Stonres RTZ, Stonhard, Inc.
  - 2. Product Description: Seamless resilient urethane flooring system infused with rubber aggregate of similar design, with integral 6” high cove profile wall base.
- G. Porcelain Tile Floor: See tiling section.
- H. Solid Vinyl Flooring: “Luxury Vinyl Tile”, including simulated wood flooring planks.
  - 1. Basis of Design Product / Manufacturer: Contour Series, Centiva
  - 2. Description: Class III Solid Vinyl Tile
  - 3. Thickness: 3 mm
  - 4. Wear Layer Thickness: .80 mm
  - 5. Adhesive: Per Manufacturer recommendation.

**END OF SECTION**

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## **098000 – Acoustical Wall Treatment**

- A. Provide Acoustical Wall Panels in stairways accessed by residents to circulate between floors.
  - 1. Basis of Design Product / Manufacturer: Metro Rebound, Wall Technology Inc. / Owens Corning.
  - 2. Product Description:
    - a. Minimum NRC of 0.75 per ASTM C-423-09a
    - b. Panel Construction:
      - 1) Thickness: 1”
      - 2) Edge Profile: Square
      - 3) Core: 6-7 PCF Fiberglass Board with Resin Hardened Edge
      - 4) Face Sheet: Impact resistant, perforated co-polymer.
      - 5) Finish: Manufacturer’s standard, acoustically transparent fabric. Custom fabric acceptable if allowed by panel manufacturer and approved by GT Housing and Campus Interior Designer.

**END OF SECTION**

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## **099000 – Painting and Coating**

- A. Wet Areas / High Abuse: Provide epoxy-polyamide coating system.
  
- B. High Traffic / High Abuse / Dry Areas: Abuse Resistant Paint System
  - 1. Basis of Design Product / Manufacturer: Scuffmaster Scrub Tough, Master Coating Technologies.
  - 2. Product Description: Polyurethane-Fortified Eggshell Paint Finish, solid color.
  - 3. Substrates: Gypsum Wall Board and CMU.

**END OF SECTION**

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## **101400 – Signage**

- A. Signage Design Standard: Contact GT Office of Facilities Management Design and Construction for current housing graphic design standards, including graphic files for approved logos and approved colors. Design to comply with currently adopted State accessibility Code and ADAAG.
- B. Product Description:
1. Material:
    - a. General Room Identification Sign: One-Piece construction, 3/16” thick polycarbonate.
    - b. Resident Rooms Signs: Two-Piece sign with window to accept printed name insert for each room resident. 1/16” poly-carbonate face plate with raised graphics, laminated to 1/8” poly-carbonate back panel, painted to match face panel.
  2. Profile:
    - a. Letters: Raised letters / graphics 1/32” minimum.
    - b. Braille: Grade II, or as required by currently adopted State accessibility code and ADAAG.
  3. Edge Profile: Square.
  4. Edge Finish: Painted
- Fasteners: Countersunk, tamper-resistant fasteners, painted to match faceplate.

**END OF SECTION**

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## 102113 – Toilet Compartments

- A. Toilet Partition Construction: Custom assembly fabricated from following components:
1. Material: Solid Surface material, as described in division 6 section, Architectural Woodwork:
    - a Pilaster: Minimum 1” Thickness
    - b Panels, urinal screens and doors: Minimum ½” thickness.
    - c Pilaster Shoes: Factory fabricated from solid surface material to match pilaster. Minimum ¼” thickness, minimum 6” height. Provide radiused top edge, and miter to follow profile of pilaster on all sides. Metal shoes not allowed.
  2. Hardware: Basis of Design Manufacturer: Jacknob Corporation
    - a Hinges: Cast stainless steel, satin finish; surface-mounted; self-closing hinge type. Provide two (2) hinges per door except at out swinging handicapped doors, which require three (3) hinges.
    - b Brackets: Full-length, continuous extruded aluminum.
    - c Pilaster Base: Galvanized anchorage device for attachment to floor and for leveling of compartment, consisting of threaded rods, saddle, lock washers, leveling nuts and brass or lead expansion shields. Anchors shall penetrate floor a minimum of 1”.
    - d Combination bumper / coat hook (In-swinging doors).
    - e Coat Hook with separate wall bumper (out-swinging doors).
    - f Fasteners: Stainless steel, tamper-resistant/one-way heads where exposed.

**END OF SECTION**

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## **102600 – Wall Protection Systems**

- A. Corner Guards: Provide corner guards at outside corners at high traffic areas (i.e. corridors) and where exposed corners are subject to damage and abuse.
  - 1. Basis of Design Product and Manufacturer: Acrovyn SSM-20, Construction Specialties, inc.
  - 2. Product Description: Surface Mounted Corner Guard.
    - a Material: High impact vinyl acrylic extrusion.
    - b Size: 2” x 2”, full height
  
- B. Bumper Rails: Provide continuous bumper rails at high traffic areas (i.e. corridors) and where exposed partition finishes are subject to damage and abuse:
  - 1. Basis of Design Product and Manufacturer: Acrovyn FR-225n, Construction Specialties Corp.
  - 2. Product Description: Surface mounted bumper rail with radiused end caps at exposed ends.
    - a Material: High impact non-marking vinyl acrylic cover on continuous aluminum retainer.
    - b Size: 2 ¼” high
    - c Mounting: 3 Rows equally spaced, 34” to 38” to top of top rail.

**END OF SECTION**

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## 102813 – Toilet Accessories

- A. Owner supplied / contractor Installed items:
  - 1. Items included:
    - a. Toilet tissue dispensers
    - b. Hand soap dispensers
  - 2. A/E to coordinate with GT Housing on current model supplied, and locate on drawings to coordinate with adjacent construction/finishes and in compliance with current State accessibility Code and ADAAG.
  
- B. Toilet tissue dispensers: At restrooms in apartment style housing units, toilet tissue dispensers to be contractor supplied.
  - 1. Basis of Design product and manufacturer: Bobrick B-6857.
  
- C. Hand Dryers: Hand dryers to be provided in all public restrooms. Paper towels will not be stocked by GT Housing.
  - 1. Basis of Design product and manufacturer: Xlerator XL-SB, Excel Dryer Corporation. Provide stainless steel recess kit where required to meet State Accessibility Code and ADAAG.
  
- D. Feminine Napkin Disposal Cabinets: Not included in base building scope. Loose containers are typically provided by GT Housing.
  
- E. Mop and Broom Holder: Provide in each custodial closet.
  
- F. Robe Hooks:
  - 1. Locations: Provide adjacent to each shower stall. In addition, if a bench is provided within the shower area, provide a row of hooks above the bench, one per shower stall.
  - 2. Description: Surface mounted Hat and Coat Hook
  - 3. Basis of Design manufacturer and product: Bobrick B-682.
  
- G. Heavy-duty Shower Curtain Rod: Basis of Design manufacturer and product: Bobrick B-6047.
  
- H. Shower Curtain:
  - 1. Basis of Design Manufacturer and Product: Bobrick 204 w/ type 204-1 hooks.
  - 2. Description: Opaque, matte white vinyl, .008" (0.2mm) thick, contains antibacterial and flame retardant agents. Nickel-plated brass grommets along top, one every 6" (150mm). Hemmed bottom and sides. Provide type 304 stainless steel hooks. Size as required by specific project requirements.

- I. Framed Mirror: Provide at wall hung lavatories, locate per requirements of current State Accessibility Code and ADAAG
  - 1. Basis of Design manufacturer and product: Bobrick B-165, 18” x 30” minimum.
  
- J. Shower Seat: Provide where required for accessible shower stalls, located and installed per State Accessibility Code and ADAAG.
  - 1. Basis of Design Manufacturer and Product: Bobrick B-517 and B-518, depending on left or right orientation.
  - 2. Secure directly to structure or to solid blocking fastened directly to structure.
  
- K. Pipe Insulation: Provide at wall mounted sinks and lavatories that do not have an apron installed to shield the drain piping and trap:
  - 1. Basis of Design Product and Manufacturer: Lav-Guard 2 by Truebro, Inc.
  
- L. Grab Bars: Install where required by current State Accessibility Code and ADAAG:
  - 1. Description: 1 ¼” diameter, peened grip finish, with mounting concealed by snap flange.
  - 2. Secure directly to structure or to solid blocking fastened directly to structure.

**END OF SECTION**



## 113000 – Residential Equipment

- A. Model / Manufacturer: Contact GT Housing for current appliance and equipment selections and specifications
- B. Communal Kitchens: The following lists equipment typically furnished and included in base building contract for shared kitchens:
1. Microwave: Provide counter space and power for two tabletop units in each communal kitchen
  2. Refrigerator: 18 cubic foot, top-freezer, white, energy star rated, without ice maker.
  3. Range: 30” glass-top electric range
    - a. Color: White
    - b. Controls: Front controls, to meet requirements of current State Accessibility Code and ADAAG.
    - c. Where sides are exposed, specify with finished side panels.
  4. Range Hood: 36” wide range hood unit:
    - a. Duct directly to building exterior. Provide interlock fan at roof, to be energized when any kitchen exhaust fan is energized.
    - b. Provide Dry Chemical Extinguishing system at each hood, complying with NFPA 96 and Authorities Having Jurisdiction. Locate equipment above hood, with a removable shroud of material and finish to match hood assembly. Provide vision port with finished escutcheon within shroud aligned with gauge controls for extinguishing system.
  5. Ice Maker / Storage Bin:
    - a. Storage Bin / Dispenser: 22” wide, 120 lb. capacity. Basis of Design Manufacturer / Model: Scotsman HD22
    - b. Ice Maker: 300 lb capacity, mounted on top of Storage Bin / dispenser. Basis of Design Manufacturer / Model: Scotsman C0322.
- C. Apartment Style Kitchens: In apartment style kitchens in units occupied by both staff and students, the following lists equipment typically furnished and included in base building contracts:
1. Over-the-range Microwave / Vent: White, 1.6 cubic foot, 950 Watt with 2-speed exhaust fan.
    - a. Where required by State Accessibility Code, ADAAG and/or Fair Housing Standards, provide power to accommodate table-top unit.
  2. Refrigerator: 18 cubic foot, top-freezer, white, energy star rated, with ice maker.
  3. Dishwasher: White, Energy-Star Rated.
  4. Range: 30” glass-top electric range
    - a. In units required to meet State Accessibility Code, ADAAG, or Fair Housing Standards, provide unit with front controls.

