

VAMC LAKE CITY, FL.  
PROJECT NO. 573A-13-105  
BUILDING 64 ELEVATORS P-1, P-2, S-3, S-4  
SECTION 14 21 00  
REPAIR AND ALTERATION OF EXISTING ELEVATORS  
ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section of the specification is intended to cover the complete furnishing of all labor, materials, supervision, engineering, and components on elevators located in Building 64. The elevators included in the specification are the existing elevators P-1, P-2 (one group duplex) and S-3, S-4 (one group duplex).

1.2 SCOPE OF WORK

A. Elevators shall retain existing machine beams, main and counterweight rails, counterweights, entrance frames, sills, hanger supports, strut angles, fascia plates, slings, platforms, and cabs.

B. Remove existing machines, controllers, hoist cables, deflector sheaves, hoistway doors and door equipment, governors, door operators, hall push buttons, hall lanterns and hall position indicators, and cab fixtures.

1.3 ELEVATOR SERVICE

A. One elevator may be removed from service in building at any one time, unless prior arrangement is made with Contracting Officer and/or Contracting Officer's Representative (COR) to permit performance of work. All work on elevator vacated shall be completed, put into satisfactory operation, and accepted before work on any other elevator can start. Prior to each elevator acceptance, contractors shall complete all pertinent safety tests and inspections. Final inspection and tests shall be given only when all work on all elevators has been completed. Final acceptance shall be given only upon successful completion of final inspection and tests. Premises shall be occupied during performance of work, but Contractor shall have uninterrupted use of scheduled elevator vacated for completion of work.

B. When more than one elevator must be removed from service for cross connection of hall pushbuttons or interface of dispatching controls, contractor shall perform this work after 6:00 PM and before 6:30 AM. The Contracting Officer and/or Contracting Officer's Representative shall be notified ten (10) calendar days in advance of this work.

1.4 WORK SCHEDULE

A. Before work is started, submit prepared work schedule for approval and arrange with COR sequence of procedure, means of access to premises, space for storage, use of approaches, corridors, stairways and elevators, location of temporary partitions, etc. The COR must be notified twenty (20) calendar days, in writing, in advance of starting work on elevators. No work may begin on any elevator until all materials for that elevator have been delivered to the site and verified by the Contracting Officer and/or Contracting Officer's Representative. The phasing of work on the elevators shall be coordinated with the Contracting Officer and/or the Contracting Officer's Representative.

1.5 SAFETY PRECAUTIONS

- A. Building will be occupied during execution of work. Work shall be conducted in a manner to afford maximum protection of building, facilities, patients, employees and the public and to prevent unreasonable delay or interference with normal functioning of hospital activities.
- B. Provide fire extinguishers so that they shall be readily available at all times.
- C. It shall be the obligation of the Elevator Contractor to maintain a free and clear passageway in each elevator lobby. Parts, tools, etc. shall be kept within the confines of entrance partitions. Trash and debris shall be removed daily.

1.6 REMOVED MATERIALS AND EQUIPMENT

A. Materials that are required to be removed and not specified to be reused or retained under contract shall be removed daily from the site at the expense of the Elevator Contractor. Elevator Contractor shall receive title to all materials and equipment required to be removed and not specified to be reused or retained, as of date of withdrawal of material from service by Elevator Contractor to complete required and scheduled work. Government does not warrant condition of said material to which Contractor shall obtain title, nor shall Government be liable for damage before or after title passes to Elevator Contractor.

1.7 APPLICABLE PUBLICATIONS

A. The following specifications and standards of the issues listed below (including the amendments, addenda, and errata designated) form a part of this specification to the extent indicated by the reference thereto. In text, such specifications and standards are referred to by basic number or designation only.

B. Federal Specifications (Fed. Spec.):

- J-C-30B(1).....Cable and Wire: Electrical (Power, Fixed Installation).
- W-C-596A(2).....Connector, Plug, Electrical; Connector, Receptacle, Electrical.
- W-F-406E.....Fittings for Cable, Power, Electrical & Conduit, Metal, Flexible.
- W-F-408E.....Fittings for Conduit, Metal, Rigid, (Thick-Wall & Thin Wall (EMT) Type).
- ABSI/UL 797.....Conduit, Metal, Rigid: Electrical, Thin-wall Steel Type (Electrical Metallic Tubing): Straight Lengths, Elbows & Bends.
- WW-C-566C.....Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Zinc-coated.

- 1. GAUGES: Sheet and Plate: U.S. Standard Wire: American wire Gauge (AWG).
- 2. D1.1-72: American Welding Society (AWS).
- 3. IEEE: Institute of Electrical and Electronic Engineers.
- 4. NEMA: National Electric Manufacturers Association.
- 5. NFPA No. 252: Fire Tests of Door Assemblies.

C. The following standards and codes of the issues listed below (including the latest amendments, addenda, and errata) form a part of this specification:

1. A17.1: 2010 American National Standards Institute (ANSI/ASME) Standards: Safety Code for Elevators and Escalators. In text, publication will be referred to as the Code.
2. A17.2: 2010 American National Standards Institute (ANSI) Standards: Practice for the Inspection of Elevators, Escalators and Moving Walks, Inspector's Manual.
3. NFPA No. 70: National Electrical Code, Latest edition. In text, the Code will be referred to as NEC.
4. Uniform Federal Accessibility Standards & VA Supplement to uniform Federal Accessibility Standards, 1988.
5. Americans with Disabilities Act, 1994.

#### 1.8 QUALIFICATIONS:

A. Approval by the Contracting Officer is required for products and services of proposed manufacturers, suppliers and installers and shall be contingent upon submission by Contractor of certificates stating the following:

1. Elevator contractor is currently and regularly engaged in the installation of elevator equipment as one of his principal products.
2. Elevator contractor has successful experience, trained supervisory personnel, and facilities to install elevator equipment specified herein.
3. The installers shall be Certified Elevator Mechanics with technical qualifications of at least five years of successful experience and Apprentices actively pursuing certified mechanic status. Certificates shall be submitted for all workers employed in this capacity.
4. Elevator contractor shall submit information regarding a prior installation where all the elevator equipment he proposes to furnish for this project functioned satisfactorily to serve varying traffic and material handling demands. Provide a list of customers that have the equipment in operation for at least two years preceding the date of this specification. Provide the names and addresses of these customers.

B. Approval of Elevator Contractor's equipment will be contingent upon their identifying an elevator maintenance service provider that shall render services within two hours of receipt of notification, together with certification that the quantity and quality of replacement parts stock is sufficient to warranty continued operation of the elevator installation.

C. Approval will not be given to elevator contractors and manufacturers who have established on prior projects, either government, municipal, or commercial, a record for unsatisfactory elevator installations, have failed to complete awarded contracts within the contract period, and do not have the requisite record of satisfactorily performing elevator installations of similar type and magnitude.

D. All electric traction elevators shall be the product of the same manufacturer.

E. Elevator Contractor shall provide and install only those types of safety devices that have been subjected to tests witnessed and certified by an independent professional testing laboratory that is not a subsidiary of the firm that manufactures supplies or installs the equipment.

F. Welding at the project site shall be made by welders and welding operators who have previously qualified by test as prescribed in American Welding Society Publications AWS D1.1 to perform the type of work required. Certificates shall

be submitted for all workers employed in this capacity. A welding or hot work permit is required for each day and shall be obtained from the COR of safety department. Request permit one day in advance.

G. Electrical work shall be performed by Licensed Electricians as requirements by NEC. Certificates shall be submitted for all workers employed in this capacity.

#### 1.9 WIRING DIAGRAMS

A. Provide three complete sets of field wiring and straight line wiring diagrams showing all electrical circuits in the hoistway, as well as the machine room. Install one set framed under plastic on pivoted hard boards and mounted in the elevator machine room as directed by the COR. In the event field modifications are found necessary during installation, diagrams shall be revised to include all corrections made prior to and during the final inspection. Corrected diagrams shall be delivered to the Medical Center COR within 30 days of final acceptance.

B. The following information relating to the specific type of microprocessor controls installed on this project shall be provided:

1. Owner's information manual, containing general data on major components maintenance and adjustment.
2. System logic description.
3. Complete wiring diagrams needed for field troubleshooting, adjustment, repair and/or replacement of components. Diagrams shall be base diagrams, containing all changes and additions made to the equipment during the design and construction period.
4. Changes made during the warranty period shall be noted on the drawings in adequate time to have the finalized drawings reproduced for mounting in the machine room no later than six months prior to the expiration of the warranty period.

#### 1.10 ADDITIONAL EQUIPMENT

A. Additional equipment required to operate specified equipment manufactured and contemplated for this installation shall be furnished and installed. The cost of such equipment shall be included in the base bid.

#### 1.11 SAMPLES AND DESCRIPTIVE DATA

A. Materials shall be submitted singularly and separately and apart from materials specified under other Sections and shall be marked 'SUBMITTED UNDER SECTION 14 21 00. In accordance with provisions of section 01340, SAMPLES AND SHOP DRAWINGS', all submitted drawings and related elevator material shall be forwarded to the VAMC Lake City, Engineering Service (138D), 619 South Marion, Lake City FL. 32025 in order to perform a concurrent review.

B. Before executing any work, furnish information sufficient to evidence full compliance with contract requirements on proposed items. Such information shall include, as required: Manufacturer's Name, Trade Names, Model or Catalog Number, Nameplate Data (size, capacity, rating) and corresponding specification references (Federal or project specification number and paragraph).

C. Name of manufacturer, type or style designation and applicable data of the following equipment shall be shown on the elevator layouts:

1. Controllers
2. Selector/Leveling unit
3. Solid state motor control (AC DRIVE)

4. Electric door operator; H.P. rating and R.P.M. of motor
5. Auto dial phone system
6. Audio voice system and list of messages.
7. Hoist rope gripper
8. Governor
9. Hoistway doors, tracks, hangers, etc.
10. Infrared curtain units
11. Machine room computer system
12. Top of car run button.

D. Shop Drawings:

1. Cuts or drawings showing details of all signal and car equipment fixtures.
2. Furnish certificates as required under paragraph "Qualifications".
3. Car operating panels.
4. New AC hoist motors and machines.
5. Drop ceiling and lighting. Elevators P-1, P-2.
6. Ceiling, cove lighting and "dog house". Elevators S-3, S-4.
7. Cab drawings with finishes.
8. 3-, S-4 cab flooring.

