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SHEET  
E4.1

**Low-Voltage Systems - 17000**

**1.1 General**

**1.2 Emergency Call System**

**1.3 Resident Unit Telephone Wiring**

**1.4 Facility Telephone System**

**1.5 Fire Alarm System**

**1.6 Television System Wiring**

**1.7 Public Address System**

**1.8 Facility Data Port System**

**1.9 Room Smoke Detectors**

**2.0 Access Door Card Readers**

**2.1 Door monitoring system/CCTV camera system.**

**1.1 General**

A. All low-voltage systems, including public address systems, emergency call system, telephone wiring, data drops, fire alarm system, CATV and card access system, shall be installed by a qualified low voltage (LV) contractor. All systems equipment, excluding television, is provided by the Owner. Owner's representative will provide technical advice on all systems, and will perform the final operational check-out. Qualification of LV contractor subject to Owner approval.

B. All low-voltage system installation to be installed to maintain fire ratings of walls. Equipment shall be mounted in listed boxes, "mud rings" only is not acceptable.

C. LV contractor shall follow all applicable local, state, and national codes. Provide as specified. Route all low-voltage wire separate from 110 volt and at least 24" from panel service cables in corridors. Provide voltage barriers where LV and line voltage are located together. Staples are NOT acceptable as support on any conductor runs. Low voltage wire shall be well supported, secure and neat, without "crimps" or "knots" parallel to building lines. Provide raceway where required by code and where conductors are subject to damage.

**1.2 Emergency Call System**

A. See separate and complete specifications and drawings from owner supplied Tel-Tron "Companion One" Emergency Call System. LV contractor will provide wire, boxes, blocks, and labor, and insure that the system is installed and operating properly. LV contractor should attend a free Tel-Tron training class held quarterly. Contact the owner's representative for details. The wire for this system shall be as required, and a different color than any other wiring.

B. Emergency Call System installer shall provide surge protection system to protect the emergency call equipment.  
 -Provide 120 volt plug in style surge protection at outlet locations. Single AC outlet with 720 joules max surge energy. Ditek DTK-1F, or approved equal.  
 -Provide in line digital ethernet surge protection for main network feed to emergency call system. Ditek DTK-MRJ45C5E, or approved equal.

**1.3 Resident Unit Telephone Wiring**

A. Provide complete wiring and boxes to all resident units. Wiring to be CAT 5E home run from all units. Wire shall be routed to central-living-area jack first, then to bedroom 1 and then to bedroom 2 (see "suite plans", ES sheets, for phone jack locations). T-tap is not acceptable.

B. Electrical contractor shall service conduit underground to point of connection with phone utility. Confirm location and conduit size with utility. Mount central equipment in TTB room on 1/2" plywood panel. Verify with local phone company any additional requirements. All conductor provided underground shall be waterproof, labeled as waterproof, and UL listed for underground. Provide Direct bury cable or route underground cable in raceway. LV contractor shall verify Underground with electrical contractor.

C. Provide #6 AWG copper wire ground from phone board to building ground. Verify with local phone company. LV contractor shall verify with electrical contractor.

D. Wiring runs to multiple cottages or villas to be run from main building demark board to an outlying central distribution enclosure using a multi-pair cable with minimum two (2) pair per unit. From the remote central enclosure, four (4) pair is required. All runs to outlying buildings shall be protected per NEC Article 800. Provide lightning protection at each building.

E. LV contractor will supply phone jacks (only use Leviton - 41106 - RW6) w/face plate #41080-1WP. "Pigtail" will be used to "loop" jack to jack.

F. All phone cables (4 pair, 24 gauge) are to be terminated on standard M1-6650 type punch blocks mounted using 998 standoff brackets (REQUIRED) to plywood telephone backboard. Six (6) cables are to be terminated on each side of block (12 cables total) per block. Label each Apt. # on the blocks. A single pair of 24 gauge cross connect wire shall be run from first pair (white/blue pair) of each room cable to the local telephone company provided interface point (screw terminals or punch blocks). The connection order is to be coordinated by the LV contractor with the local telephone company.

**1.4 Facility Telephone System**

A. Provide wiring, boxes, connections and jacks (Leviton 41106-RW6), w/faceplate 41080 2WP for the facility phone system. LV contractor shall install Owner furnished phone system. Owner's representative will provide the final inspection check-out. Elevator contractor shall supply elevator phone and wiring to the elevator equipment. Low voltage contractor shall run CAT 5E wire from the elevator equipment to the telephone terminal location and connect to a 66 block. All wiring shall be CAT 5E, 4 pair, and home run to each location.

B. Low voltage contractor shall coordinate with electrical contractor to provide (4) 110 volt outlets on the telephone board. These outlets shall be on emergency backup power.

Note: 110 volt outlets in the Main office and marketing Office shall be tied to the emergency system.