- b. Color: White
- 5. Washer/Dryer Units (Where required – confirm with GT Housing):
  - a. Type: Stacked Washer/Dryer Combo. Front-load dryer above top-load washer.
  - b. Dryer heat: Electric
  - c. Capacity: Large capacity – 2.6 cubic foot
  - d. Color: White.

**END OF SECTION**

## **12 5000 – Window Coverings**

- A. Horizontal Louver Blinds:
  - 1. Basis of Design Manufacturer / Model: Levolor Riviera
  - 2. Slats: Nominal 1” wide aluminum
  - 3. Operation: Wand Tilter
  - 4. Finish: Alabaster

**END OF SECTION**

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### **129300 – Site Furnishings**

- A. Cook Grill: Basis of Design Manufacturer / Model: R. J. Thomas Mfg Co., Model No. EC-26, with optional utility shelf.
  - 1. Installation: Direct bury base #B-2.
  
- B. Hot Coal Disposal Bin: Basis of Design Manufacturer / Model: Pilot Rock HCB / B-1.

**END OF SECTION**

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## 142000 – Elevators

- A. Hoist Mechanism: Machine-room-less (MRL) electric traction elevator.
- B. Capacity: 4,000 lb
- C. Speed: 150 fps min, greater speeds may be required depending on number of stops.
- D. Car Size: Service size, or as required by GT Housing and requirements of Authorities Having Jurisdiction for accommodation of stretcher.
- E. Car Enclosure:
  - A. Partial Glass Back: Where elevator hoistway is located on an exterior wall, provide elevator car enclosure with laminated glass back, aligned with corresponding glazing in hoistway enclosure, to provide visibility into the car for enhanced security.
  - B. Wall Panels: Custom heavy duty stainless steel wall panels.
    - a. Basis of Design Manufacturer: Rigidized Metals Corporation.
    - b. Finish: Random Swirl
    - c. Pattern: RB4 – Raised Square design
    - d. Material / Thickness: .060” Type 304, applied to ½” thick fire-retardant treated substrate panel, wrap metal over front and side edges of panel.
  - C. Ceiling: Manufacturer’s standard stainless steel ceiling panels, satin finish.
- F. Signalization:
  - A. Provide Vandal Resistant Controls and Signalization at Car Operating Panel, Hall Lanterns / Hall Position Indicators, and Hall Stations.
    - a. Impact, scratch, burn and splash resistant.
    - b. Textured stainless steel face plates
    - c. Buttons: non-projecting, metallic, and impact resistant with round amber call acceptance light.
    - d. Mounting: Flush.
- G. Security Hardware: Traveler cable to be specified with data connection for proximity card reader to interface with the car operating panel to provide card access security to each floor.

**END OF SECTION**

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## **220553 - Identification for Plumbing Piping and Equipment**

- A. Equipment Labels: Metal Labels for Equipment: Material and Thickness: Brass, 0.032-inch minimum thickness and having predrilled or stamped holes for attachment hardware. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch. Minimum Letter Size: 1/4 inch. Fasteners: Stainless-steel rivets or self-tapping screws. Label Content: Include equipment's Drawing designation or unique equipment number. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch paper. Equipment schedule shall be included in operation and maintenance data.
- B. Pipe Labels: General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions. Lettering Size: At least 1-1/2 high. Provide pipe labels on 10-foot centers, piping change of directions, wall penetrations and branch takeoffs, inside mechanical room or equivalent spaces. Provide pipe labels on 20-foot centers, piping change of directions, wall penetrations and branch takeoffs, in all other spaces.
- C. Valve Tags: Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware. Fasteners: Brass S-hook. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses. Valve-tag schedule shall be included in operation and maintenance data. Provide plastic label with white background and black lettering, sized to fit and adhered to the metal T-bar ceiling grid. Locate labels directly below valve.

**END OF SECTION**

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## **221116 – Underground Pre-Insulated Domestic Water Piping**

### **1. General:**

- A. Provide pre-insulated domestic underground pipe, outside the footprint of the building connecting city mains and or from service meters on piping 2-1/2 inches and smaller.
- B. Provide domestic ductile iron underground pipe, outside the footprint of the building connecting city mains and or from service meters on piping 3 inches and larger.
- C. Provide identification plastic-tape for warning and identification of buried piping. Warning and identification shall be "CAUTION BURIED DOMESTIC PIPING BELOW" or similar wording. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material.

### **2. Underground Domestic Ductile-iron pipe (3" and larger):**

- A. Mechanical-Joint, Ductile-Iron Pipe shall comply with AWWA C151, with mechanical-joint bell and plain spigot end. Ductile-Iron Fittings shall be AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

### **3. Underground Domestic Pre-Insulated Piping (2-1/2" and smaller):**

- A. Specify a complete HDPE jacketed system of factory pre-insulated copper piping for the domestic water service. Domestic Hot, Cold and Return Water: Carrier pipe shall be copper type "K", ASTM B-88. standard weight for all sizes. Copper pipe should have ends cut square and beveled for butt-welding. Straight sections of factory insulated pipe shall have 6" of exposed pipe at each end for field joint fabrication. The jacket throughout the entire system shall incorporate electric fusion, butt fusion, or extrusion welding at all fittings, joint closures, or other points of connection. This shall create a jacket that is seamless throughout the entire system with the exception of anchors, whose water shed rings are sealed with a Raychem Dirax or Canusa GTS-65 wrap prohibiting the ingress of water. All pre-insulated pipe, fittings, insulating materials, and technical support shall be provided by the Pre-insulated Piping System manufacturer.
- B. Fittings shall be factory prefabricated and preinsulated with urethane to the thickness specified and jacketed with a molded or mitered, extrusion welded PE jacket. Carrier pipe fittings shall be butt welded, except sizes smaller than 2' shall be socket-welded. Fittings include expansion loops, elbows, tees, reducers and anchors.
- C. Field Service: Specify field service provided by a factory representative. The factory representative will be available at the job to test all HDPE fusion welds, check pipe installation,

conduct system pressure testing, inspect field joint insulation, and observe backfilling techniques.

**END OF SECTION**

## **221316 – Plumbing Piping, Valves and Specialties**

### **1. Sanitary Waste And Vent Piping:**

- A. Soil, Waste, and Vent Piping Below Ground: Piping: Hub-and-spigot cast-iron soil pipe, ASTM A 74. Fittings: Hub-and-spigot cast-iron soil pipe fittings, ASTM C 564 neoprene rubber gaskets, lubricant, and compression joints, ASTM A 74, Service Class.
- B. Soil, Waste, and Vent Piping Above Ground: Piping: Hubless cast-iron soil pipe, CISPI 301. Fittings: Hubless cast-iron soil pipe fittings; stainless-steel, or cast-iron couplings for hubless cast-iron soil pipe and fittings; and hubless joints, with ASTM C 564 neoprene sealing sleeve, with stainless-steel corrugated shield-and-clamp assembly, CISPI 301. Sealing gasket: ASTM C 564 neoprene sealing gasket, with cast-iron housing and stainless steel bolts.

### **2. Natural Gas Distribution:**

- A. Piping: ASTM A 53, Type S, Grade A, Schedule 40, seamless, plain ends. Fittings: Malleable-Iron, ASME B16.3, Class 150, standard pattern, with threads conforming to ASME B1.20.1.
- B. Underground Polyethylene (PE) Gas Piping: Pipe: ASTM D 2513, 100 psig working pressure, Standard Dimension Ratio (SDR), the ratio of pipe diameter to wall thickness, 11.5 maximum. Socket Fittings: ASTM D 2683. Butt-Fusion Fittings: ASTM D 2513, molded. Provide tracing wire for underground piping.
- C. Provide identification plastic-tape for warning and identification of buried piping. Warning and identification shall be "CAUTION BURIED NATURAL GAS PIPING BELOW" or similar wording. Use permanent code and letter coloring unaffected by moisture and other substances contained in trench backfill material. Provide 10 AWG copper tracer wire for locating PE piping. Insulation color shall meet the APWA color code standard for identification of buried utilities.
- D. Risers: Manufacturer's standard riser, transition from plastic to steel pipe with 7 to 12 mil thick epoxy coating. Use swaged gas-tight construction with O-ring seals, metal insert, and protective sleeve. Provide remote bolt-on or bracket riser supports.
- E. Provide metal sleeve on plastic piping turning up above grade for grounding and Cathodic protection. Exposed plastic piping should be protected with metal sleeve.

### **3. Rainwater (Interior):**

- A. Piping Above and Below Ground 8" and smaller: Polyvinyl chloride, schedule 40, ASTM D1785-1991 with solvent cement joint connections.
- B. Rainwater piping passing through fire rated partitions shall be wrapped with fire rated material or cast iron.

4. **Domestic Valves:**

- A. Provide body with rising stem Gate Valves on lines 4" and Larger: MSS SP-70; Class 125 iron body, bronze mounted, with body and bonnet conforming to ASTM A 126 Class B; with flanged ends, "Teflon" impregnated packing, and two-piece backing gland assembly.
- B. Provide Ball Valves on lines less than 4": Rated for 150 psi saturated steam pressure, 400 psi WOG pressure; 3-piece construction; with bronze body conforming to ASTM B 62, conventional port, chrome-plated brass ball, replaceable "Teflon" or "TFE" seats and seals, blowout proof stem, and vinyl-covered steel handle. Provide solder ends for condenser water, chilled water, and domestic hot and cold water service; threaded ends for heating hot water and low-pressure steam.