1.12 PERFORMANCE STANDARDS

A. The elevators shall be capable of meeting the highest standards of the industry and specifically the following.

B. Contract speed shall mean speed in the UP direction with full capacity load in the car. Speed variation under any load condition, regardless of direction, shall be no more than 3 percent.

C. The controlled rate of change of acceleration and retardation of the car shall not exceed 0.1G per second and the maximum acceleration and retardation shall not exceed 0.2G per second.

D. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration and deceleration. Stopping shall be without bumps or jars.

E. Full speed running shall be quiet and free from vibration and swaying. When cars are standing at the floor with doors open, they shall remain firmly stopped and shall not rock side to side.

F. Rope stretch recovery shall be provided to re-level cars at a floor, if the ropes slightly stretch.

G. Cars shall not move from side to side during the process of opening and closing the doors.

H. Elevator control systems shall be capable of starting the car without noticeable "roll-back" of hoistway machine sheave, regardless of load condition in car, location of car, or direction of travel.

1.13 TOLERANCES

A. Floor Accuracy:

1. Leveling control systems, 1/8 inch above or below the floor.

1.14 WARRANTY:

Inclusive of any additional product or equipment warranties, the Warranty of Construction clause (FAR 52.246-1) is applicable to all materials supplied, equipment installed, and work performed under this contract.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Where stainless steel is specified, it shall be corrosion resisting steel complying with Fed. Spec. QQ-S-766, Class 302 or 304, Condition A with Number 4 finish (150 grit) on exposed surfaces. Stainless steel shall have the grain of belting in the direction of the longest dimension and all surfaces shall be perfectly smooth and without waves. During erection, all stainless steel surfaces shall be protected by suitable material.

2.2 MANUFACTURED PRODUCTS

A. Materials, devices and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items. Items not meeting this requirement, but which otherwise meet technical specifications and the merits of which can be established through reliable test reports or physical examination of representative samples, will be considered.

B. When two or more units of same class of materials, devices or equipment are required, these units shall be products of one manufacturer.

C. Manufactures of equipment assemblies which include components made by others shall assume complete responsibility for the final assembled unit.

1. All components of an assembled unit shall be products of the same manufacturer.

2. Parts that are alike shall be the product of a single manufacturer.

3. Components shall be compatible with each other and with the total assembly for the intended service.

D. If the elevator equipment to be installed is not known to the COR, the Elevator Contractor shall submit drawings in triplicate (2 prints and 1 sepia), for approval, showing all details or demonstrate to the satisfaction of the COR that the equipment to be installed is in strict accordance to the Specifications.

E. Motor nameplates shall state rated horsepower, speed, volts, amperes and other characteristics required by NEMA Standards and shall be securely attached to the item of equipment in a conspicuous location.

F. The elevator equipment, including controllers, selectors, door operators, relay panels, leveling units, and supervisory system, shall be the product of one manufacturer of established reputation, except that any of the above items may be the products, either wholly or in part, of any manufacturer of established reputation provided such items are capably engineered and produced under coordinated specifications to ensure a first class, safe and smooth operating system.

G. Where key operated switches are furnished in conjunction with any component of this elevator installation, furnish 4 keys for each individual switch or lock. Do not provide "barrel" type keys. Attach each key to a tag bearing a stamped or etched legend identifying its purpose. Engrave tags and imprint "Property of U.S. Government" Provide standard (code) fire service keys and switches. Provide 4

keys per fire switch. Engrave tags and imprint "Property of U.S. Government" on reverse side.

### 2.3 CAPACITY, SPEED, TRAVEL, ETC.

A. Each elevator shall have the capacity to lift a live load (exclusive of the weight of the car and ropes) at the speed in feet per minute as specified in the following schedule:

Elev. No	Rated Load Lbs.	Speed FPM	Rated Travel Ft.	Total Floors Served	Stops	No. of Openings
P-1	4000	350	49 ft. 9 in.	B,1-4	5	5
P-2	4000	350	49 ft. 9 in.	B,1-4	5	5
S-3	4000	350	49 ft. 9 in.	B,1-4	5	5
S-4	4000	350	49 ft. 9 in.	B,1-4	5	5

B. Total travel is approximate and must be verified in the field by the Contractor.

C. Rated speed shall mean speed in either direction of travel with rated capacity load in car. Actual speed, under any load condition shall not vary more than five percent of rated speed.

### 2.4 POWER SUPPLY

A. Power for emergency operation of elevators specified will be available from emergency power feeders and transfer switch.

B. GENERAL CONTRACTOR. Remove existing fused disconnect and existing shunt trip circuit breakers. Install new shunt trip breakers located in elevator machine room.

C. See Section 2.11 for Auxiliary power operation.

### 2.5 GROUNDING

A. Equipment grounding shall be provided. Ground conductors, supports, controller enclosure, motors, platform and car frames and other noncurrent conducting metal enclosures for electrical equipment in accordance with NEC. The ground wires shall be copper, insulated and sized as required by NEC. Bond the grounding wires to each pull boxes, junction boxes, cabinets and other enclosures through which the wires pass.

### 2.6 CONDUIT AND WIREWAY

A. May reuse existing conduit that conforms to NEC. New conduit shall conform with the following paragraphs.

B. Unless otherwise specified or approved, install electrical conductors, except traveling cable connections to the car, in rigid zinc-coated steel or aluminum conduit, electrical metallic tubing or metal wireways. Rigid conduit smaller than 3/4 inch or electrical metallic tubing smaller than 1/2 inch electrical trade size shall not be used. All raceways completely embedded in concrete slabs, walls, or floor fill shall be rigid steel conduit. Wireway (duct) shall be installed in the hoistway and to the controller and between similar apparatus in the elevator machine room. Fully protect self-supporting connections, where approved, from abrasion or other mechanical injury. Flexible metal conduit not less than 3/8 inch electrical trade size may be used, not exceeding 18 inches in length unsupported, for short connections between risers and limit switches, interlocks, and for other applications permitted by NEC.

C. All conduit terminating in steel cabinets, junction boxes, wireways, switch boxes, outlet boxes and similar locations shall have approved insulation bushings. Install a steel lock nut under the bushings if they are constructed completely of insulating materials. Protect the conductors at ends of conduits not terminating in steel cabinets or boxes by terminal fittings having an insulated opening for the conductors.

D. Rigid conduit and EMT fittings using set screws or indentations as a means of attachment shall not be used. All fittings shall be steel or malleable iron.

E. Connect motor or other items subject to movement, vibration or removal to the conduit or EMT systems with flexible, steel conduits.

#### 2.7 CONDUCTORS: NEW

A. Remove all existing hoistway and machine room wiring.

B. Unless otherwise specified, conductors, excluding the traveling cables, shall be stranded or solid coated annealed copper in accordance with Federal Specification J-C-30B for Type RHW or THW. Where 16 and 18 AWG are permitted by NEC, single conductors or multiple conductor cables in accordance with Federal Specification J-C-580 for Type TF may be used provided the insulation of single conductor cable and outer jacket of multiple conductor cable is flame retardant and moisture resistant. Multiple conductor cable shall have color or number coding for each conductor. Conductors for control boards shall be in accordance with NEC. Joints or splices are not permitted in wiring except at outlets. Tap connectors may be used in wireways provided they meet all UL requirements.

C. All wiring must test free from short circuits or ground faults. Insulation resistance between individual external conductors and between conductors and ground shall be a minimum of one megohm.

D. Where size of conductor is not given, voltage and amperes shall not exceed limits set by NEC.

E. Terminal connections for all conductors used for external wiring between various items of elevator equipment shall be solderless pressure wire connectors in accordance with Federal Specification W-S-610. The Elevator Contractor may, at his option, make these terminal connections on #10 gauge or smaller conductors with approved terminal eyelets set on the conductor with a special setting tool, or with an approved pressure type terminal block. Terminal blocks using pierce-through serrated washers are not acceptable.

#### 2.8 TRAVELING CABLES: NEW

A. All conductors to the car shall consist of flexible traveling cables conforming to the requirements of NEC. Traveling cables shall run from the junction box on the car directly to the controller. Cables shall be securely anchored to avoid strain on individual terminal connections. Flame and moisture resistant outer covering must remain intact between junction boxes. Abrupt bending, twisting and distortion of the cables shall not be permitted.

B. Provide spare conductors equal to 10 percent of the total number of conductors furnished, but not less than 5 spare conductors in each traveling cable.

C. Provide shielded wires for the auto dial telephone system within the traveling cable. Add 5 pair shielded wires for card reader, 2 RG-6/U coaxial CCTV cables, and 2 pair 14 gauge wires for CCTV power as needed.

D. If traveling cables come into contact with the hoistway or elevator due to sway or change in position, provide shields or pads to the elevator and hoistway to prevent damage to the traveling cables.

E. Hardware cloth wide may be installed from the hoistway suspension point downward to the elevator pit to prevent traveling cables from rubbing or chafing.

Hardware cloth shall be securely fastened and tensioned to prevent buckling. Hardware cloth is not required when traveling cable is hung against a flat wall.

## 2.9 CONTROLLER and SUPERVISORY PANEL

A. UL/CSA Labeled Controller: Mount all assemblies, power supplies, chassis switches, and relays on a self-supporting steel frame. Completely enclose the equipment and provide a mean to control the temperature. Solid state components shall be designed to operate between 32 to 104 degrees Fahrenheit, humidity non-condensing up to 85 percent.

B. All controller switches and relays shall have contacts of design and material to insure maximum conductivity, long life and reliable operation without overheating or excessive wear, and shall provide a wiping action to prevent sticking due to fusion. Switches carrying highly inductive currents shall be provided with arc shields or suppressors.

C. Where time delay relays are used in the circuits, they shall be of acceptable design, adjustable, reliable, and consistent such as condenser timing or electronic timing circuits.

D. Properly identify each device on all panels by name, letter, or standard symbol which shall be neatly stencil painted or decaled in an indelible and legible manner. Identification markings shall be coordinated with identical markings used on wiring diagrams. The ampere rating shall be marked adjacent to all fuse holders. All spare conductors to controller and supervisory panel shall be neatly formed, laced, and identified.

## 2.10 MICROPROCESSOR CONTROL SYSTEM: NEW VVVF AC

A. Provide Motion Control Elevator (MCE) Model 4000 AC type controllers. Provide a microprocessor based system with absolute position/speed feedback encoded tape to control the hoisting machine and signal functions in accordance with these specifications. Complete details of the components and printed circuit boards, together with a complete operational description, shall be submitted for approval.