C. All phone cables (4 pair, 24 gauge) are to be terminated on standard m 1-6650 type punch blocks mounted using standoff brackets (REQUIRED) to plywood telephone backboard. Six cables are to be terminated on each side of block (12 cables total) per block.

D. See Details 6/E4.2. All jack locations will be identified on the 66 Blocks.

E. Low voltage contractor shall coordinate with telephone service provider to cross-connect FAX/DSL phone line to fax line in Manager's Office and DSL line (if applicable) to Electrical Room's 48-port patch panel, using port 47 or 48. Both lines must be tested for dial tone. Also, the fire alarm system cannot be cross-connected to the FAX/DSL line. This will cause both DSL and fire alarm issues.

**1.5 Fire Alarm System**

A. Provide fire alarm system for entire building per section 907.2.6 GROUP I. A manual fire alarm system shall be installed in group I occupancies. An electrically supervised, automatic smoke detection system shall be installed in accordance with sections 907.2.6.1 and 907.2.6.2.

B. Fire alarm system shall comply with NFPA 72.

C. The fire alarm system shall be a Silent Knight 5820XL system supplied by Silent Knight/Honeywell. Refer to Fire Alarm Drawings. Provide telephone connection to Fire Alarm System as required. Not less than 2 separate (one-dedicated) lines or as required by local code.

D. Fire alarm installer shall provide surge protection for fire alarm system. Provide Ditek DTK-TSS1 Total Surge Protection System, or approved. Located adjacent to the FACP. The system shall protect 120V AC power, and two to ten pairs of SL, IDC, NAC and dialer circuits. See detail 17/E4.2.

**1.6 Cable Television Wiring--CATV**

A. Provide complete community television CATV system. Provide wire and all hardware as required. Service connection fee to be paid by Owner. Low voltage contractor to coordinate service connection and design with local cable company. Install service conduit underground from inside terminal connection to point of connection with cable. (Coordinate w/Elec. Contractor)

B. Building to be wired using home-run type system with separate cable to each suite. All runs to be labeled with room number. Install outlet in each suite location as shown on drawings and in staff lounge, TV room, and office (coordinate and confirm locations with Owner). Mount 1/2" plywood terminal board in mechanical room or as shown on drawings. Terminate at point of use with flush-mount plate and type F81 connector, ready for tenant hookup.

C. Cable wire to be type approved by cable system provider. Check with provider prior to installation. Typical: RG-6 Quadshield.

D. Comply with NEC, and local codes.

**1.7 Public Address System**

A. Provide public address system for one-way communication and music from office to all common areas except dining area. System to have five-zone paging with all call. Confirm zoning with owner. Low voltage contractor to supply all wire, boxes and installing material. Volume control to be installed for speakers which are located in TV room, activity center, and library. Speakers to be installed throughout the common areas and corridors to provide adequate coverage for paging and music. Average spacing is 30' to 40' in corridors. Provide separate dining area coverage. See drawings for speaker layout.

B. 8" cone type speakers with 70 volt transformer, white metal baffle with backbox, and T-bar bridge: Owner supplied.

C. Dining Room Public Address System: Owner supplied.

Provide sound reinforcement system for Dining Room. Owner shall provide one 35 watt amplifier, one handheld wireless microphone, system selection switch, and ceiling speaker assemblies as required. Low voltage contractor to supply wire, boxes, installing material, and hookup. Seven (7) total speakers: Six (6) in Main Dining (1 in lower ceiling) and 1 in Private Dining w/volume control. See Detail 8/E4.2.

**D. Wire, Cable, and Raceway**

Speaker wire shall be CL2/CM-rated 18 gauge stranded twisted pair with overall jacket. Provide wire, cable, and raceway per NEC and local codes.

**1.8 Facility Data Port System**

A. Provide network wall mount rack enclosure inside Electrical Room with enough space to swing unit open. Adequate wiring length must be provided by low voltage personal - approximately 3 feet of slack. Wall mount enclosure will consist of the following components:

1. Tripp-Lite 12U wall mount rack enclosure (PN: SRW12US) or approved equal.
2. Tripp-Lite smart rack enclosure cabinet 3U fan panel airflow (PN: SRFAN3U) or approved equal.
3. Tripp-Lite CAT5E 2U 48-port CAT5E rack mount patch panel (PN: N252-048) or approved equal.
4. Tripp-Lite CAT6 1U 12-port CAT6 rack mount patch panel (PN: N252-012) or approved equal.
5. Two Tripp-Lite fixed 1U cantilever shelves (PN: SRSHELPZP1U) or approved equal.

B. Low Voltage contractor shall coordinate with electrical contractor to provide dedicated orange 2-gang (4 power outlets) 110 volts electrical power to ensure an uninterrupted power supply via generator system for wall mount enclosure equipment.

C. Low Voltage contractor shall coordinate with HVAC contractor to ensure air conditioning will be provided inside office closet for protection of networking and other electronic components.