5. **Backflow Preventors:**

- A. Provide full size Bypass with valve around backflow preventers with valve isolations.

6. **Water Pressure Regulators:**

- A. Provide full size Bypass with valve around water pressure regulators with valve isolations.

7. **Hose Bibs:**

- A. Provide metal recessed and lockable access panels with power washer and hose bib connection adjacent to every entrance and adjacent to roof mounted equipment. Bronze body, with renewable composition disc, 1/2 or 3/4 inch (DN 15 or DN 20) threaded or solder-joint inlet. Provide ASME B1.20.7 garden-hose threads on outlet and integral or field-installed, non-removable, drainable, hose-connection vacuum breaker.

8. **Water Meters**

- A. Provide full size Bypass with valve around water meters. Group service to laundry facilities in buildings on separate meter tied into the building automation system.

9. **Floor and Shower Drains**

- A. Provide square grate for all floor and shower drains in tile locations.

10. **Clean Outs**

- A. Where possible provide wall clean-out for maintenance.

**END OF SECTION**

**224000 Plumbing Fixtures**

<b>BUILDING TYPE</b>	<b>TYPE of FIXTURE or EQUIPMENT</b>	<b>Water Usage (GALLONS/USE)</b>
Resident Hall, Student Dorm	Widespread faucets (under counter mounted) with solid brass pop-up lavatory drain	0.5 gpm aerator, manual hot and cold operated
Resident Apartment or Staff Apartment	Widespread faucets (under counter mounted) with solid brass pop-up lavatory drain	0.5 gpm aerator, manual hot and cold operated
Resident Hall, Student Dorm Kitchens	Widespread faucets (under counter mounted) (NO SPRAYER)	2.2 gpm, manual hot and cold operated
Resident Apartment Kitchens	Widespread faucets (under counter mounted) WITH SPRAYER	2.2 gpm, manual hot and cold operated
Resident Hall, Student Dorm	Floor Mounted Toilets	1.1 / 1.6 gallon per flush, manual operated dual flush
Resident Hall, Student Dorm	Toilets Flush Valve	1.1 / 1.6 gallon per flush, manual operated dual flush
Resident Hall, Student Dorm	Urinals	0.125 gallons per flush (pint), manual operated
Resident Hall, Student Dorm (Gang Bathroom)	Showerheads Shower Valve: Pressure balancing shower valve, Scald-Guard valve	1.0 gpm vandal resistant wall mounted type with Bricor shower head attached to small extension 6'6" height off finished floor to head.
Resident Apartment	Showerheads Shower Valve: Pressure balancing shower valve, Scald-Guard valve	1.0 gpm arm type Bricor shower head 6'6" height off of finished floor to head.
Resident Hall, Student Dorm, Resident Apartment	Domestic Water Heaters – provide instantaneous or semi-instantaneous. Provide sacrificial anode to prevent corrosion of piping.	N/A

**END OF SECTION**

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## **230001 – Mechanical General and Design**

### **1. MECHANICAL CODES AND STANDARDS**

- A. LEED – Mechanical system design shall meet the minimum requirements to achieve LEED certification, with emphasis placed on energy savings.

### **2. MECHANICALLY VENTILATED SPACES**

- A. Meet the minimum requirements of ASHRAE Standard 62.1-2010.

### **3. PIPE IDENTIFICATION SYSTEM**

- A. All piping shall be labeled to show direction of flow and identify service. Labels shall be applied every 20 feet, change in direction, and on both sides of wall penetrations.
- B. All valves shall be provided with valve tags indicating type, service and ID. Valve location shall be identified on ceiling grid. Valve ID shall be indicated on the as-built drawings.

### **4. WATER TREATMENT**

- A. Coordinate with GT Housing Department for contractor information specific to project.

### **5. CAMPUS CHILLED WATER SYSTEM**

- A. Cooling coil condensate shall be collected to a holding tank for re-use; coordinate with plumbing.
- B. Holding tank requirements shall be coordinated with the GT Yellow Book cistern section.
- C. In the event that the project site does not allow for a holding tank, the cooling coil condensate shall be collected to a central location for future connection to a holding tank.

**END OF SECTION**

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## **230002 – HVAC – General and Design**

### **1. CONDITIONING REQUIREMENTS**

- A. Air Conditioning and Heating: Student bedrooms, living rooms, storage corridors, kitchens, study rooms, stairwells, offices, bathrooms, vending rooms, laundry rooms and elevator lobbies.
- B. Dedicated Air Conditioning: Telecommunications rooms and elevator machine rooms.
- C. Mechanical/Ventilation: Janitors closets, toilet rooms, shower rooms, vending machine rooms, electrical and mechanical equipment rooms.
- D. Dedicated Ventilation: Chemical storage and cleaning supply rooms.

### **2. INTERNAL LOADS**

- A. All spaces shall be designed per ASHRAE Standard 90.1-2010

### **3. OUTSIDE AIR**

- A. All spaces shall be designed per ASHRAE Standard 62.1-2010
- B. All outside air shall be dehumidified and conditioned prior to entering the building.
- C. All outside air shall be supplied by a dedicated outside air system. Energy recovery system is required.

### **4. TEMPERATURE CONTROL**

- A. Living Areas: Zone maximum one dorm room or apartment per zone.
- B. Corridors: Dedicated system, single floor per zone maximum.
- C. Offices, Study Rooms, Conference Rooms: Zone maximum three (3) spaces per thermostat zone.
- D. Laundry Rooms and Kitchens: Dedicated system, single zone.
- E. Provide CO2 direct control ventilation (DCV) for high occupant spaces. CO2 sensors shall only be used if there is energy savings to be gained.

### **5. AIR FILTRATION**

- A. All air filters shall be provided as recommended by ASHRAE Standard 52.2-07.

### **6. APPROVED AIR CONDITIONING SYSTEM**

- A. Ceiling mounted fan coil and/or air handling units shall not be used unless approved by housing.
- B. Fan Coil Units (4-Pipe System): Minimum 3-row chilled water coil, heating hot water coil located in the pre-heat location, 3-speed direct drive fan, modulating 2-way pressure independent water control valves, and filter.
- C. Air Handling Units (4-Pipe System): Minimum 3-row chilled water coil, heating hot water coil located in the pre-heat location, 3-speed direct drive fan, modulating 2-way pressure independent water control valves, and filter.
- D. Fan Coil Unit (Cooling Only): 3-pipe chilled water coil, 3-speed direct drive fan, modulating 2-way pressure independent control valve, and filter.

- E. Fan Coil Unit (Heating/Ventilation Only): Heating hot water coil, modulating 2-way pressure independent control valve, and filter.
- F. Pipe all fan coil units hot on the left and cold on the right.
- G. Energy Recovery Unit (ERU): 4-pipe chilled and heating hot water coils, dual enthalpy and sensible energy recovery wheels and variable frequency drive (VFD) supply and exhaust fans. Pre-heat and reheat coils, coil access sections, bypass capability, and segmented energy wheels that allow piece-by-piece wheel removal for service. The unit shall be a packaged system, factory tested with factory provided controls to provide temperature and humidity control. Unit shall be capable to supply 70°F at 42% RH (adj.).
- H. Premium efficiency motors shall be provided for all motors over 1 HP.

## **7. APPROVED CHILLED AND HOT WATER PIPING DISTRIBUTIONS**

- A. Chilled Water System: System shall be variable secondary pumping through the building with the campus loop acting as the primary loop. System shall bridge to the primary campus loop with automatic pump bypass. System shall maintain a 6 to 8 psi (adj.) differential pressure across the farthest FCU coil and valve in the loop.
- B. Provide minimum 10% chilled water bypass utilizing a pressure independent control valve.
- C. Each FCU and AHU shall have a 2-way modulating, pressure independent control valve. The control valve shall be provided with manual dial to calibrate flow. Control valves shall be automatically balancing.
- D. Heating Hot Water System: System shall be variable primary pumping through a shell and tube, steam to heating hot water converter or a condensing boiler plant. System shall control from return water temperature, maintain supply water temperature at maximum 160°F (adj.) and be provided with outdoor temperature reset. Condensing boiler return water maximum temperature shall be 110°F.
- E. Provide a cathodic protection system for all hot water systems.
- F. Pipe risers shall be provided with isolation valves and automatic air vents at the high points. Provide drain valves and drains at bottom of all risers.

**END OF SECTION**

### **230519 – Metering and Related Piping**

- A. Reference GT Yellow Book
- B. Individual Buildings shall be metered for electric, natural gas, domestic cold water, domestic hot water, chilled water, steam, steam condensate, and/or heating hot water. Coordinate all metering with The Office of Facilities Management Design and Construction.
- C. Laundry rooms shall be metered separate for water, electric and natural gas consumption.
- D. Metering shall conform to LEED requirements.
- E. Leasing centers and parking decks shall be metered separate.
- F. Sub-metering shall be per design; coordinate with GT Housing Department.

**END OF SECTION**

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**230800 – Commissioning**

**1. DESCRIPTION**

- A. Commissioning shall meet and include LEED requirements.
- B. Provide enhanced commissioning on all projects.
- C. Include post-occupancy commissioning on a quarterly basis for the 1st year of building occupancy.

**2. SYSTEMS TO BE COMMISSIONED**

A.