1. All controllers shall be non-proprietary.

2. Proprietary tools shall not be necessary for adjusting, maintenance, repair, and testing of equipment.

3. Controller manufacturer shall provide engineering and technical support, including all manuals and wiring diagrams to the VA Medical Center's designated Elevator Maintenance Service Provider.

B. All controller assemblies shall provide smooth, step-less acceleration and deceleration of the elevator, automatically and irrespective of the load in the car. All control equipment shall be enclosed in metal cabinets with lockable, hinged door(s) and shall be provided with a means of ventilation. All non-conducting metal parts in the machine room shall be grounded in accordance with NEC. Cabinet shall be securely attached to the building structure.

C. Circuit boards for the control of each and every elevator system; dispatching, signals, door operation and special operation shall be installed in a NEMA Type 1 General Purpose Enclosure. Circuit boards shall be moisture resistant, non-corrosive, non-conductive, fabricated of non-combustible material and adequate thickness to support the components mounted thereon. Mounting racks shall be spaced to prevent accidental contact between individual circuit boards and modules.

D. Modules shall be the type that plug into pre-wired mounting racks. Field wiring or alteration shall not be necessary in order to replace defective modules.

E. Each device, module and fuse (with voltage and ampere rating) shall be identified by name, letter or standard symbol in an approved indelible and legible manner on the device or panel. Coordinate identification markings with identical markings on wiring diagrams.

F. The electrical connections between the printed circuit boards (modules) and the circuit connectors incorporated in the mounting racks shall be made through individual tabs which shall be an integral part of each module. The tabs shall be nickel-gold plated or other approved metal of equal electrical characteristics. Modules shall be keyed or notched to prevent insertion of the modules in the inverted position.

G. Light emitting diodes (LED) shall be for visual monitoring of individual modules.

H. Components shall have interlocking circuits to assure fail-safe operation and to prevent elevator movement should a component malfunction.

I. Method of wire wrapping from point to point with connections on the mounting racks shall be submitted for approval.

J. Field wiring changes required during construction shall be made only to the mounting rack connection points and not to the individual module circuitry or components. If it is necessary to alter individual modules they shall be returned to the factory where design changes shall be made and module design records changed so correct replacement units will be available.

K. All logic symbols and circuitry designations shall be in accordance with ASME and NEC Standards.

L. Solid state components shall be designed to operate within a temperature range of 32 to 104 degrees Fahrenheit, humidity non-condensing up to 85 percent.

M. Wiring connections for operating circuits and for external control circuits shall be brought to terminal blocks mounted in an accessible location within the controller cabinet. Terminal blocks using pierce through serrated washers shall not be used.

#### 2.11 VVVF AC MOTOR CONTROL WITH REGENERATIVE DRIVE: NEW

##### A. Variable Voltage Variable Frequency Motor Control:

1. Elevator control shall be affected by means of a compact solid state motor control unit for each and every elevator with electrical characteristics to suit the power supply. The system shall consist of the necessary three phase, full-wave bridge rectifiers and be equipped with regenerative drive.

2. Solid state motor control unit shall operate with high efficiency and low power consumption, have the capacity to handle peak currents typical of elevator service and contain a balanced, coordinated fault protection system which shall accomplish the following:

a. Protect the complete power circuit and specifically the power semi-conductors from failure under short circuit (bolted fault) conditions.

b. Protect against limited faults arising from partial grounds, partial shorts in the motor armature or in the power unit itself.

c. Protect the drive motor against sustained overloads. A solid state overload circuit shall be used.

d. Protect motor and power unit against instantaneous peak overload.

- e. Provide semi-conductor transient protection.
- f. Provide phase sequence protection to insure incoming line is phased properly.
- g. Provide regenerative drive.
- h. Removable printed circuit boards shall be provided for the VVVF control. Design tabs so boards cannot be reversed.

#### 2.12 AUXILIARY POWER OPERATION: EXISTING

- A. The control system for Elevators P-1, P-2, (one group) and Elevators S-3, S-4, (one group) shall provide for the operation of both elevators in each elevator bank on auxiliary power upon failure of the normal power supply.
- B. Auxiliary power supply, its starting means, transfer switch for transfer of elevator supply from normal to auxiliary power, two pair of conductors in a conduit from an auxiliary contact on the transfer switch (open or close contacts as required by Controller Manufacturer) to terminals in the group elevator controller if not existing, and other related work shall be provided by the Electrical Contractor.
- C. Remove existing auxiliary power control box cover plates and cover with new stainless steel plate. Boxes located above the hall push buttons at the first floor.
- D. Upon loss of normal power supply there shall be a delay before transferring to auxiliary power of 10 seconds minimum to 45 seconds maximum, the delay shall be accomplished through an adjustable timing device. Following this adjustable delay the associated elevators shall function as if on normal power.
- E. Prior to the return of normal power an adjustable timed circuit shall be activated that will cause all cars to remain at a floor if already there or stop and remain at the next floor if in flight. Actual transfer of power from auxiliary power to normal building power shall take place after all cars are stopped at a floor with their doors open.
- F. Car lighting circuits shall be connected to the auxiliary power panel.

#### 2.13 DUPLEX SELECTIVE COLLECTIVE AUTOMATIC OPERATION

- A. Provide duplex selective collective automatic operation for Elevators P-1, P-2 (one group) and S-3, S-4 (one group)
- B. Design system so that on operation of one or more dispatch buttons within the car, car shall start automatically, providing hoistway door interlock and car door contact circuits have been established and shall stop at the first floor reached for which a call has been registered. Stops shall be made in the natural order in which floors have been reached, irrespective of sequence in which calls have been registered, provided call is registered sufficiently in advance of arrival of car at that particular floor to permit stop to be made. During this operation the cars shall only respond to calls registered at the landings, but only one car shall respond to any one landing call and it shall be the car nearest to the call which is set to travel in the corresponding direction of the registered call.
- C. Arrange the system so that normally one car shall be parked at the main landing and the other car at the last landing served. Both cars shall park with their doors closed. The car parked at the main landing shall be considered the "parked" car and the other car shall be considered the "free" car. Should both cars complete their calls at the main landing, the car which arrived first shall be considered the "free" car. An idle "free" car shall respond to any landing call registered either above or below the floor at which it is standing. When the "free" car is responding to car or landing calls, the "parked" car shall

automatically start up in response to an "up" call registered below an "up" traveling "free" car, or "up" or "down call registered above a "down" traveling "free" car. Either car shall always respond to its own calls. If the "parked" car leaves the main landing for any reason, it shall assume the duties of the "free" car and the "free" car shall proceed upon completion of its calls, to the main landing to become the "parked" car.

D. If a car is taken out of service for any reason, or fails to respond to a landing call within a predetermined adjustable time limit of approximately 40 to 180 seconds, all calls shall be transferred to the other car which shall function as a single car selective collective elevator until the "out of service" car is returned to the system.

E. Provide a time relay which shall hold the car and the hoistway doors open for an adjustable predetermined time to give passengers time to leave or enter the car.

F. A landing car call registered from the landing at which either the "parked" car or "free" car is parked shall automatically open car and hoistway doors. Provide sufficient time delay to allow entering passengers to register a car call and establish direction before that car can respond to other landing calls registered at the same time.

G. If the system has landing calls in registration continuously without interruption for an adjustable predetermined period of 30 to 90 seconds, the "parked" car shall automatically start up to assist the "free" car in answering calls.

H. Car lights and fan in the elevator shall not shut off when elevator is idle. Arrange circuits so that power to lights and outlets on top and bottom of car shall not be interrupted.

#### 2.14 MACHINE ROOM MONITOR (CCTV)

A. Install a monitor in the machine room located in the Group Dispatch Operation Cabinet. Provide one keyboard for terminal. All 4 elevators shall be monitored from the one monitor.

B. The CCTV shall contain indicators to provide the following information:

1. The floor where each elevator is currently located.
2. The direction that each elevator is currently traveling or is scheduled to travel.
3. The location and direction of currently registered hall calls.
4. Elevators that are currently out of service.
5. Elevators that are currently bypassing hall calls.
6. Elevators that are currently engaged in passenger transfers.
7. Operations program under which entire group is currently operating.
8. Zone divisions of the entire group.
9. Door positions.
10. Status indication for cars on independent service, car top inspection, stop switch activated, alarm activated, fire service, and earthquake protection activated, etc.

C. The maintenance terminal shall be suitable for all troubleshooting procedures related to the specific type microprocessor installed on this project.

## 2.15 FIREFIGHTERS' SERVICE: REUSE EXISTING

A. Provide Firefighters' Service as per ASME A17.1 Section 2.27.

B. Smoke Detectors:

1. Smoke detection devices that are designated for actuation of Elevator Phase I "FIRE SERVICE" response in each elevator lobby, and machine room are existing and shall be reused. Replace the top of hoistway smoke detector with a new smoke detector that has 2 sets of contacts. One set of contacts shall be for Phase one fire service recall and the second set shall operate the new top of hoistway motorized louvered venting. The new top of hoistway smoke detector shall be provided by the General Contractor.

a. Elevator lobby smoke detectors shall activate only the elevators sharing the corresponding or common lobby.

b. Machine room smoke detectors shall activate fire recall for all four elevators with equipment located in that machine room.

c. First floor is Main Fire Floor. Basement floor is Alternate Fire Floor.

d. Remove existing fire service key switch and plate located at basement level.

## 2.16 SHUNT TRIP CIRCUIT BREAKER: PROVIDED BY GENERAL CONTRACTOR

A. Remove existing mainline disconnects and any existing shunt trip breakers. Replace with new shunt trip circuit breakers in elevator machine room. Provide new wiring from shunt trips to new controllers.

B. Reuse existing heat detector in machine room and if necessary, move heat detector to within 24 inches of each sprinkler head.

C. Provide new wiring from machine room heat detectors to fire service panel (for alarm only) and back to the machine room to a 110V (AC) switch for each circuit breaker.

D. When activated by the heat detectors, a supervised signal located in the elevator machine room in the form of a relay with a set of 110 Volt "C" contacts for each elevator is then activated. The 110 Volt circuit is to be on emergency power system. The relay shall be located in the machine room. Power shall be removed from each elevator controller by activating an independently controlled shunt trip circuit when the temperature in the machine room exceeds the setting of the heat detector.