D. All wiring to home run from each location indicated on low voltage drawings with CAT5E for data and CAT6 for camera/TV data connections. CAT5E wiring will terminate at 48-port patch panel mounted toward the top of the 12U network wall mount rack enclosure. CAT6 wiring will terminate at 12-port patch panel mounted directly beneath the 48-port patch panel in Electrical Room. All cabling shall be terminated at the patch panel and faceplate, no daisy chaining, interim connections, or splices. All home runs must be installed and tested per the standards of TIA/EIA-568-B. A printed report of the tests must be provided to the owner representative. In addition, all wiring will be correctly labeled at the patch panels and faceplates, per detail 18 (typical faceplate detail) on sheet E4.2.

E. Run CAT5E cable from second floor closet for Tel-Tron equipment to office, then use red RJ-45 connector for termination and label faceplate "TEL-TRON ONLY".

F. Use male RJ-45 connectors for termination of CAT5E wiring, at device installation location for timeclock (must be located between manager's and marketing offices) and wireless access point (located on second floor corridor, per sheet E3.2), then label accordingly.

G. Run two (2) CAT5E cables, for DSL/modem, from telephone terminal board in mechanical room to 48-port patch panel. Use ports 47 and 48 for connection in office closet, then label accordingly.

H. Provide #6 AWG copper wire ground from data cabinet to building ground. LV contractor shall verify with electrical contractor.

**1.9 Room Smoke/CO Detectors**

A. Standard Resident unit: Smoke detectors to be supplied by Owner: (Gentex 9123F) Photoelectric type for smoke, self-contained, local alarm, 120 volt wired with auxiliary contacts. (Gentex GN-503F) Combination Photoelectric type for smoke and Carbon Monoxide, self-contained, local alarm, 120 volt wired with auxiliary contacts. (Detector in bedroom shall be a Combination Photoelectric type for smoke and Carbon Monoxide), 120 volt tandem by electrical. Provide wiring to detectors for emergency call system interconnect. See Silversphere drawings. For residential units that have two or more detectors, wiring shall be 3-wire to each detector. Detectors within the same suite shall be provided so if one detector sounds, all detectors in that suite sound.

B. Accessible Resident unit: Smoke alarm with not less than 177 cd visual signaling strobe supplied to be supplied by Owner. (Gentex 7139 CSC) Photoelectric type for smoke, and (Gentex CO1209) Carbon Monoxide detector (Detector in bedroom/sleeping area shall be a Combination Photoelectric type for smoke and Carbon Monoxide), self-contained, local alarm, 120 volt wired with auxiliary contacts. 120 volt tandem by electrical. Provide wiring to detectors for emergency call system interconnect. See Silversphere drawings. For residential units that have two or more detectors, wiring shall be 3-wire to each detector. Detectors within the same suite shall be provided so if one detector sounds, all detectors in that suite sound.

C. All detectors in a tandem installation must be controlled by the same circuit breaker on the lighting circuit.

D. Detectors locations and number per unit is shown on typical suite plans.

E. See Detail 3/E4.2

**2.0 ACCESS DOOR CARD READERS**

The front door and three additional exits shall have proxy reader I.E.I. systems. Locations of readers shown on E3.1. Provide conductors and rough-in. All other equipment furnished by Owner.

The central I.E.I. hub master shall be located in the Electrical Room. Electrical Contractor to run a 110VAC circuit for a plug-in transformer to be located in Electrical Room. Outlet shall be on emergency circuit.

From the hub max to door locations, run 4 conductor 16 ga. (2 spares) into the Von Duprin power supply. Electrical Contractor to run a 110 volt (from emergency circuit) to the concealed power supply. Run (4) 16 ga. wire from power supply to electric strikes (2 spares). From a single-gang box located on the exterior wall, run 4 conductor shielded stranded wire to hub max. See Detail 7/E4.2.

From the hub max location run (4) conductor 22 ga., stranded/shielded to a single gang box next to the data jack location at the office counter.

Access door installing contractor to provide surge protection system to protect main access control system.

-Provide card reader surge protection. Ditek DTK-4LV/PCR, or approved equal. Located adjacent to main access control panel.

-Provide access control door strike surge protection for each electronic strike. Ditek DTK-ESS, or approved equal. Provide two units for each electronic strike one located at electronic strike and one located at the main access control panel.

-Provide 120 volt plug in style surge protection for the main access control panel. Single AC outlet with 720 joules max surge energy. Ditek DTK-1F, or approved.

**2.1 DOOR MONITORING SYSTEM/CCTV SYSTEM**

A. Provide 4-twisted pair not smaller than 18 AWG conductors where noted at exterior exits for door monitoring system. Route concealed in all locations back to office.

B. Provide conductors where noted for CCTV camera system. Route concealed in all locations back to Electrical Room or as directed by Owner. Provide CAT6 wire.