Mechanical Equipment and System	Functional Test Requirements Specified in:	Mechanical Equipment and System	Functional Test Requirements Specified in:
Fan Coil Units (FCU)	230900	Test, Adjust, and Balance	230900
Air Handling Units (AHU)	230900	Test, Adjust, and Balance	230900
Energy Recovery Units (ERU)	230900	Test, Adjust, and Balance	230900
Outside Air Units (OAU)	230900	Test, Adjust, and Balance	230900
Fans	230900	Test, Adjust, and Balance	230900

**END OF SECTION**

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## **230900 – DDC CONTROLS AND HVAC INSTRUMENTATION**

### **1. DETAILS OF CONTROLS**

- A. Fan coils/air handling units shall have the following: LCD display thermostat indicating room and setpoint temperature, 0-10V/4-20 mA signal for water control valves, high and low temperature limit lockout with adjustable setpoints, occupancy sensor (motion and infrared) for HVAC shut down.
- B. Building system temperature setpoints and lockouts shall be controlled individually and/or by whole building.
- C. Energy recovery (ERU) and outside air units (OAU) shall have the following: LCD display thermostat indicating space temperature. LCD display humidistat indicating space humidity. Thermostat outputs shall interface with the control package provided by the unit manufacturer. Unit controls shall be interlocked to the building automation system (BAS) for monitoring and control.
- D. All controls shall be Direct Digital Control (DDC).
- E. Boiler plant heating hot water loop controls shall include water temperature reset based on outdoor air temperature.

### **2. EQUIPMENT**

- A. Manual volume, air balancing dampers located over inaccessible ceilings shall be provided with remote actuators.
- B. Fire/smoke and/or smoke dampers shall be provided with automatic smoke detector reset.
- C. Automatic flow control valves: Valves shall be 2-way pressure independent modulating flow control valves. Valves shall modulate the water coil flow to match the load and be provided with gpm dial for balancing. Valves shall be self-balancing and have 100% authority.
- D. Valve actuator shall be driven by a 24V AC/DC motor and shall accept 0-10V DC, 2-10V DC, 0-20 mA, 4-20 mA, 2-position or 3-point floating electric input signal. Actuator shall be capable of providing same as input, 0-10V DC, 2-10V DC, 0-20 mA, 4-20 mA, feedback signal to the control system. Valves and actuators shall have a 5-year product warranty.
- E. Valves in insulated piping systems shall have an extension on the valve to facilitate operation of valve without compromising insulation thickness.
- F. All fan coil and air handling units shall be provided with a condensate overflow switch to shut down the unit.

**END OF SECTION**

## **230901 – COMPRESSED AIR PIPING SYSTEMS**

### **1. PNEUMATIC CONTROL SYSTEMS**

- A. New construction shall be provided with electronic controls.

**END OF SECTION**

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## **231112 – CAMPUS CHILLED WATER DISTRIBUTION SYSTEM**

### **1. CAMPUS CHILLED WATER DISTRIBUTION SYSTEM**

- A. Secondary building chilled water connection to the primary campus chilled water distribution system shall be direct with isolation valves. Provide isolation valves, P/T ports, thermostats, pressure gauges, and temperature and pressure sensors for metasys campus control system interlock on both the supply and return piping connection.
- B. Campus bypass to the chilled water loop shall not be provided.
- C. Isolation valves shall be double offset, high performance butterfly valves.

**END OF SECTION**

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## **231113 – HYDRONIC PIPING**

### **1. VALVES, STRAINERS, UNIONS AND FLANGES**

- A. Fan coil and air handling unit coil connections shall have flexible hose connections, isolation valves, unions, T and P ports on both supply and return sides of each hydronic coil. The supply side of the coil shall have a strainer and the control valve shall be located on the return side of each hydronic coil. Provide pressure test ports on supply and return sides of control valves.
- B. Provide pressure test ports across all pressure independent control devices.

### **2. PENETRATIONS OF WALLS AND FLOORS**

- A. Underground wall penetrations shall be provided with pipe sleeve and link seal.
- B. All rated penetrations shall be firestopped.

### **3. INTERIOR CHILLED WATER SYSTEMS**

- A. All cold water piping shall be closed cell rigid foam insulation with vapor retarder film and tape. Fiberglass is not allowed for cold water piping.
- B. Elbows, valves, tees, unions, and fillings shall be insulated with pre-formed blocks and covers.
- C. Insulation shall have a 25/50 flame spread/smoke developed rating.
- D. Valves requiring access and maintenance shall be provided with an insulated valve wrap that is easily removable and resealed. Approved manufacturer: No-sweat valve wraps or submit for equal.
- E. Chilled water and condensate piping shall be insulated continuous to the coil connections, including over condensate drain pans. Provide Armaflex insulating tape or approved equal.
- F. All flexible hoses shall be insulated. Insulation shall be tight, provide Armaflex insulating tape or approved equal.

**END OF SECTION**

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## **232123 – HYDRONIC PUMPS**

### **1. PUMP CHARACTERISTICS**

- A. Provide premium efficiency motors for variable speed drive applications.
- B. Pumps shall be selected for maximum efficiency with life cycle cost compared to initial cost.

**END OF SECTION**

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## **232213 – STEAM AND CONDENSATE HEATING PIPING**

### **1. PIPING CHARACTERISTICS**

- A. Isolation valves for steam shall be triple offset, high performance butterfly valves.

**END OF SECTION**

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## **234100 – AIR TREATMENT – FILTERS**

### **1. FILTER CHARACTERISTICS**

- A. Filter selection shall comply with ASHRAE Standard 52.2-2007. Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

**END OF SECTION**

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## **237200 – VENTILATION SYSTEMS**

### **1. GENERAL**

- A. Exhaust duct serving high humidity areas (shower rooms, etc.) shall be constructed of aluminum.
- B. Exhaust fans shall be direct drive where possible and provided with solid state speed controller for balancing.
- C. Common area residential kitchen exhaust duct risers shall be U.L. listed, zero clearance, double wall, factory insulated grease duct.
- D. Common area kitchen range exhaust hoods shall be provided with fire suppression system.

**END OF SECTION**

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## **237313 – INDOOR CENTRAL-STATION AIR-HANDLING UNITS**

### **1. GENERAL**

- A. Premium efficiency motors shall be provided for all motors over 1 HP.

**END OF SECTION**

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## **238123 – COMPUTER ROOM AIR CONDITIONING UNITS**

- A. MDF Rooms and IDF closets shall be provided with dedicated chilled water fan coil units. Units shall be located outside the computer room where possible. Fan coil units located inside computer rooms shall be ductless with all control valves and valve accessories located exterior to the room. No piping shall be routed above electronic equipment. Water piping routed above electronic equipment shall be protected.
  
- B. Dedicated DX cooling systems are acceptable when chilled water is not available.

**END OF SECTION**



## **238234 – EPA TITLE V REQUIREMENTS**

### **1. GENERAL**

- A. All natural gas fired equipment requires coordination with the GT Department of Environmental Health & Safety. Equipment selections and characteristics shall be submitted early in the design. Submittals shall be provided to the GT project manager for submission to the GT Department of Environmental Health & Safety.

**END OF SECTION**

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**260000 – ELECTRICAL - GENERAL**

This appendix establishes housing design standards for both renovation and new construction of campus housing that are not listed in the Yellow Book. Please refer to the Georgia Tech Yellow Book for all other engineering guidelines and design standards not listed in this appendix.

**1. GENERAL REQUIREMENTS:**

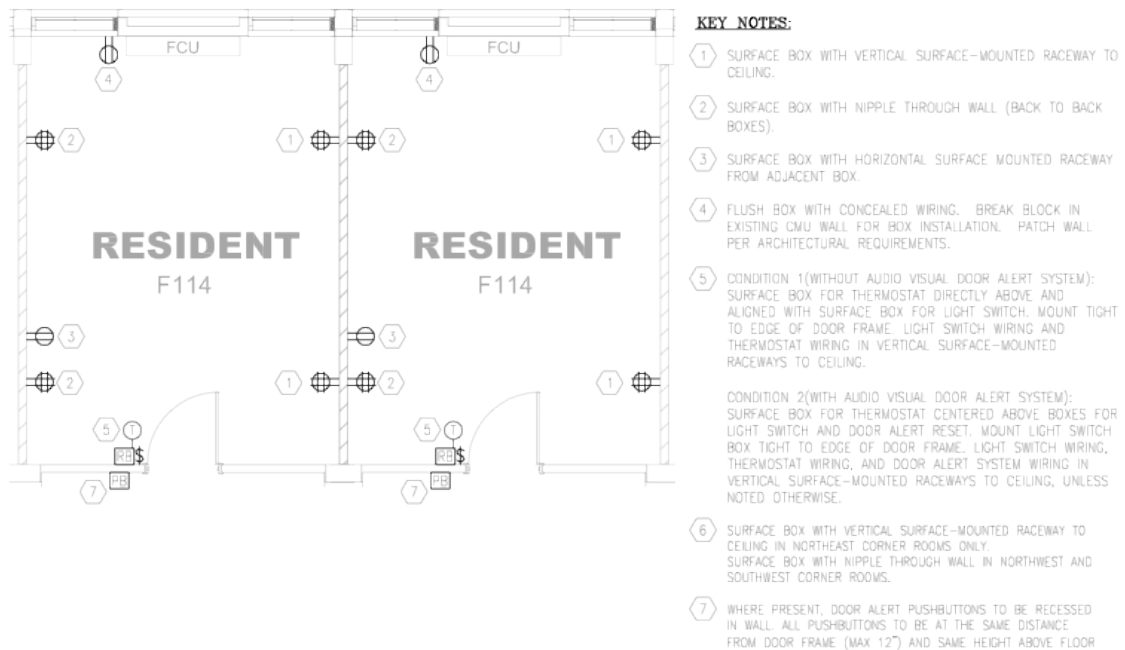


DIAGRAM E1





## **260500 – Common Work Results for Electrical**

### **1. DEFINITIONS**

- A. Apartment Unit - A single unit, providing complete and independent living facilities for one or more persons, including permanent provisions for living, sleeping, cooking, and sanitation.
- B. Dorm Room – A sleeping room without permanent provisions for cooking.