E. The heat detector shall be independent of the fire service system.

## 2.17 HOISTWAY VENTING; EXISTING (GENERAL CONTRACTOR TO PROVIDE WORKING VENTING)

A. Provide top of hoistway motorized louvered venting located at top of hoistway. May install motorized louvered venting in existing top of hoistway venting hole. Provide a louvered vent with motor and wiring. When top of hoistway smoke detector is activated, one set of contacts will send the elevator into phase one fire service and the second set of contacts will operate the motorized venting. The venting shall stay closed under power. When the top of hoistway smoke detector is activated, the power is removed from the venting and the venting will open. When the smoke detector is reset, the venting is closed under power.

## 2.18 MEDICAL EMERGENCY SERVICE

A. Provisions shall be made for calling elevator P-1, P-2 (ONE GROUP) and S-3, S-4 (ONE GROUP) on "Medical Emergency" operating independently from the dispatch

signals and landing call signals. Provide a two-position, key-operated, momentary contact, spring return switch at floors at all floors.

B. Install key switch in the floor landing push button fixture above the push buttons.

C. Landing key switches shall be momentary pressure-spring return to "OFF" position. Provide a call registered light indicator adjacent to key switch. The landing key switch and the "Medical Emergency" key switch in the car shall not be operable by keys used for any other purpose in the hospital.

D. When switch is activated at any floor, the call register light indicator shall illuminate at that floor only, and the elevator shall respond to the medical emergency call. Immediately upon selection, all car calls within that car shall be cancelled. If the car is traveling away from the medical emergency call, it shall slow down and stop at the nearest floor, maintain closed doors, reverse direction and proceed nonstop to the medical emergency call floor. If the selected car is traveling toward the medical emergency call floor, it shall proceed to that floor nonstop. If at the time of selection it is slowing down for a stop, the car shall stop, maintain doors closed, and start immediately toward the medical emergency floor.

E. Arriving at the medical emergency floor, the car shall remain with doors open for 30 seconds. After this interval has expired and the car has not been placed on medical emergency operation from within the car, the car shall automatically return to normal service.

1. Locate a "Medical Emergency" key switch in the upper section of each main car operating panel for selecting medical emergency service. Activation of the key switch will allow the car to accept a car call for any floor, close doors, and proceed nonstop to the floor desired. The return of the key switch to normal position will restore the car to normal service. The key shall be removable only in the off position.

F. Provide an LED illuminated indicator light next to the Medical Emergency key switch the same size as the Fire Service indicator. In the center of the rear cab panel provide a back lighted "MEDICAL EMERGENCY" LED illuminated display that shall flash on and off continuously when the car is assigned to this operation and until it is restored to normal service. May reuse existing box. Provide new light. "MEDICAL EMERGENCY" indicator shall be a photographic negative type 1830 mm (72 in.) to center above the floor, 152 mm (6 in.) wide X 76 mm (3 in.) high, with 12 mm (1/2 in.) high letters and legible only when illuminated.

G. All of the key switches in the "Medical Emergency" system shall operate from the same key. The medical emergency call service key shall not operate any other key switch in the elevator system, nor shall any other key required by the elevator system be able to operate the medical emergency call service switches.

H. Should the car be operating on "Independent Service", the medical emergency service indicator lights in the car operating panel and rear wall shall be illuminated, buzzer shall sound, and the "Audio Voice" system shall direct the attendant to return the car to automatic operation.

I. Should the car be out of service and unable to answer medical emergency calls, the call register light shall not illuminate.

J. Each switch faceplate shall have legible indelible legends engraved or etched to indicate its identity and positions. All letters in faceplates shall be 6 mm (1/4 in.) high, filled with black paint.

K. When Phase I fire recall is activated it shall over-ride elevator on medical emergency service and return to the main or alternate fire service recall floor. When the fire emergency floor has been identified the attendants may complete

their medical emergency run on Phase II firefighters' operation if life safety is not affected.

L. Provide four (4) keys for each "Medical Emergency" key cylinder furnished.

#### 2.19 GEARED TRACTION AC HOIST MACHINE

A. Provide new Geared Traction Hoist Machine that meets ASME A17.1 Elevator Code.

1. Worm geared traction type with an AC motor, brake, gear, drive shaft, cable deflector sheave, and gear case mounted in proper alignment on an isolated bedplate.
  2. Hoisting motor of geared traction machine shall be alternative current type and shall be designed to develop the required high starting torque with a low starting current and shall conform to the NEMA Standards for 50 degree C, sixty minute rated elevator hoisting motor.
  3. Provide hoist machine mounted direct drive, digital, closed-loop velocity encoder.
  4. Armature must be electrically balanced and together with motor coupling and brake, mechanically balanced.
  5. The structural design of the motor shall insure perfect alignment of bearings. The rotating elements shall be dynamically balanced to minimize vibration.
  6. Thrust bearings shall be ball, roller, or radial type, of the highest grade, designed to take thrust in both directions. Motor and sheave bearings shall be ball or roller type. Bearings shall be of ample size, self-aligning or pre-loaded, non-adjustable and arranged to eliminate backlash.
  7. Hoisting machine brake shall be drum or disc type and shall have the capacity to hold the elevator with 125 percent of rated load. Arrange brake circuits so that no current shall be applied to the brake coil prior to the establishment of the hoistway door interlock circuit, except during leveling, re-leveling, and hoistway access operation.
  8. Provide hoist machine drip pans to collect lubricant seepage.
- B. Vibration isolation machine foundation and pads shall be furnished for machines mounted over hoistway.
- C. Provide new wiring from controller to motor.

#### 2.20 SHEAVES; NEW

- A. Elevators P-1, P-2 S-3, S-4. Provide new deflector sheaves with a metal basket type guard mounted below the sheave and a guard to prevent ropes from jumping out of grooves. Securely fasten guard to sheave beams.
- B. Fabricate sheave guards from not less than 10-gauge thick steel and install with minimum clearance between guard and cables to prevent ropes from jumping out of grooves.
- C. Elevators S-3, S-4. Remove and replace existing idler sheaves from top of car crosshead and top of counterweight frame. Two-to-one idler sheaves on car and counterweights, shall be provided with metal guards that shall prevent foreign objects from falling between ropes and sheave grooves and accidental contact or injury to workers on top of the car. Fabricate sheave guards from not less than 10-gauge thick steel and install with minimum clearance between guard and cables to prevent ropes from jumping out of grooves.

#### 2.21 HOIST ROPES; NEW

- A. Provide elevator with the required number and size of new ropes to insure adequate traction for the range of loads with a factor of safety not less than that required by ASME A17.1 Section 2.20. Hoisting ropes shall be preformed 8 x 19 or 8 x 25 traction steel, conforming to Federal Specification RR-W-410 with minimum nominal diameter of 0.50 inch. For machines located overhead, 6 x 19 preformed traction steel hoisting ropes may be used in lieu of 8 x 19 that meet the requirements of the sheave manufacturer, at the elevator contractor's option.
- B. Securely attach a corrosion resistant metal data tag to one hoisting rope fastening on top of the elevator.
- C. Provide wedge type shackles.

#### 2.22 GOVERNOR ROPE; NEW

- A. Provide new governor rope that shall be 6 x 19 or 8 x 19 wire rope, preformed traction steel, uncoated, fiber core, conforming to Federal Specification RR-W-410 with minimum nominal diameter of 0.375 inch having a minimum safety factor of 5. Tiller rope construction is not acceptable.
- B. Under normal operation rope shall run free and clear of governor jaws, rope guards, and other stationary parts.
- C. Securely attach governor rope tag to governor rope releasing carrier. Data tag shall be corrosion-resisting metal and bear data as required by ASME A17.1 Section 2.18.

#### 2.23 OVERSPEED GOVERNOR; NEW

- A. Provide new centrifugal type car driven governor, in accordance with ASME A17.1 Section 2.18, to operate the car safety device. Governor shall be complete with weighted pit tension sheave, governor release carrier and mounting base with protected cable sleeves.
- B. Furnish over speed switch and speed reducing switches when required.
- C. The governor rope clamping device shall be designed so that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the safety.
- D. Provide anti-friction metal bearings for the governor and pit tension sheaves. Bearing shall be either self-oiling or Zerk fitting type connections. Ball or roller bearings may be used in lieu of sleeve type.
- E. Provide metal guard over top of governor rope and sheaves.
- F. Governor, with the exception of finished surfaces, screw threads, etc., shall be factory painted and shall operate freely. Field painting of governor parts shall be permitted in accordance with ASME A17.1 Rule 2.18.3.1.
- G. Where the elevator travel does not exceed 100 feet, the weight tension sheave may be mounted on a pivoted steel arm in lieu of operating in steel guides.

#### 2.24 CAR SAFETY DEVICE

- A. Reuse existing. Clean, repair, and lubricate.
- B. Field testing of car safety and governor shall be as specified in Section 3.7 PRETEST and TEST of this specification.

#### 2.25 ASCENDING CAR OVERSPEED PROTECTION

- A. Provide a device to prevent ascending over speed and unintended motion away from the landing when the doors are not locked in accordance with ASME A17.1 Section 2.19.

## 2.26 CAR AND COUNTERWEIGHT BUFFERS; NEW

- A. Provide new buffers on Elevators P-1, P-2 for each car and for each counterweight and car pit buffers on Elevators P-3, P-4 that meet the requirements of ASME A17.1 Section 2.22. Securely fasten buffers and supports to the pit channels and in the alignment with striker plates on car and counterweight. Each installed buffer shall have a permanently attached metal plate indicating its stroke and load rating. Buffer anchorage shall not puncture pit waterproofing.
- B. Design and install buffers to provide minimum car runby required by ASME A17.1 Rule 2.4.2.
- C. Furnish pipe stanchions and struts as required to properly support the buffer.
- D. May reuse existing pit channels if buffers can be made to bolt down and fit properly.

## 2.27 COUNTERWEIGHTS; REUSE EXISTING

- A. Elevator shall be counterweighted with the weight of the car plus 40 percent of the rated capacity load as required by the controller manufacturer.
- B. Sub weights shall be added to or removed from the counterweights frame to provide a counterbalance equal to the weight of the complete car and approximately 40 percent of the rated capacity. New subweight shall be sectional cast iron, flame cut hot rolled steel or cast lead.
- C. Reuse existing counterweight guards.

## 2.28 CAR AND COUNTERWEIGHT ROLLER GUIDES

- A. Reuse existing 6 wheel roller guides on elevators P-1, P-2. Replace any bad rollers. Grease roller guides. Reuse existing counterweight roller guides.
- B. Provide elevators S-3, S-4 with new 6 wheel main rail roller guides. Provide counterweight frame with new 3 wheel counterweight roller guides. The car and counterweight shall have adjustable roller guides. Each guide shall be of an approved type consisting of not less than six (6) wheels for main rails and three (3) wheels for counterweight rails each with a durable, resilient oil-resistant material tire rotating on ball bearings having sealed-in lubrication. Assemble rollers on a substantial metal base and mount to provide continuous spring pressure contact of all wheels with the corresponding rail surfaces under all conditions of loading and operation. Secure the roller guides at top and bottom on each side of car frame and counterweight frame. All mounting bolts shall be fitted with nuts, flat washers, split lock washers, and if required, beveled washers.
- C. Provide sheet metal guards to protect wheels on top of car and counterweight for all 4 elevators.
- D. Diameter of car rollers shall match size of rollers on P-1, P-2. The entire elevator car shall be properly balanced to equalize pressure on all guide rollers. Cars shall be balanced in post-wise and front-to-back directions. Test for this balanced condition shall be witnessed at time of final inspection.
- E. Minimum diameter of counterweight rollers shall not be less than 75 mm (3 in.). Properly balance counterweight frame to equalize pressure on all guide rollers. The Contractor shall have the option of furnishing, for counterweight only, mechanically adjusted roller guide in lieu of spring loaded roller guides as specified.
- F. Equip all cars and counterweight with an auxiliary guiding device for each guide shoe which shall prevent the car or counterweight from leaving the rails in the event that the normal guides are fractured. These auxiliary guides shall not,

during normal operation, touch the guiding surfaces of the rails. Fabricate the auxiliary guides from hot rolled steel plate and mount between the normal guide shoes and the car and counterweight frames. The auxiliary guides may be an extension of the normal guide shoe mounting plate if that plate is fabricated from hot rolled steel. The portion of the auxiliary guide which shall come in contact with the rail guiding surfaces in the event of loss of the normal guides shall be lined with an approved bearing material to minimize damage to the rail guiding surfaces.

#### 2.29 GUIDE RAILS, SUPPORTS AND FASTENINGS

- A. Reuse existing, guide rails shall conform to ASME A17.1 Section 2.23.
- B. Thoroughly clean all guide rails of grease, oil, rust and other foreign substances. File and remove all rough edges and surfaces and tighten bracket bolts and guide clips for smooth and quiet operation of car and counterweight.
- C. Provide any required rail backing and/or intermediate tie brackets to comply

#### 2.30 NORMAL AND FINAL TERMINAL STOPPING DEVICES; NEW

- A. Provide new normal and final terminal stopping devices that conform to ASME A17.1 Section 2.25.
- B. Mount terminal slowdown switches and direction limit switches on the elevator or in hoistway to reduce speed and bring car to an automatic stop at the terminal landings.
  - 1. Switches shall function with any load up to and including 125 percent of rated elevator capacity at any speed obtained in normal operation.
  - 2. Switches, when opened, shall permit operation of elevator in reverse direction of travel.
- C. Mount final terminal stopping switches in the hoistway.
  - 1. Switches shall be positively opened should the car travel beyond the terminal direction limit switches.
  - 2. Switches shall be independent of other stopping devices.
  - 3. Switches, when opened, shall remove power from hoist motor, apply hoist machine brake, and prevent operation of car in either direction.
- D. After final stopping switches have been adjusted, through bolt switches to guide rail.

#### 2.31 WORKMAN'S LIGHTS AND OUTLETS; NEW

- A. Provide duplex GFCI protected type receptacles and lamps with guards on top of each elevator car and beneath the platform. The receptacles shall be in accordance with Fed. Spec. W-C-596 for Type D7, 2-pole, 3-wire grounded type, rated for 15 amperes and 125 volts.

#### 2.32 TOP-OF-THE CAR OPERATING DEVICE; NEW

- A. Provide a car top operating device that meets the requirements of ASME A17.1 Section 2.26.
- B. The device shall be activated by a toggle switch mounted in the device. The switch shall be clearly marked "INSPECTION" and "NORMAL" on the faceplate, with 6 mm (1/4 in.) letters.
- C. Movement of the elevator shall be accomplished by the continuous pressure on a direction button and a safety button.
- D. Provide an emergency stop toggle type switch.

E. Provide permanent identification for the operation of all components in the device.

F. The device shall be permanently attached to the elevator crosshead on the side of the elevator nearest to the hoistway doors used for accessing the top of the car.

### 2.33 CAR LEVELING DEVICE

A. Car shall be equipped with a two-way leveling device to automatically bring the car to within 3 mm (1/8 in.) of exact level with the landing for which a stop is initiated regardless of load in car or direction.

B. If the car stops short or travels beyond the floor, the leveling device, within its zone shall automatically correct this condition and maintain the car within 3 mm (1/8 in.) of level with the floor landing regardless of the load carried.

C. Provide encoded steel tape, steel tape with magnets or steel vanes with magnetic switches. Submit design for approval.

### 2.34 EMERGENCY STOP SWITCHES; NEW

A. Emergency stop switches shall conform to the code.

B. Provide an emergency stop switch for each top-of-car device, pit, machine spaces, service panel and firefighters' control panel inside the elevator.

C. Each stop switch shall be red in color and shall have "STOP" and "RUN" positions legibly and indelibly identified.

D. Provide new pit switches. Locate one pit switch 4 feet above pit floor and a second pit switch located on wall 4 feet above lowest landing floor by pit ladder.

### 2.35 MAIN CAR OPERATING PANEL

A. Locate the main car operating panel in the car enclosure on the front return panel for the elevators. The top floor car call push button shall not be more than 1220 mm (48 in.) above the finished floor. Car call push buttons and indicator lights shall be round with a minimum diameter of 25 mm (1 in.), LED white light illuminated. No vandal proof buttons.

B. One piece front faceplate, with edges beveled 15 degrees, shall have the firefighters' service panel recessed into the upper section and the service operation panel recessed into the lower section, fitted with hinged doors. Doors shall have concealed hinges, be in the same front plane as the faceplate and fitted with cylinder type key operated locks. Secure the faceplate with stainless steel tamperproof screws.

C. All terminology on the main car operating panel shall be raised or engraved. Use 6 mm (1/4 in.) letters to identify all devices in upper section of the main car operating panel. The handicapped markings with contrasting background shall be recessed .030 inch in the faceplate, square or rectangular in shape, with the finished face of the 12 mm (1/2 in.) numerals and markings flush with the faceplates. Surface mounted plates are not acceptable.

D. The upper section shall contain the following items in order listed from top to bottom:

1. Engrave elevator number, 25 mm (1 in.) high with black paint for contrast.

2. Engrave capacity plate information with black paint for contrast with freight loading class and number of passengers allowed.

3. Emergency car lighting system consisting of a rechargeable battery, charger, controls, and LED illuminated light fixture. The system shall automatically provide emergency light in the car upon failure or interruption of the normal car lighting service, and function irrespective of the position of the light control switch in the car. The system shall be capable of maintaining a minimum illumination of 1.0 foot-candle when measured 1220 mm (48 in.) above the car floor and approximately 305 mm (12 in.) in front of the car operating panel, for not less than four (4) hours.

4. Firefighters' Emergency Operation Panel shall conform to the requirements of ASME A17.1 Section 2.27. Firefighters' Panel shall be 1676 mm (66 in.) minimum to 1830 mm (72 in.) maximum to the top of the panel above finished floor.

5. Firefighters' Emergency Indicator Light shall be round with a minimum diameter of 25 mm (1 in.).

6. Elevators P-1, P-2 (ONE GROUP) and elevators S-3, S-4 (one group). Medical Emergency switch marked "MEDICAL EMERGENCY" with two positions labeled "ON" and "OFF" and Medical Emergency Indicator Light located next to the key switch shall be round with a minimum diameter of 25 mm (1 in.). Key removable in off position only. Instruction for Medical Emergency operation shall be engraved below the key switch and light.

7. Elevators S-3, S-4. Provide door hold button. Provide a "Door Hold" button on faceplate. It shall have "Door Hold" engraved on button. Button shall light when activated. When activated, the door shall stay open for a maximum of 1 minute. To over ride door hold timer, push car operating panel floor call button.

8. Key operated Independent Service; see Section 2.37 for detailed description.

9. Complete set of round car call push buttons, minimum diameter of 25 mm (1 in.), and LED white light illuminated, corresponding to the floors served. Car call buttons shall be legibly and indelibly identified by a floor number and/or letter not less than 12mm (1/2 in.) high in the face of the call button. Stack buttons in a single vertical column for low rise buildings up to six floors with front openings only. No vandal proof buttons.

10. Door Open and Door Close buttons shall be located below the car call buttons. They shall have "OPEN" and "CLOSE" legibly and indelibly identified by letters in the face of the respective button. The Door Open button shall be located closest to the door jamb as required by ADA.

11. Red Emergency Alarm button that shall be located below the car operating buttons. Mount the emergency alarm button not lower than 890 mm (35 in.) above the finished floor. It shall be connected to audible signaling devices as required by A17.1 Rule 2.27.1.2. Provide audible signaling devices including the necessary wiring.

12. Provide a red stop/run key switch.

13. Emergency Help push button shall activate two way communications by Auto Dial telephone system as required by ASME A17.1 Rule 2.27.1.1.3. Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12 mm (1/2 in.) high letters.

14. Provide a corresponding Braille plate on the left side of each button. The handicapped markings with contrasting background shall be recessed .030 inch in the faceplate, square or rectangular in shape, with the finished face of the 12 mm (1/2 in.) numerals and markings flush with the faceplates. Surface mounted plates are not acceptable.

E. The service operation panel, in the lower section shall contain the following items:

1. Light switch (toggle) labeled "LIGHTS" for controlling interior car lighting with its two positions marked "ON" and "OFF".

2. Inspection switch (toggle) that will disconnect normal operation and activate hoistway access switches at terminal landings. Switch shall be labeled "INSPECTION" with its two positions marked "ON" and "OFF".

3. Three position switch (toggle) labeled "FAN" with its positions marked "HIGH", "LOW" and "OFF" for controlling car ventilating blower.

4. Two position, spring return, toggle switch or push button to test the emergency light and alarm device. It shall be labeled "TEST EMERGENCY LIGHT AND ALARM".

#### 2.36 AUXILIARY CAR OPERATING PANEL

A. Provide an auxiliary car operating panel in the side wall of the elevator between the handrails immediately adjacent to the front entrance column strike jamb. The auxiliary car operating panel shall contain only those controls essential to passenger (public) operation. The auxiliary car operating panel faceplate shall match the main car operating panel faceplate in material and general design. Secure the faceplate with stainless steel tamperproof screws.