### **2. CODES AND STANDARDS**

- A. LEED – Electrical system design shall meet the minimum requirements to achieve LEED certification, with emphasis placed on energy savings.

**END OF SECTION**

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## **260519 – Low-Voltage Electrical Power Conductors and Cables**

### **1. BRANCH CIRCUITS**

- A. A dedicated homerun junction box shall be provided in each dorm room. Consideration should be given to the location of the homerun junction box within dormitory rooms (where the branch circuits are pulled from a common electrical closet). These junction boxes must be accessible. Access can be gained through the removal of the light fixture in the ceiling, a blank cover plate on the junction box, or an access panel will need to be provided at the location of the junction box.
- B. AFCI protection shall be provided in accordance with the requirements of the NEC for dwelling units and shall also be provided for branch circuits serving dorm rooms.
- C. Garbage disposers shall be provided in all communal and private kitchens. Provide branch circuiting for connection of this equipment.
- D. A minimum of two branch circuits shall be provided in all communal kitchens for microwaves.
- E. Provide labeling of branch circuits at each device location for future maintenance use. Labeling shall be placed on the inside of the cover plate so that it cannot be easily removed.
- F. Type NM cable is prohibited.

**END OF SECTION**

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## **260533 – Raceways and Boxes for Electrical Systems**

### **1. CONDUIT AND RACEWAY**

- A. Surface raceways shall be metallic and shall not be smaller than Wiremold 700 series.
- B. Non metallic tubing is prohibited unless approved by Georgia Tech Housing.

### **2. INSTALLATION**

- A. Consideration shall be given during the renovation of an existing building to limit the amount of exposed raceway used. Where possible, outlet boxes should be located in back to back conditions to limit the surface raceway to one side of the wall. See diagram E1 for further details.
- B. The use of powder driven anchors in concrete and masonry walls is prohibited.

**END OF SECTION**

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## **260573 – Short Circuit and Coordination Study**

### **1. SHORT-CIRCUIT, COORDINATION AND ARC-FLASH HAZARD STUDIES**

A. Studies shall include the load centers in all apartment units.

### **2. ARC-FLASH HAZARD WARNING LABELS**

A. Warning labels shall be provided for load centers in all apartment units.

**END OF SECTION**

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## **260923 – Lighting Control Devices**

### **1. OCCUPANCY SENSORS**

- A. Occupancy sensors shall be hard-wired in all new construction.
- B. Wireless occupancy sensor systems may be used in renovation projects or retrofit applications where hard-wired systems cannot be easily installed.
- C. Wireless occupancy sensors shall be powered entirely by energy-harvesting solar cells. Consideration shall be given to the location of these sensors to minimize the amount of time spent in complete darkness in order to maintain the solar exposure necessary to operate.
- D. Minimum time delay shall be 30 minutes unless requested otherwise by Georgia Tech Housing.
- E. Occupancy sensors shall not be used in dorm rooms and/or apartment units. Manual controls shall be used in these areas.
- F. In multiple common area/corridor applications, each corridor shall be treated as an individually controlled space.
- G. Manual “off” wall switches shall be provided in study rooms and communal kitchens where lighting is controlled by an occupancy sensor.

**END OF SECTION**

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## **262416 – Panelboards**

### **1. LOAD CENTERS**

- A. Load Centers shall be used for all staff apartments within a dormitory building. These load centers shall be located within the apartment unit.
- B. A load center shall be provided for all door control circuits and shall be located within the APC enclosure provided by Division 280000 to house the door controls. Coordinate each load center size with the APC enclosure.

**END OF SECTION**

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## **262813 – Electricity Metering**

### **1. INSTALLATION**

- A. A metering detail shall be provided in the design documents indicating how the master meter and sub-meters (if any) are to be connected. Refer to Diagram E2 as an example of this requirement.
- B. Coordinate all sub-metering requirements with Georgia Tech Housing.

**END OF SECTION**

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## **262726 – Wiring Devices**

### **1. WIRING DEVICES**

- A. A weatherproof GFCI receptacle shall be provided adjacent to all hose bibbs on the building exterior.

**END OF SECTION**

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## **263300 – Battery Equipment**

### **1. UNINTERRUPTIBLE POWER SUPPLY**

- A. A UPS shall be provided for door controls and communications electronics, including network switches, telecoms equipment, etc. A maintenance bypass shall be provided to service the UPS."

**END OF SECTION**

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## **265100 – Interior Lighting**

### **1. INTERIOR LIGHTING**

- A. The use of LED recessed downlights is encouraged. Other LED applications can be used as approved by Georgia Tech Housing.
- B. T5 Fluorescent lamps are to be specified for general lighting.
- C. Fluorescent strip lights shall be used at all vanities and toilet walls in communal bathrooms. These lights are to be located within the wallboard cove with an egg crate grill by architect.
- D. All lensed fluorescent fixtures shall be provided with a #19 pattern lens, 0.156" thickness.
- E. Wall sconce fixtures in resident hall corridors are discouraged.
- F. Wireguards shall be provided on all bare-lamp fixtures located in mechanical, electrical, and storage rooms.
- G. A junction box with a blank coverplate shall be provided on the wall 46" AFF to center at the entrances to all communal bathrooms. A 1/2" conduit shall be provided from this box to the lighting circuit at occupancy sensor or other accessible point as shown for interconnection of future switches.

**END OF SECTION**

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## **265600 Exterior Lighting**

### **1. EXTERIOR LIGHTING**

- A. Coordinate with housing as to what is considered campus site lighting and what will be considered building lighting for each project.
- B. The use of in ground light fixtures is prohibited unless otherwise approved by Georgia Tech Housing.
- C. All exterior lights (poles and building floods) shall have an ID sticker at reading level below them.

**END OF SECTION**

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## **270500 Common Work Results for Communications**

### **1. General**

Housing Building projects shall adhere with the Georgia Tech Yellow Book Requirements plus the following additional requirements:

- A. Number of telecom rooms shall be minimized per housing building. Requirement shall be to ensure that the 90 meter cabling rule is satisfied. In general, designers shall confirm that cabling distances are not in excess of ~250' to accommodate for service loops.
- B. In housing buildings, stacked telecom chases shall be provided to allow cabling distances to be minimized.
- C. For telecom outlets in housing buildings, designer shall require deep back boxes with tile rings to accommodate bend radius of coaxial cables.
- D. Telecom outlet boxes shall be provided with dedicated 1" EMT from outlet box to telecom room/chase. Where outlet boxes are mounted on same wall or back to-back, single homerun may be shared by two back boxes but conduit size to be adjusted to be in accordance with maximum 40% cabling fill in any given raceway.
- E. For housing renovation projects, surface mount raceway shall be permitted from surface mount outlet box to ceiling space. For areas with inaccessible ceilings, minimum 8" x 8" ceiling mount access panel shall be required in each student room to accommodate transition between surface mount raceway and EMT conduit above ceilings.
- F. Locations of wireless data access point cabling outlets shall be determined by Georgia Tech Housing.
- G. In fitness spaces, one CATV outlet shall be required per fitness machine.
- H. All laundry equipment shall be network based. Coordinate with Georgia Tech Housing for cabling requirements.
- I. All ATM machines in housing buildings shall be provided with Category 5e data outlet. Coordinate with manufacturer for outlet height requirement.
- J. Housing building irrigation systems shall be networked based and will require Category 5e data circuits. Coordinate with location of irrigation controllers.

### **2. Telecommunication Outlet Components/Configurations:**

- A. Housing Student Room: (1) cat5e data outlet and (1) cat5e voice outlet shall be provided per student bed & (1) CATV outlet shall be provided per student room.
  
- B. Housing Study Rooms – Each housing study room shall be provided with (1) cat5e data outlet, (1) cat 5e voice outlet, and (1) CATV outlet mounted at 72” AFF.

**END OF SECTION**



## **274100 Multimedia Infrastructure**

### **1. General**

- A. Housing buildings may be equipped with classrooms. When this is the case, all of the requirements noted in the Georgia Tech Yellow Book shall apply.
- B. In Housing buildings, noted conference rooms shall be equipped with audio/visual systems that will be required to be coordinated with Georgia Tech multimedia standards. The general requirements of conference rooms shall include the following:
  - 1. Flat panel LCD screen with integral speaker systems – Sized & provided by Georgia Tech
  - 2. The AV Input Plate Module placed in two 2-gang electrical housings at outlet height. Location is in the front of the room to the left of the flat panel LCD screen. All connections to the input plate must be designed for quick disconnect. Refer to Section 2.01.1A of [Section 274100](#) (Multimedia Infrastructure) for specific requirements.
  - 3. AV grommet wall plate module placed in two 2-gang electrical housings placed behind flat panel LCD screen for cable routing between AV Input Plate and LCD screen.