1. Mount door "OPEN" and door "CLOSE" buttons closest to the door jamb and mount the alarm button no lower than 875 mm (35 in.) above the finished floor. The Door Open button shall be located closest to the door as required by ADA.

2. Complete set of round car call push buttons, minimum diameter 25 mm (1 in.), and LED white light illuminated, corresponding to the floors served. Car call button shall be legibly and indelibly identified by a floor number and/or letter not less than 12 mm (1/2 in.) high in the face of the call button corresponding to the numbers of the main car operating buttons. No vandal proof buttons.

3. Cross-connect all buttons in the auxiliary car operating panels to their corresponding buttons in the main car operating panel. Registration of a car call shall cause the corresponding button to illuminate in the main and auxiliary car operating panel.

4. Emergency Help push button shall activate two way communications by Auto Dial telephone system as required by ASME A17.1 Rule 2.27.1.1.3. Help button shall be LED white light illuminated and flash when call is acknowledged. Legibly and indelibly label the button "HELP" in the face of the button with 12 mm (1/2 in.) high letters.

5. Install emergency telephone system in the auxiliary car operating panel.

6. Provide a corresponding Braille plate on the left side of each button. The handicapped markings with contrasting background shall be recessed .030 inch in the faceplate, square or rectangular in shape, with the finished face of the 12 mm (1/2 in.) numerals and markings flush with the faceplates. Surface mounted plates are not acceptable.

#### 2.37 INDEPENDENT SERVICE

A. Provide a legibly and indelibly labeled "INDEPENDENT SERVICE", two-position key operated switch on the face of the main car operating panel that shall have its positions marked "ON" and "OFF". When the switch is in the "ON" position, the car shall respond only to calls registered on its car dispatch buttons and shall bypass all calls registered on landing push buttons. The car shall start when a car call is registered, car call button or door close button is pressed, car and

hoistway doors are closed, and interlock circuits are made. When switch is returned to "OFF" position, normal service shall be resumed.

#### 2.38 CAR POSITION INDICATOR

A. Provide an L.E.D. alpha-numeric digital car position indicator located in the new main car operating panel, consisting of numerals and arrows not less than 50 mm (2 in.) high, to indicate position of car and direction of car travel.

B. Remove existing car position indicator.

#### 2.39 AUDIO VOICE SYSTEM

A. Provide digitized audio voice system activated by stopping at a floor. Audio voice shall announce floor designations, direction of travel, and special announcements. The voice announcement system shall be a natural sounding human voice that receives messages and shall comply with ADA requirements for audible car position indicators. The voice announcer shall have two separate volume controls, one for the floor designations and direction of travel, and another for special announcements. The voice announcer shall have a full range loud speaker, located on top of the cab. The audio voice unit shall contain the number of ports necessary to accommodate the number of floors, direction messages, and special announcements. Install voice announcer per manufacturer's recommendations and instructions. The voice system shall be the product of a manufacturer of established reputation. Provide manufacturer literature and list of voice messages.

1. Fire Service Message
2. Medical Emergency Service Message.
3. "Please do not block doors"
4. Provide special messages as directed by Project Engineer.

#### 2.40 AUTO DIAL TELEPHONE SYSTEM

A. Furnish and install a complete ADA compliant intercommunication system.

B. Provide a two-way communication device in the car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability with minimum two numbers.

C. "HELP" button shall illuminate and flash when call is acknowledged. Button shall match floor push button design.

D. Provide "HELP" button tactile symbol engraved signage and Braille adjacent to button mounted integral with car operating panels.

E. The auto dial system shall be located in the auxiliary car operating panel. The speaker and unit shall be mounted on the backside of the perforated stainless steel plate cover.

F. Each elevator shall have individual phone numbers.

G. If the operator ends the call, the phone shall be able to redial immediately.

#### 2.41 CORRIDOR OPERATING DEVICE FACEPLATES

A. Fabricate faceplates for all elevator operating and signal devices from not less than 1/8-inch thick flat stainless steel. Install all faceplates flush with surface upon which they are mounted.

B. New corridor pushbutton faceplates shall be the same size or larger as existing faceplates. May reuse existing push button boxes.

C. Fabricate faceplates for elevator operating and signal devices from not less than 3 mm (1/8 in.) thick flat stainless steel with all edges beveled 15 degrees. Install all faceplates flush with surface on which they are mounted.

D. Elevator Corridor Call Station Pictograph shall be engraved in the faceplate.

E. Fasten all car and corridor operating device and signal device faceplates with stainless steel tamperproof screws.

E. Design corridor push button faceplates so that pressure on push buttons shall be independent of pressure on push button contacts.

F. Engraved legends in faceplates shall have lettering 6 mm (1/4 in.) high filled with black paint.

G. Provide a corresponding Braille plate on the left side of each button. The handicapped markings with contrasting background shall be recessed .030 inch in the faceplate, square or rectangular in shape, with the finished face of the 12 mm (1/2 in.) numerals and markings flush with the faceplates. Surface mounted plates are not acceptable.

#### 2.42 CORRIDOR OPERATING DEVICES

A. Provide one riser of landing call buttons for Elevators P-1, P-2 and one riser for S-3, S-4. Locate in the existing locations.

B. Fixtures for intermediate landings shall contain "UP" and "DOWN" buttons. Fixtures for terminal landings shall contain a single "UP" or "DOWN" button. No vandal proof buttons.

C. Each button shall contain an integral registration LED white light which shall illuminate upon registration of a call and shall extinguish when that call is answered.

D. The direction of each button shall be legibly and indelibly identified by arrows not less than 12 mm (1/2 in.) high in the face of each button. Buttons shall be 1 inch in diameter.

E. Landing push buttons shall not re-open the doors while the car and hoistway doors are closing at that floor, the call shall be registered for the next available elevator. Calls registered shall be canceled if closing doors are re-opened by means of "DOOR OPEN" button or infrared curtain unit.

#### 2.43 DIGITAL CORRIDOR LANTERN/POSITION INDICATOR

A. Remove all existing hall lanterns and hall position indicators.

B. Provide each car with flush mounted combination corridor lantern/position indicator digital display mounted over the hoistway entrances at all floors. Provide each terminal landing with "UP" or "DOWN", minimum 64 mm (2 1/2 in.) high digital arrow lanterns and each intermediate landing with "UP" and "DOWN" digital arrow lanterns. Each lens shall be LED illuminated of proper intensity, so shielded to illuminate individual lens only. The lenses in each lantern shall be illuminated white to indicate "UP" travel and red to indicate "DOWN" travel. Lanterns shall signal in advance of car arrival at the landing indicating the direction of travel whether or not corridor button has been operated at that floor. Hall calls shall receive immediate assignment to individual cars and hall lantern shall sound and illuminate. Corridor lanterns shall not be illuminated when a car passes a floor without stopping. Each lantern shall be equipped with a clearly audible electronic chime which shall sound once for "UPWARD" bound car and twice for "DOWNWARD" bound car. Audible signal shall not sound when a car passes the floor without stopping. Provide adjustable sound level on audible signal. Car riding lanterns are not acceptable.

C. Provide alpha-numeric digital position indicators directly between the arrival lanterns at each and every floor. Indicator faceplate shall be stainless steel. Numerals shall be not less than 50 mm (2 in.) high with direction arrows. Cover plates shall be readily removable for re-lamping. The appropriate direction arrow shall be illuminated during entire travel of car in corresponding direction.

D. Provide LED illumination in each compartment to indicate the position and direction the car is traveling by illuminating the proper alpha-numeric symbol. When the car is standing at a landing without direction established, arrows shall not be illuminated.

#### 2.44 HOISTWAY ACCESS SWITCHES

A. Reuse existing hoistway access box. Remove existing switches and replace with new switches for elevator at top terminal landing to permit access to top of car, and at bottom terminal landing to permit access to pit. Lock shall not be operable by any other key which will operate any other lock or device used for any other purpose at the VA Medical Center. Arrange the hoistway switch to initiate and maintain movement of the car. When the elevator is operated in the down direction from the top terminal landing, limit the zone of travel to a distance not greater than the top of the car crosshead level with the top floor.

#### 2.45 HOISTWAY ENTRANCES:

A. Refinish, remove all scratches and restore existing stainless steel entrance frames.

B. Clean and reuse existing sills, hanger supports, strut angles, fascia plates and toe guard.

C. Install exiting hoistway dust covers. Replace all damaged or missing dust covers.

D. Install new 2 speed side opening stainless steel doors with sight guards, tracks, gibs, separate fire gibs, door rollers, door locks, drive roller assemblies and closers. Auxiliary automatic door closers required under ASME A17.1 Section 2.11.3 shall be torsion spring type or spring loaded sill mounted type. Door panels shall be not less than 16-gauge stainless steel, flush type construction, and not less than 32 mm (1 1/4 in.) thick. Wrap stainless steel around the leading and trailing edges of the door panel. Top and bottom of door panels shall have continuous stiffener channels welded in place. Reinforcement of the door panels shall be approximately 1.0 mm (0.04 in.) in thickness and of the hat section type. At bottom of each and every panel, provide two removable laminated phenolic gibs or other approved material guides and a separate fire gib. Reinforce each door panel for hangers, interlock mechanism, drive assembly, and closer. Every door panel for each entrance shall bear a BOCA label, Underwriters' label, or in lieu of this, labels from other accredited test laboratories may be furnished provided they are based on fire test reports and factory inspection procedures acceptable to the COR. Fasten sight guard of 14-gauge stainless steel, extending full height of panel, to leading edge of fast speed panel of two-speed doors.

E. Provide new Braille plates on both sides of door frame entrances located 60 inches to center line above finished floor.

F. Provide emergency access for all hoistway doors. Provide drop key hole in hoistway doors.

#### 2.46 ELECTRIC INTERLOCKS

A. Equip each hoistway door with a new interlock, functioning as hoistway unit system, to prevent operation of car until all hoistway doors are locked in closed position. Hoistway door interlocks shall not be accepted unless they meet the requirements of ASME A17.1 Section 2.12.

B. Equip car doors with electric contact that prevents operation of car until doors are closed unless car is operating in leveling zone or hoistway access switch is used. Locate door contact to prevent its being tampered with from inside of car. Car door contact shall not be accepted unless it meets the requirements of ASME A17.1 Section 2.12.

C. Wiring installed from the hoistway riser to each door interlock shall be NEC type SF-2 or equivalent.

1. Type SF-2 cable terminations in the interlock housing shall be sleeved with glass braid fillers or equivalent.

D. Provide devices, either mechanical or electrical, that shall prevent operation of the elevator in event of damaged or defective door equipment that has permitted an independent car or hoistway door panel to remain in the "unclosed" and "unlocked" position.

#### 2.47 CAR FRAME:

A. Reuse existing. Clean and check for proper alignment. Replace any missing bolts.

#### 2.48 CAR PLATFORM:

A. Reuse existing platforms. Remove existing floor tile and first layer of wood. Replace wood with new marine plywood. Elevators shall have new sheet vinyl flooring or VCT tile floor not less than 1/8 inch thick. Type and color shall be submitted for selection by COR. Adhesive material shall be the type recommended by the manufacture of the tile. Lay tile flush with threshold plate and cover base of car.

B. Reuse existing car door sills.

C. Provide a new platform guard (toe guard) that meets the requirements of ASME A17.1 Section 2.15.9, of not less than 12-gauge sheet-steel on the entrance side, extend 76 mm (3 in.) beyond each side of entrance jamb. Securely brace platform guard to car platform, and bevel bottom edge at a 60-75 degree angle from horizontal. Install platform in the hoistway, so that the clearance between front edge and landing threshold shall not exceed 32 mm (1 1/4 in.).

#### 2.49 CAR ENCLOSURE: PASSENGER ELEVATORS P-1, P-2

A. Reuse existing cab. Reuse existing stainless steel cab walls from floor to 48 inches to laminated panel. Clean and polish. Provide new laminate on side and rear panels 48 inches from finished floor to ceiling. Apply the wall covering to a minimum 1/2 inch fire rated plywood/particle board that meets ASME and Federal requirements. Submit a method of fastening particle board to steel. Color and type of wall material shall be selected by COR. All joints shall be smooth and flush, with no ragged or broken edges.

B. Remove and replace existing front car return panels and transom with new stainless steel panels to match existing.

C. Remove existing drop ceiling and cab lighting. Re-skin existing ceiling with sheet steel and paint ceiling bright white. Leave openings for fan and emergency exit. Install new drop ceiling with new flat plastic laminate and egg crate type panels in new aluminum frame. Type panel, frame and color to be selected by COR.

D. Provide new ceiling frame and light fixtures

1. Provide new stainless steel hanging ceiling frame. Construct frame of 1/8 in. x 1 1/2 in. x 1 1/2 in. "T" and "L" sections, divide ceiling into six panels.

2. Provide new fluorescent car lights, 4 sets, four feet long, two lights each (T-8) and electronic ballasts above the ceiling panels.

E. Re-install half round mirror now located at top of rear wall against drop ceiling. May reuse medical emergency box on back wall.

F. Reuse existing handrails the full length of the side and rear cab walls. Install

G. Remove existing phone box from side wall and cover hole to meet fire rating.

F. Provide new emergency car lighting system located in new main car operating panel.

G. Install new GFI electrical outlet in front cab wall below main car operating panel in existing box six inches off floor.

H. Reuse existing emergency exit switches. Install new wire.

I. Provide car top railings that meet the requirement of ASME A17.1 Rules 2.14.1.7 and 2.10.2.

J. Provide new 2 speed fan. Provide a blower unit arranged to exhaust through an opening in the canopy. Provide a stainless or chrome plated fan grill around the opening. Provide 2-speed fan, capable of rated free delivery air displacement of approximately 380 and 700 cfm at respective speeds. Mount fan on top of car with rubber isolation to prevent transmission of vibration to car structure. Provide screening over intake and exhaust ends of blower. Provide a 3-position switch to control the unit in the service panel.

K. Provide car entrance with two-speed side opening horizontal sliding car doors, of same type as hoistway doors. Construct door panels to be flush hollow metal construction, not less than 32 mm (1 1/4 in.) thick, consisting of one continuous piece 16-gauge stainless steel on car side face wrapped around the leading and trailing edges. Separate two plates by a sound-deadening material, and reinforce by steel shapes welded to the plates at frequent intervals. Reinforce panels as required for installation of hangers, power-operating and door-opening devices. Hang doors on two-point suspension hangers having sealed ball-bearing sheaves not less than 76 mm (3 in.) in diameter, with rubber or non-metallic sound-reducing tires. Equip hangers with adjustable ball-bearing rollers to take upward thrust of panels. Upthrust rollers shall be capable of being locked in position after adjustment to a maximum of .38 mm (1/64 in.) clearance. Provide two laminated phenolic gibs on each door panel. Gibs shall be replaceable without removal of door panel. Provide door drive assembly, restrictor, gate switch, header, track, arms, and all related door hardware.

#### 2.50 CAR ENCLOSURE: SERVICE ELEVATORS S-3, S-4

A. Reuse existing cab. Reuse existing stainless steel cab walls from floor to 48 inches to laminated panel. Clean and polish. Provide new laminate on side and rear panels 48 inches from finished floor to ceiling. Apply the wall covering to a minimum 1/2 inch fire rated plywood/particle board that meets ASME and Federal requirements. Submit a method of fastening particle board to steel. Color and type of wall material shall be selected by COR. All joints shall be smooth and flush, with no ragged or broken edges.

B. Remove and replace existing front car return panels and transom with new stainless steel panels to match existing.

C. Reuse existing cove lighting fixtures for elevator. Provide car lighting with new indirect fluorescent lamps mounted above lighting cove along each side wall of cab, front wall to back wall. Install new T-8 fluorescent lights and electronic ballasts. Equip fluorescent fixtures with symmetrical reflectors having ALZAK or equal finish. Enclose the entire vertical space between the light trough outer edge and the cab canopy with new approved clear plastic sheeting. Install the plastic sheets so that they are removable for cleaning and re-lamping.

D. Repaint existing ceiling bright white.

E. Reuse existing handrails the full length of the side and rear cab walls. Add a steel "bumper rail" 4 inches wide and same thickness as handrails, mounted flush (bolted with countersunk bolts) on back wall 12 inches centerline from floor. Bumper rail steel to match existing handrails.

F. Raise the back wall of the elevator by installing "dog house" type of cab extension. Raise rear of cab wall and dome 18 inches and from edge of cove lighting on side wall to edge of cove lighting on opposite side wall. Locate from back wall forward one dome panel or 24 inches. Side wall and rear extension to be painted bright white. Install the new emergency exit with electrical contacts to prevent operation of the elevator when the emergency exit is open.

G. May reuse existing medical emergency box located on back wall.

H. Reuse existing pad hooks. Replace any missing pad hooks.

I. Provide new emergency car lighting system located in new main car operating panel.

J. Remove existing phone box from side wall and cover hole to meet fire rating.

K. Install new GFI electrical outlet in front cab wall below main car operating panel six inches off floor.

L. Provide car top railings that meet the requirement of ASME A17.1 Rules 2.14.1.7 and 2.10.2.

M. Provide new 2 speed fan. Provide a blower unit arranged to exhaust through an opening in the canopy. Provide a stainless or chrome plated fan grill around the opening. Provide 2-speed fan, capable of rated free delivery air displacement of approximately 380 and 700 cfm at respective speeds. Mount fan on top of car with rubber isolation to prevent transmission of vibration to car structure. Provide screening over intake and exhaust ends of blower. Provide a 3-position switch to control the unit in the service panel.

N. Provide car entrance with two-speed side opening horizontal sliding car doors, of same type as hoistway doors. Construct door panels to be flush hollow metal construction, not less than 32 mm (1 1/4 in.) thick, consisting of one continuous piece 16-gauge stainless steel on car side face wrapped around the leading and trailing edges. Separate two plates by a sound-deadening material, and reinforce by steel shapes welded to the plates at frequent intervals. Reinforce panels as required for installation of hangers, power-operating and door-opening devices. Hang doors on two-point suspension hangers having sealed ball-bearing sheaves not less than 76 mm (3 in.) in diameter, with rubber or non-metallic sound-reducing tires. Equip hangers with adjustable ball-bearing rollers to take upward thrust of panels. Upthrust rollers shall be capable of being locked in position after adjustment to a maximum of .38 mm (1/64 in.) clearance. Provide two laminated phenolic gibs on each door panel. Gibs shall be replaceable without removal of door panel. Provide door drive assembly, restrictor, gate switch, header, track, arms, and all related door hardware.

#### 2.51 ELECTRIC POWER DOOR OPERATORS: REMOVE EXISTING;

A. Provide a new high speed heavy duty door operator, header, tracks, arms, etc. Door operator shall automatically open the car and hoistway doors simultaneously when the car is level and automatically close the doors simultaneously at the expiration of the open timing. Motor shall be of the high-internal resistance type, capable of withstanding high currents resulting from stall without damage to the motor. The door operator shall be capable of opening a car door and hoistway door simultaneously at a maximum speed of not less than 2 feet per second. The closing speed shall be one foot per second. A reversal of direction of the doors from the closing to opening operation whether initiated by the

infrared curtain unit, or the door open button, shall be accomplished within no more than 1-1/2 inches of door movement. Particular emphasis is to be placed on obtaining quiet interlock and door operation and smooth, fast, dynamic braking for door reversals and stopping of the doors at both extremes of travel. All levers operating the doors shall be constructed of heavy steel members and all pivot points shall have ball or roller bearings. Electric power shall be used to open and close the doors. Springs may be used for auxiliary automatic door closers required under Rule 2.11.3 of the Code.

B. Door operator shall open and close both car and hoistway door simultaneously. Inherent design and installation of door operating devices shall be such as to preclude possibility of any hoistway door panel being disengaged from operating devices under any condition of operation of cars. Doors shall open automatically when car has stopped at landing. Doors shall be synchronized with operation of leveling car and opening car and hoistway doors simultaneously. Car and hoistway doors shall close automatically after an adjustable predetermined time sufficient to allow passengers to enter and leave the car. Before the interlock circuit is established, hoistway door for landing shall lock and remain in closed position until the car makes another stop at that landing.

C. Door shall operate smoothly and without slam in opening and closing directions and shall be cushioned in final movement in each direction of travel by regulated and adjustable electric power or other equally effective means. No electrical power shall be required to hold doors either open or closed. Hoistway doors shall be provided with door closers arranged to close open doors automatically if car for any reason leaves landing zone. In case of interruption or failure of electric power, mechanism shall permit manual opening from within car at door zone only. Door operator shall operate in conjunction with, incorporate in its design, or be equipped with interlocks or safety switches. It shall not be possible for the doors to open by power unless the elevator is within the leveling zone. Elevator, when out of the leveling zone, is restricted to 4 inch opening. Provide door locking device as per code.