**END OF SECTION**

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## 281300 Access Control

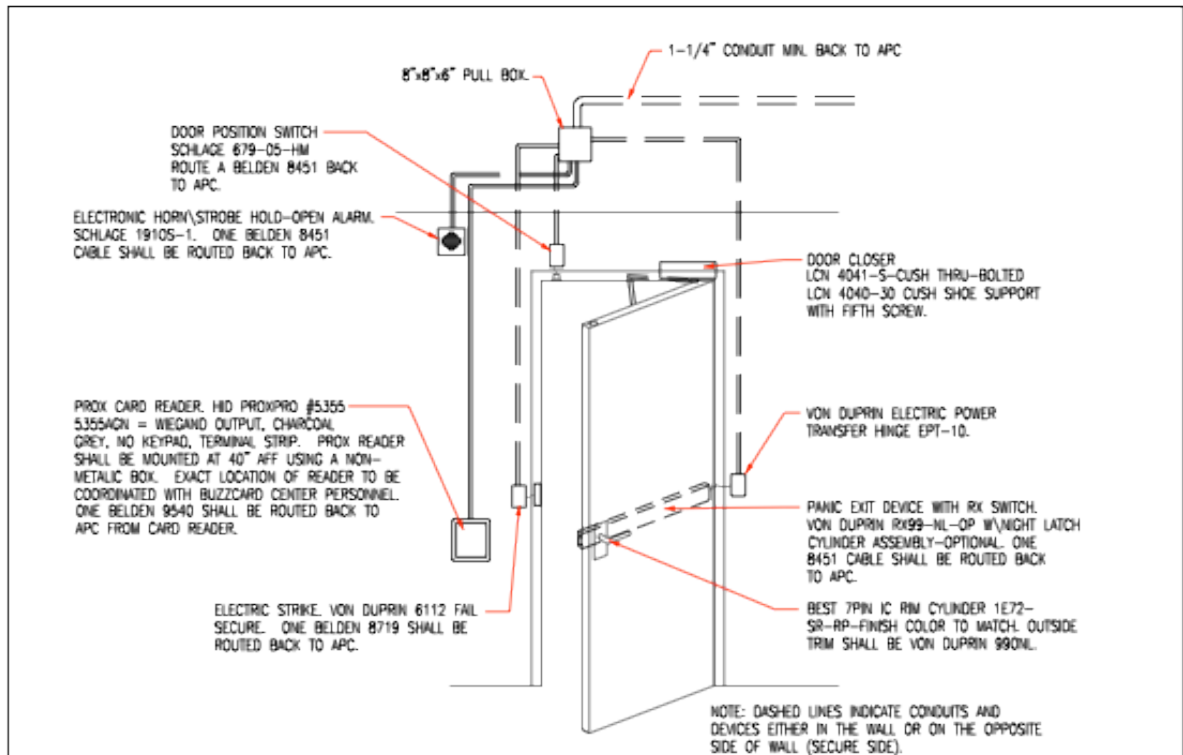
### 1. General

- A. Georgia Tech Housing Access Control Systems (ACS) shall be based on the products of Blackboard in order to integrate with existing systems.
- B. When routing cabling through hollow metal door frames, the security contractor shall be responsible for drilling holes in door frames and all holes shall be de-burred of all rough edges. In addition, a protective plastic bushing shall be installed in all drilled holes to ensure a smooth path for all installed cabling.
- C. All doors provided with electronic access control and/or security systems shall contain conduit in the door frames. This includes store-front doors.
- D. All openings provided with electric door hardware shall be equipped with mechanical key override.
- E. All security & access control systems shall be powered from emergency panel boards.
- F. For Housing projects, the following security & access control requirements shall be provided:
  - 1. Composite cables may be utilized for wiring all security and access control components at a given door opening. Composite cables are typically provided by Georgia Tech unless indicated otherwise. Contractor shall be responsible for verifying that composite cables are being provided by Georgia Tech.
    - a Note 1 – For doors with electronic latch retraction, in addition to the composite cables, the contractor shall be responsible for routing 2 pairs of 12AWG stranded twisted cables to each opening. This is required because composite cables are not equipped with appropriate cables for this hardware type.
    - b Note 2 – Contractor to confirm that 40% conduit fill is not exceeded.
    - c Note 3 – Cable for Prox Reader is not included in composite cable and contractor shall be responsible to provide.
  - 2. Door position switch sensors shall be provided on all roof hatches and attic doors. Requirement for card readers on roof hatches and attic doors shall be confirmed by the housing department.
  - 3. Card readers, electric door hardware, and door position switches shall be required on the main mechanical room door, main telecom room door, and main electrical room door in

each housing building. Electronic wireless lock only to be used when reviewed and approved by Housing.

4. Card reader access shall be provided on both sides of main roof doors. All roof doors shall be wired for intrusion detection.
5. All ADA doors shall be provided with long range card readers and electric door hardware.
6. Resident corridors shall be provided with card access control. This includes the requirement for card readers in elevators when an elevator provides direct access from common area assembly spaces & program spaces to resident housing corridors. In assembly or program space, card reader shall be required to call elevator.
7. Access control readers shall be multi-technology readers.
8. See appendix for typical door installation details.

**END OF SECTION**




Type "A" Door – Full Access		
Qty.	Description	Product
1	Proximity Card Reader	HID #5355 ProxPro (5355AGN => Wiegand Output, Charcoal Gray, No Keypad, Terminal Strip)
1	Manual Door Closer	LCN #4041 S-CUSH, Thru-Bolted, Match Finish
1	Manual Door Closer Installation Accessory	LCN #4040-30, CUSH Shoe Support, Fifth Screw
1	Electric Strike *	Von Duprin #6112, 24VDC, Fail-Secure (FS), Match Finish
1	Rim Exit Device	Von Duprin #RX99-NL-OP, Night Latch Cylinder Assembly-Optional Pull, Match Finish
1	Trim	Von Duprin #990NL
1	Door Position Switch	Schlage #679-05 HM, Hollow Metal Door & Frame, Concealed SPDT Magnetic Switch
1	Electronic Horn	Schlage #1910S-1, Horn w/Strobe, 24VDC
1	Best 7 pin IC Rim Cylinder	Best #1E72-SR-RP, Match Finish

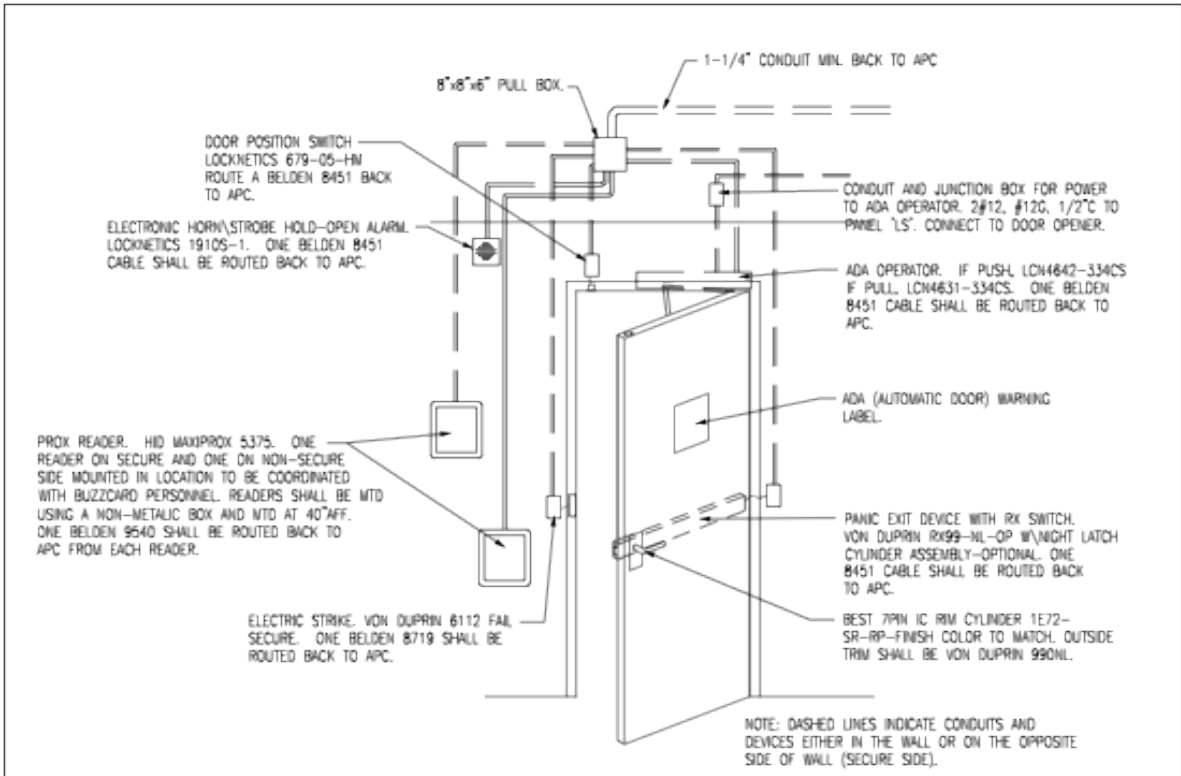
\*Where "blade stops" occur on aluminum frames, use Von Duprin 6113 Blade Stop Shim 010655-XX.

PLAN **1** TYPICAL TYPE "A" FULL ACCESS DOOR  
 NOT TO SCALE

GENERAL NOTE: FOR DOORS WITH ELECTRONIC LATCH RETRACTION, IN ADDITION TO THE COMPOSITE CABLES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING 2 PAIRS OF 12AWG STRANDED TWISTED CABLES TO EACH OPENING. THIS IS REQUIRED BECAUSE COMPOSITE CABLES ARE NOT EQUIPPED WITH APPROPRIATE CABLES FOR THIS HARDWARE TYPE.

 <p>PHONE: (770) 817-4220 FAX: (770) 234-6878                  4343 Shallowford Road Suite F5, Marietta, GA 30062</p>	Project Title: <b>GA TECH STANDARDS</b>	Project No: 13002 Sheet Ref: NONE Scale: NONE Drawn By: K. PERKINS
	Sketch Title: <b>TYPICAL TYPE "A" DOOR</b>	5/3/2013 Print Date: <b>SK-01</b> Drawing No.

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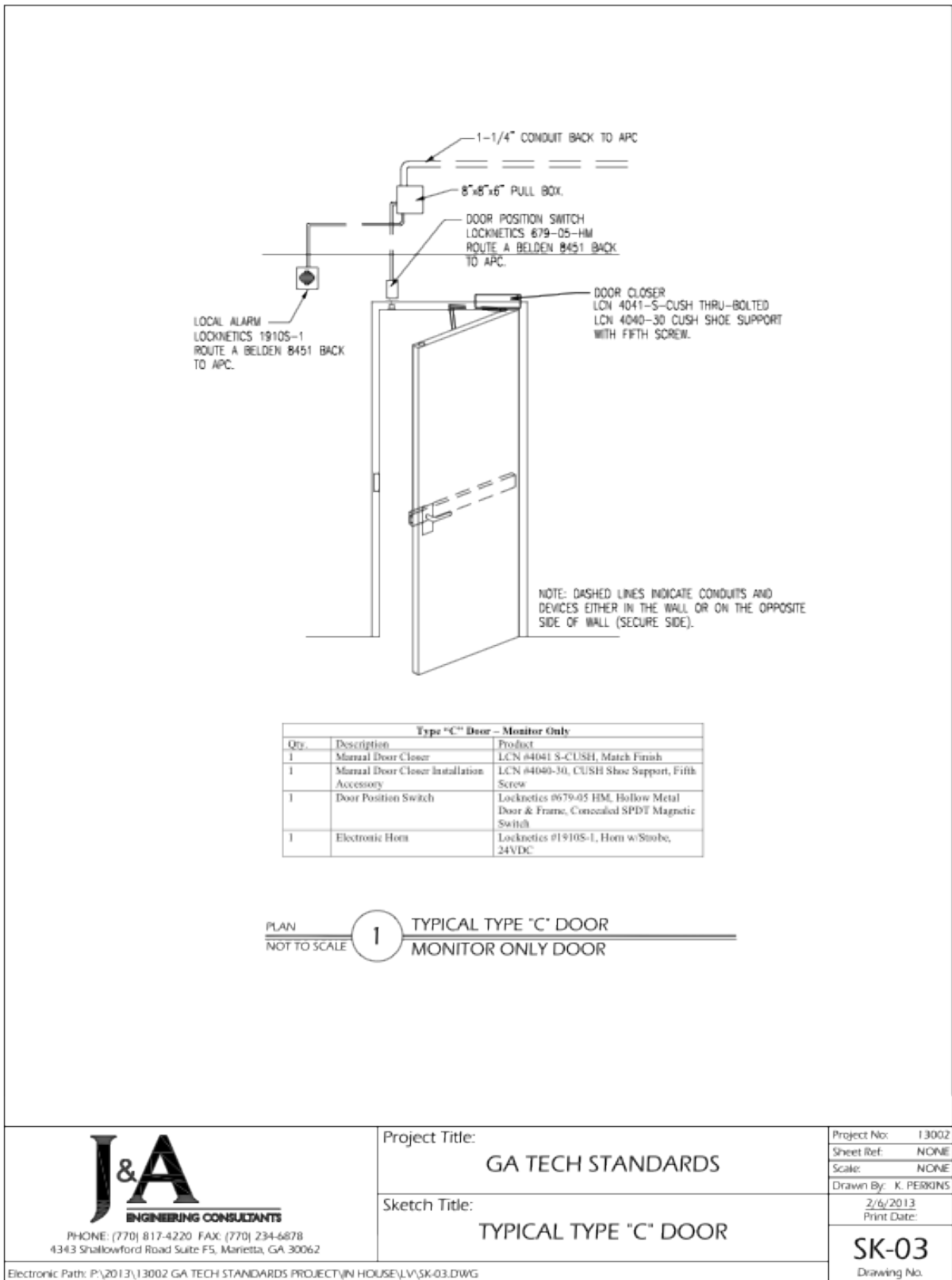
Type "B" Door – Full Access, ADA		
Qty.	Description	Product
2	Proximity Card Reader	HID #5375 MaxiProx, Charcoal Gray
1	Automatic Door Operator	Push Device – LCN #4642-334CS, Match Finish Pull Device – LCN #4631-334CS, Match Finish
1	Electric Strike *	Von Duprin #6112, 24VDC, Fail-Secure (FS), Match Finish
1	Rim Exit Device	Von Duprin #RX99-NL-OP, Night Latch Cylinder Assembly-Optional Pull, Match Finish
1	Trim	Von Duprin #990NL
1	Door Position Switch	Locknetics #679-05 HM, Hollow Metal Door & Frame, Concealed SPDT Magnetic Switch
1	Electronic Horn	Locknetics #1910S-1, Horn w/Strobe, 24VDC
1	Best 7 pin IC Rim Cylinder	Best #1E72-SR-RP, Match Finish

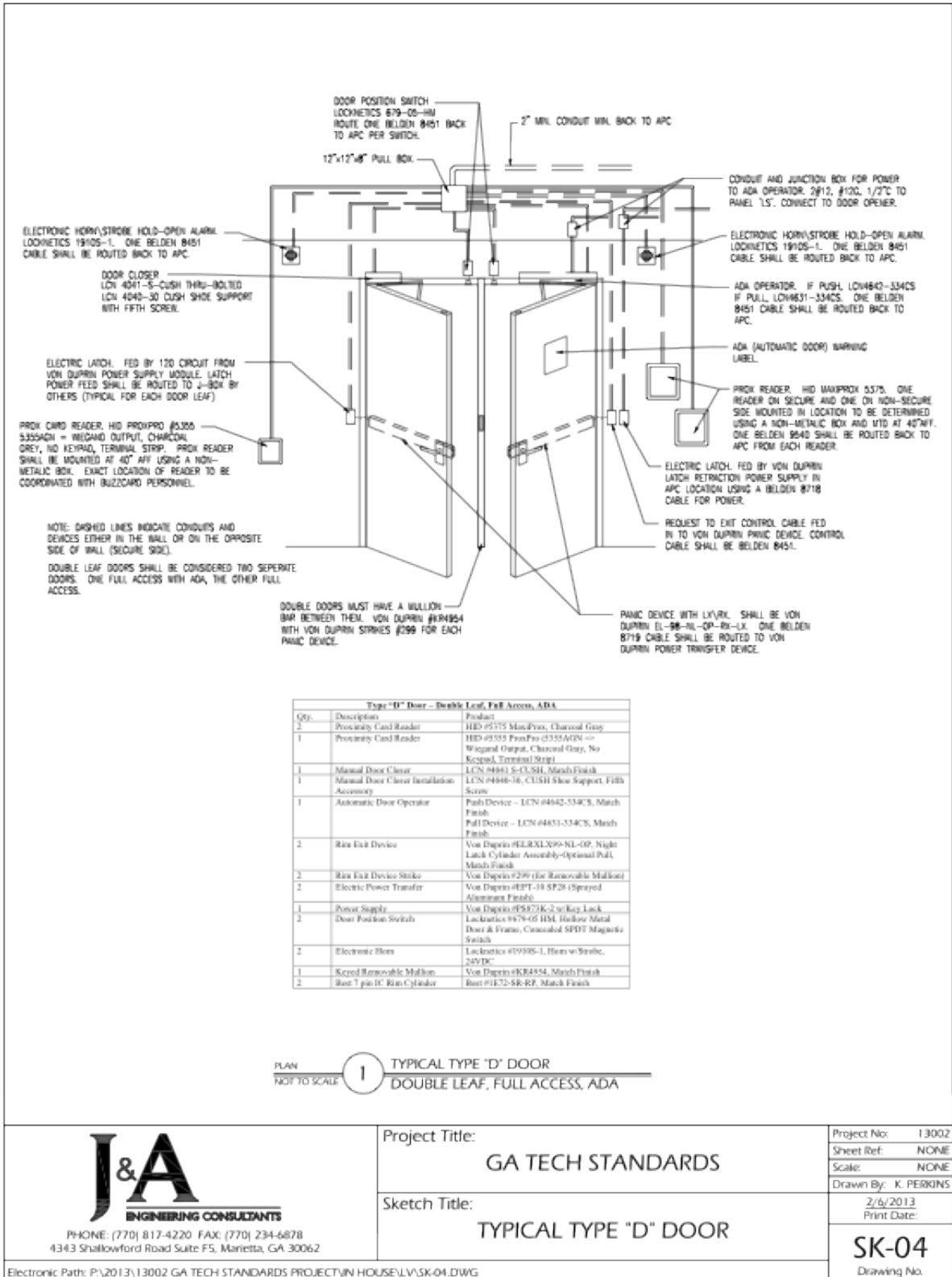
\*Where "blade stops" occur on aluminum frames, use Von Duprin 6113 Blade Stop Shim 010055-XX