D. Provide new infrared curtain unit. The device shall cause the car and hoistway doors to reverse automatically to the fully open position should the unit be actuated while the doors are closing. Curtain unit shall function at all times when the doors are not closed, irrespective of all other operating features.

E. Should the doors be prevented from closing for more than a predetermined adjustable interval of 20 to 60 seconds by operation of the curtain unit or door open button, these devices shall be rendered unable to cause door reversals, the doors shall stay open, the audio voice message shall sound and a buzzer located on the car shall sound. Do not provide door "nudging"

F. Provide car and hoistway door open and close buttons. When the door open button is pressed, the doors, if in the open position, shall remain open, or if the doors are closing, they shall stop, reverse and re-open. Momentary pressure of the door close button shall initiate the closing of the doors prior to the expiration of the normal door open time. The open and close buttons shall be located in the car operating station below the floor buttons. The door open button shall be located adjacent to the door opening.

G. Should the doors be prevented from closing by an obstruction, that does not activate a door re-opening device, for more than an adjustable interval of 15 to 60 seconds, the doors shall automatically reverse to the fully opened position.

H. Provide new door clutch, gate switch, door header, track, arms and related door equipment.

## PART 3 - EXECUTION

### 3.1 SPACE CONDITIONS

A. Attention is called to existing overhead clearances, pit clearances, overall spaces available in hoistway and machine room and machine room environmental conditions in connection with completion of specified elevator work. Provide proper, satisfactory and code legal installation of equipment as a whole, including all construction, accessories, and devices in connection with elevator, mechanical and electrical work specified herein.

B. Any construction changes or relocation of equipment, conduit, wiring, etc., required to accomplish the specified elevator installation must be arranged and obtained by the contractor, subject to the approval of the Contracting Officer. Cost of such changes shall be included in the base bid and shall form a part of the contract.

### 3.2 ARRANGEMENT OF EQUIPMENT

A. Clearance around elevator, mechanical and electrical equipment shall comply with applicable provisions of NEC. Arrange equipment in machine room so that major equipment components can be removed for repair or replacement without dismantling or removing other equipment in the same machine room. Where applicable, locate controller near and visible to its respective hoist machine.

### 3.3 WORKMANSHIP AND PROTECTION

A. All installations shall be performed to "Best Possible Industry Standard" by certified mechanics experienced in the trade involved. All details of the installation shall be mechanically and electrically correct. All materials and equipment shall be new and without imperfections.

B. Recesses, cutouts, slots, holes, patching, grouting, refinishing and the like to accommodate installation of equipment shall be included in the contractor's work. All new holes in concrete shall be core drilled.

C. No structural members shall be cut or altered. Work in place which is damaged or defaced shall be restored equal to original condition.

D. Finished work shall be straight, level and plumb, with true, sharp surfaces and lines. All machinery and equipment shall be protected against dirt, water, or mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in perfect unblemished condition.

E. Where beams, slabs, or other building construction protrude more than four inches into the hoistway, all top surfaces shall be beveled at an angle of at least 75 degrees to the horizontal.

F. If needed, protective enclosures shall be provided around hoistway openings during construction. Enclosure shall remain secured at all times.

G. Contractor shall provide and maintain approved fire extinguishers on site and in the areas where welding or cutting is to occur.

H. Provide code compliant fire stopping at all penetrations. Coordinate with COR for acceptable products and procedures.

I. Provide screening between hoistways during construction.

### 3.4 CLEANING

A. Clean machine room and equipment.

B. Perform hoistway clean down.

C. Prior to final acceptance remove protective covering from finished or ornamental surfaces, and clean and polish surfaces with respect to type of material.

### 3.5 PAINTING AND FINISHING

A. Controllers and all other uncoated ferrous metal items shall be painted not less than one factory priming coat or approved equal.

B. Upon completion of installation and prior to final inspection, all equipment shall be thoroughly cleaned of grease, oil, cement, plaster and other debris. All equipment, except that otherwise specified as to architectural finish, shall then be given two coats of paint of approved color, conforming to manufacturer's standard.

C. Field painting of governors shall be in accordance with ASME A17.1 Rule 2.18.3.1.

D. Paint floor designation not less than four inches high on hoistway doors, fascias and/or walls as required by Rule 2.29.2 of the Code. The color of paint used shall contrast with the color of the surfaces to which it is applied.

E. Elevator hoistway machines and controllers shall be identified by 4 inches high numbers located as directed. Governors, shunt trip circuit breakers, safety plank and cross heads of cars shall be identified by 4 inches high numerals and letters located as directed. Numerals shall contrast with surrounding color and shall be decal or stenciled.

F. Surface of door frames, door panels, interior cab surfaces and fixtures that become damaged or marred during renovations shall be restored to original condition in a satisfactory manner before final acceptance of work.

### 3.6 PRETESTS AND TESTS

A. Pre-test the elevators and related equipment in the presence of the Project Engineer or his authorized representative for proper operation before requesting final inspection. Conduct final inspection at other than normal working hours, if required by Project Engineer.

1. Procedure outlined in the Inspectors Manual for Electric Elevators, ASME A17.2 shall apply.

- a. Final test shall be conducted in the presence of and witnessed by an ASME QEI-1 Certified Elevator Inspector.

- b. Government shall furnish electric power including necessary current for starting, testing, and operating machinery of each elevator.

2. Contractor shall furnish the following test instruments and materials on-site and at the designated time of inspection: properly marked test weights, voltmeter, amp probe, thermometers, direct reading tachometer, megohm meter, vibration meter, sound meter, light meter, stop watch, and a means of two-way communication.

B. Inspect workmanship, equipment furnished, and installation for compliance with specification.

C. Balance Tests: The percent of counterbalance shall be checked by placing test weights in car until the car and counterweight are equal in weight when located at the mid-point of travel. If the actual percent of counter balance does not conform to the specification, the amount of counterweight shall be adjusted until conformance is reached.

D. Full-Load Run Test: Elevators shall be tested for a period of one hour continuous run with full contract load in the car. The test run shall consist of

the elevator stopping at all floors, in either direction of travel, for not less than five or more than ten seconds per floor.

E. Speed Test: The actual speed of the elevator shall be determined in both directions of travel with full contract load, balanced load and no load in the elevator. Speed shall be determined by applying a certified tachometer to the car hoisting ropes or governor rope. The actual measured speed of the elevator with all loads in either direction shall be within three (3) percent of specified rated speed. Full speed runs shall be quiet and free from vibration and sway.

F. Temperature Rise Test: The temperature rise of the hoisting motor shall be determined during the full load test run. Temperatures shall be measured by the use of thermometers. Under these conditions, the temperature rise of the equipment shall not exceed 50 degrees Centigrade above ambient temperature. Test shall start when all machine room equipment is within five (5) degrees Centigrade of the ambient temperature. Other tests for heat runs on motors shall be performed as prescribed by the Institute of Electrical and Electronic Engineers.

G. Check amp readings with empty, balanced and full load. At full load, the amp readings shall not exceed the name plate amperage.

H. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of leveling at all floors with no load in car, balanced load in car, and with contract load in car, in both directions of travel. Accuracy of floor level shall be within plus or minus 3 mm (1/8 in.) of level with any landing floor for which the stop has been initiated regardless of load in car or direction of travel. The car leveling device shall automatically correct over travel as well as under travel and shall maintain the car floor within plus or minus 3 mm (1/8 in.) of level with the landing floor regardless of change in load.

I. Brake Test: The action of the brake shall be prompt and a smooth stop shall result in the up and down directions of travel with no load and rated load in the elevator. Down stopping shall be tested with 125 percent of rated load in the elevator.

J. Insulation Resistance Test: The elevator's complete wiring system shall be free from short circuits and ground faults and the insulation resistance of the system shall be determined by use of megohm meter, at the discretion of the Elevator Inspector conducting the test.

K. Safety Devices and Governor Tests: The safety devices and governor shall be tested as required by ASME A17.1 Section 8.10.

L. Overload Devices: Test all overload current protection devices in the system at final inspection.

M. Limit Stops:

1. The position of the car when stopped by each of the normal limit stops with no load and with contract load in the car shall be accurately measured.

2. Final position of the elevator relative to the terminal landings shall be determined when the elevator has been stopped by the final limits. The lower limit stop shall be made with contract load in the elevator. Elevator shall be operated at inspection speed for both tests. Normal limit stopping devices shall be inoperative for the tests.

N. Setting of Car Door Contacts: The position of the car door at which the elevator may be started shall be measured. The distance from full closure shall not exceed that required by ASME A17.1. The test shall be made with the hoistway doors closed or the hoistway door contact inoperative.

O. Setting of Interlocks: The position of the hoistway door at which the elevator may be started shall be measured and shall not exceed ASME A17.1 requirements.

P. Operating and Signal System: The elevator shall be operated by the operating devices provided and the operation signals and automatic floor leveling shall function in accordance with requirements specified. Starting, stopping and leveling shall be smooth and comfortable without appreciable steps of acceleration or deceleration.

Q. Performance of the Elevator supervisory system shall be witnessed and approved by the representative of the Project Engineer.

R. Evidence of malfunction in any tested system or parts of equipment that occurs during the testing shall be corrected, repaired, or replaced at no additional cost to the Government, and the test repeated.

S. If equipment fails test requirements and a re-inspection is required, the Contractor shall be responsible for the cost of re-inspection; salaries, transportation expenses, and per-diem expenses incurred by the representative of the COR.

### 3.7 INSTRUCTION OF PERSONNEL

A. Provide competent instructors to train VA personnel in the operation of equipment and accessories installed under this contract, not to exceed eight hours. Instruction shall commence after completion of all work and at such time as directed by the COR. Training shall be conducted between the hours of 8:00 AM and 4:30 PM.

B. In addition to oral instruction, written instructions in triplicate relative to car, adjustment and operation of all equipment and accessories shall be furnished and delivered to the COTR in independently bound folders. Written instructions shall include correct and legible wiring diagrams, nomenclature sheet of all electric apparatus including location of each device, complete and comprehensive sequence of operation, complete replacement parts lists with descriptive literature and identification and diagrammatic cuts of equipment and parts.

C. Provide any supplementary instruction for adjustment and care of new equipment that may become necessary because of changes, modification and/or replacement of equipment or operation.

END SECTION 14 21 00