PLAN NOT TO SCALE **1** TYPICAL TYPE "B" DOOR FULL ACCESS ADA DOOR

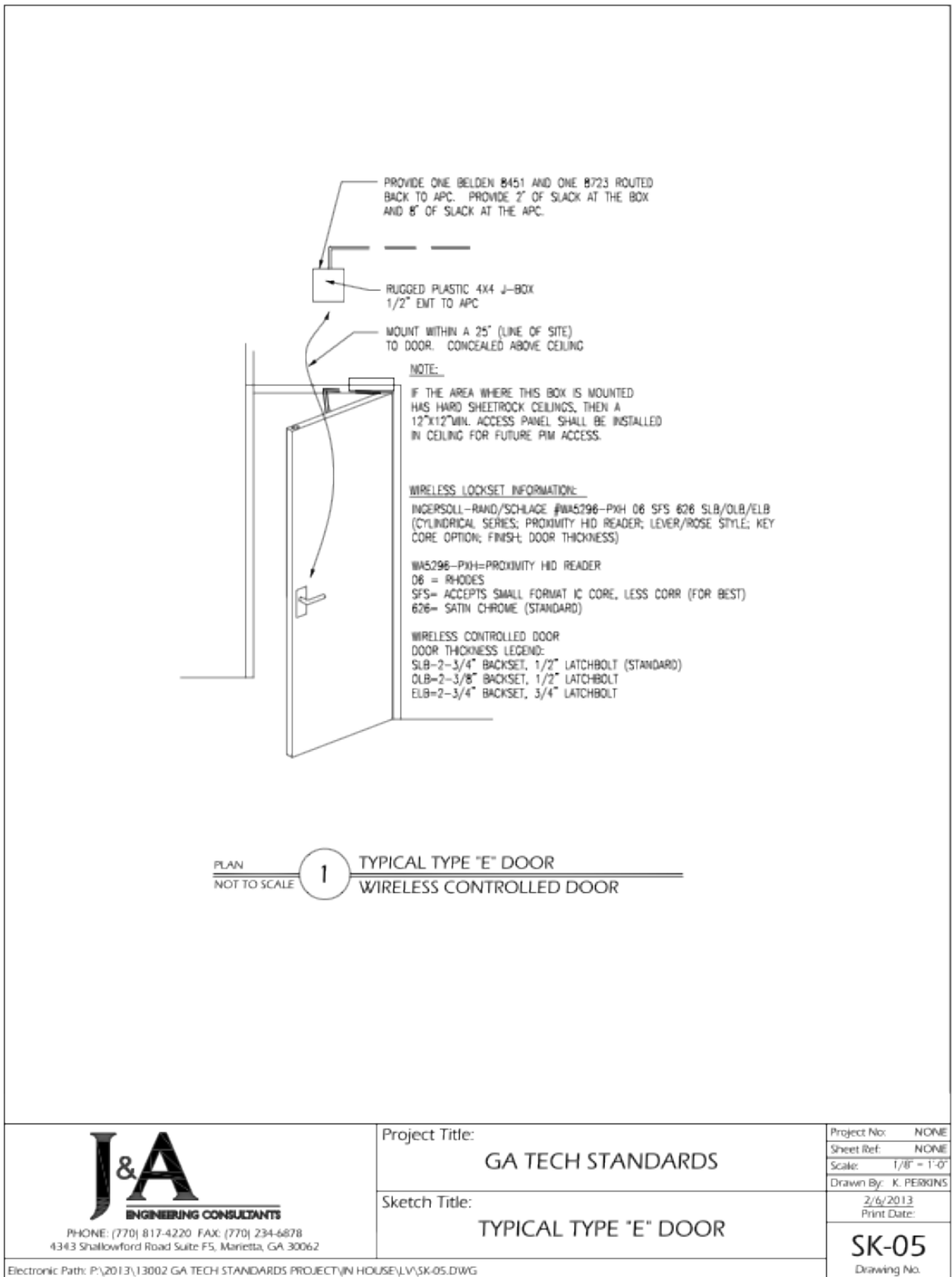
<p>PHONE: (770) 817-4220 FAX: (770) 234-6878                  4343 Shallowford Road Suite F5, Marietta, GA 30062</p>	Project Title: <b>GA TECH STANDARDS</b>	Project No: 13002 Sheet Ref: NONE Scale: NONE Drawn By: K. PERKINS
	Sketch Title: <b>TYPICAL TYPE "B" DOOR</b>	2/6/2013 Print Date: <b>SK-02</b> Drawing No.

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**PLAN 1 TYPICAL ACCESS CONTROL BUILD-OUT**  
 NOT TO SCALE

**GENERAL NOTES:**

- ALL CABLING FOR DOOR CONTROLS AND DATA CABLING IN SUPPORT OF DOOR ACCESS SHALL BE RUN IN ONE CONDUIT OF APPROPRIATE SIZE. CABLING RUN TO MULTIPLE DOORS IN ONE AREA MAY BE COMBINED IN SINGLE, LARGER CONDUITS. PULL BOXES SHALL BE PLACED AT REGULAR INTERVALS. BOXES SHALL BE OF APPROPRIATE SIZE TO ALLOW FOR CABLE PULLING AND MAINTAIN CABLE BEND RADIUS LIMITS.
- SEPARATE CONDUITS SHALL BE RUN FOR 120V POWER FEEDS TO DOOR OPENERS AND LATCH RETRACTORS. MULTIPLE POWER FEEDS TO SINGLE LOCATIONS MAY BE COMBINED PROVIDED CONDUITS ARE SIZED APPROPRIATELY.
- FIRE STOP ALL PENETRATIONS THROUGH WALLS AND FLOOR SLAB, RATES OR NON-RATED. CABLE PENETRATIONS THROUGH WALLS SHALL BE CORE DRILLED TO A SIZE THAT IS JUST LARGER THAN NECESSARY, BUT NO LARGER THAN 1.5X THE DIAMETER OF THE CONDUIT SLEEVE OR THE CABLE BUNDLE PENETRATING THE WALL. ALL PENETRATIONS THRU FLOOR AND FIRE WALLS SHALL BE SLEEVED. FIRESTOPPING SHALL COMPLY WITH ASTM #14 AND ASTM 254.
- CONDUIT SHALL BE ROUTED CONCEALED IN WALL WHERE POSSIBLE. PULL BOXES AND DEVICE BOXES SHALL ALSO BE CONCEALED WHERE POSSIBLE. EXTERIOR PULL BOX AND CONDUIT ABOVE RUN TO APC SHALL BE ROUTED ON SECURE SIDE OF DOOR. CONDUITS RUN ON NON-SECURE SIDE OF DOOR SHALL BE ROUTED SUCH TO MINIMIZE THE ABILITY TO BREAK CONDUIT OPEN AND ACCESS CABLING.
- PLYWOOD BACKBOARDS SHALL BE 3/4" 90-PH OFFSHORE GRADE PLYWOOD. PAINT BOTH SIDES AND EDGES WITH 2 COATS OF "DREY" FIRE-RETARDANT PAINT. UNLESS A SPECIFIC SIZE IS INDICATED ON THE DRAWING, PLYWOOD BACKBOARD SIZE SHALL BE 4' wide x 8' high (MINIMUM).
- PROVIDE AND INSTALL UL-LISTED, PLenum-RATED, 4-PAIR CATEGORY 5e UTP DATA STATION CABLE FROM TELECOM ROOM TO EACH DATA PORT LOCATION. TERMINATE DATA STATION CABLES ON DATA PATCH PANEL(S) IN TELECOM ROOM. CONTRACTOR SHALL PROVIDE AND INSTALL APPROPRIATE NUMBER OF 48-PORT, HIGH DENSITY, CAT5e PATCH PANELS TO TERMINATE ALL DATA STATION CABLES. UNLESS SPECIFICALLY INDICATED OTHERWISE, ALL PATCH PANELS SHALL BE 48-PORT. PROVIDE AND INSTALL A WIRE MANAGEMENT PANEL ABOVE AND BELOW EACH PATCH PANEL. WIRE MANAGEMENT PANEL SHALL HAVE 4 HORIZONTAL, 4 VERTICAL, AND 24 INDIVIDUAL WIRE CLIPS.
- PROVIDE TWO (2) 7' CATEGORY 5e RED PATCH CABLE FOR EACH RJ-45 (DATA) PORT.
- LABEL ALL DATA CABLES IN ACCORDANCE WITH GEORGIA TECH SPECIFICATIONS.
- TEST ALL DATA AND VOICE CABLES PER GEORGIA TECH SPECIFICATIONS. REFERENCE TEST REPORTS TO GEORGIA TECH CABLE IDENTIFICATION STANDARDS.
- WHERE "BLADE STOPS" OCCUR ON ALUMINUM FRAMES, CONTRACTOR SHALL USE NON-DUPRN #112, 24 VDC, BLADE STOP SHW #1005-1K.
- FINISH OF DOOR HARDWARE SHALL MATCH EXISTING HARDWARE FINISHES.
- ALL ACCESS CONTROL CABLE RUNS SHALL BE CONTINUOUS WITH NO SPICES ALONG THE ENTIRE LENGTH OF THE RUN FROM APC TO POINT OF CONNECTION/TERMINATION WITH DOOR HARDWARE DEVICES.

BaseCard Center Access Control Composite Cable					
Device	Qty	Manufacturer/Lead Color	Belden Cable #	# of Conductors	AWG
Door Position Switch	1	Yellow & White/No Box	8411	2	22
Electronic Horn	1	Green & White/Green	8451	2	22
Electric Strike Latch Retraction	1	Red & White/Red	8719	2	26
Biometric Pad	1	Violet & White/Violet	8411	2	22
Door Operator	1	Orange & White/Orange	8451	2	22
Square Cable	1	Blue & White/Blue	8411	2	22
Square Cable	1	Green & White/Green	8719	2	26

OWNER TO PROVIDE COMPOSITE ACCESS CONTROL CABLE FOR ALL DOOR HARDWARE DEVICES. CONTRACTOR TO PROVIDE CABLE FOR PROXIMITY CARD READERS (Belden 9642) AND POWER FEED CABLES (Belden 8718) FOR LATCH RETRACTION AND ADA OPERATORS.

**J&A**  
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Project Title:  
**GA TECH STANDARDS**

Sketch Title:  
**TYPICAL ACCESS CONTROL**

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 Print Date:  
**SK-06**  
 Drawing No.

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## **282300 Video Surveillance**

### **1. General**

A. For housing projects, the following video surveillance components shall be provided:

1. All elevators and elevator lobbies shall be pre-wired for video surveillance cameras.
2. All building entrances shall be pre-wired for video surveillance cameras.

**END OF SECTION**

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## **283100 – Fire Detection and Alarm**

### **1. DEVICE LOCATIONS**

- A. A fire alarm horn/speaker shall be located in every sleeping room unless directed otherwise by Georgia Tech Housing. Sound levels shall be limited to the code required minimum.
- B. Smoke detectors shall be installed at the bottom of the first landing and in the ceiling above the top landing of every stairwell.
- C. It is the preference of Georgia Tech housing to use system connected smoke detectors in dorm rooms and single/multiple station smoke alarms shall be used in apartment units.

### **2. FIRE ALARM SYSTEMS**

- A. The fire alarm control panel shall have internet-based capabilities to provide email notifications to campus personnel.
- B. Coordinate all fire alarm requirements with the campus fire marshal.

### **3. MISCELLANEOUS**

- A. All ranges located in communal kitchens shall be provided with a means to automatically disconnect power in a fire alarm condition. Automatic reset shall be provided to restore power once the fire alarm condition has been cleared.

**END OF SECTION**