
SECTION 14210

ELECTRIC ELEVATORS

TABLE OF CONTENTS

1.	<u>GENERAL:</u>	1
2.	<u>RELATED WORK:</u>	3
3.	<u>STANDARD REFERENCES:</u>	4
4.	<u>QUALIFICATIONS:</u>	4
5.	<u>SHOP DRAWINGS</u>	5
6.	<u>SAMPLES</u>	7
7.	<u>MANUALS</u>	7
8.	<u>WARRANTY AND GUARANTEE</u>	8
9.	<u>MAINTENANCE</u>	8
10.	<u>INSTRUCTIONS</u>	9
11.	<u>POWER SUPPLY</u>	10
12.	<u>CAPACITY, SPEED, TRAVEL, PLATFORM SIZE</u>	10
13.	<u>ELECTRIC FEEDERS AND WIRING</u>	10
14.	<u>ACCESSORIES</u>	12
15.	<u>PAINTING AND FINISHING</u>	14

16.	<u>MACHINE BEAMS AND OTHER SUPPORT STEEL</u>	-----	14
17.	<u>GEARED MACHINE</u>	-----	15
18.	<u>CONTROLLER</u>	-----	16
19.	<u>SOLID STATE MOTOR DRIVE (SCR DRIVE)</u>	-----	17
20.	<u>CAR LIGHTING AND FAN CONTROL</u>	-----	18
21.	<u>GROUP AUTOMATIC OPERATION</u>	-----	18
22.	<u>MICROPROCESSOR GROUP SUPERVISORY CONTROL</u>	-----	20
25.	<u>EMERGENCY POWER OPERATION</u>	-----	24
26.	<u>GROUP CAR CONTROL FUNCTIONS</u>	-----	24
27.	<u>INDIVIDUAL CAR CONTROLLER</u>	-----	27
28.	<u>COMPUTING ENVIRONMENT</u>	-----	28
29.	<u>GUIDE RAILS</u>	-----	28
30.	<u>SAFETY AND GOVERNOR</u>	-----	29
31.	<u>HOISTING AND GOVERNOR ROPES</u>	-----	30
32.	<u>COUNTERWEIGHT</u>	-----	31
33.	<u>CAR AND COUNTERWEIGHT BUFFERS</u>	-----	31
35.	<u>TERMINAL STOPPING DEVICES</u>	-----	31
36.	<u>ROLLER GUIDE ASSEMBLIES</u>	-----	31

37.	<u>CAR FRAME AND PLATFORM</u>	-----	32
38.	<u>ELEVATOR CARS</u>	-----	32
39.	<u>FINISH OF CAR FIXTURES</u>	-----	35
40.	<u>EMERGENCY CAR LIGHTING</u>	-----	35
41.	<u>TELEPHONE</u>	-----	36
42.	<u>CERTIFICATE FRAME</u>	-----	37
43.	<u>WALL PROTECTION PADS</u>	-----	37
44.	<u>SIGNAL SYSTEM</u>	-----	38
46.	<u>EMERGENCY RECALL OPERATION</u>	-----	39
47.	<u>SMOKE DETECTORS AND ANNUNCIATORS</u>	-----	40
48.	<u>PASSENGER ELEVATOR HOISTWAY ENTRANCES</u>	-----	41
49.	<u>DOOR OPERATORS</u>	-----	44
50.	<u>INTERLOCKS AND CONTACTS</u>	-----	44
50.	<u>INDEPENDENT SERVICE</u>	-----	45
52.	<u>TESTS</u>	-----	45

SECTION 14210

ELECTRIC ELEVATORS
Passenger Elevator Nos. 1-4
Service Elevator No. 5

1. GENERAL:

- 1.1 This section of the specification includes the furnishing of all material and performance of all work required for the removal of existing elevator equipment and installation of new equipment to provide four (4) geared traction passenger elevators and one (1) basement geared traction service elevator. The passenger elevators are arranged in one group.
- 1.2 **No more than one elevator shall be taken out of service during the normal working hours of the building to perform this work. Any noisy or disruptive work will be performed after the normal working hours of the facility. Include all after hours work within the proposal.**
- 1.3 Equipment to be reused: The following existing equipment may be reused with certain repairs, modifications, or adjustments as hereinafter specified:
- A. Machine Room:
 - 1. Machine Beams.
 - 2. Geared Machines (New AC Motors)
 - 3. Car frame, platform, Cab shell.
 - B. Hoistway:
 - 1. Main and counterweight rails.
 - 2. Hoistway entrance sills, headers, and fascias.
 - 3. Counterweight frames and counterweights.
 - C. All other components of the elevator system shall be installed new, whether specifically mentioned in the specifications, to provide five (5) complete elevator units.
- 1.4 All parts of the elevator equipment shall be of such design, size, and material as to satisfactorily function under all conditions of loading and operation with specified rated load and rated speed range. All parts shall be built to standard dimensions, tolerances, and clearances so that similar parts of similar machines and devices are completely interchangeable. The mechanical fastenings used throughout the equipment on parts subject to wear and requiring replacement shall be key and seat, nut, screw, or other removable and replaceable type not requiring physical deformation or field positioning. The use of rivets or similar devices will not be accepted as mechanical fastenings for such parts.

- 1.5 The major elevator components shall be the products of one manufacturer of established reputation, except they may be the products, either wholly or in part, of another manufacturer of established reputation provided such items are engineered and produced under coordinated specifications. Also, the major components to be furnished shall be of a make or makes that have performed satisfactorily together under conditions of normal use in not less than two other elevator installations of equal or greater capacity and speed for a period of at least one year. Prior to award, the names and addresses of the buildings and the names of the owners or managers thereof, in which the proposed combination of major components has so performed, shall be furnished.
- A. The term "major elevator components" as mentioned above shall mean such items as an elevator hoisting machine, motor drive, controller, selector, and group supervisory control equipment.
- 1.6 Equipment in the elevator machine room shall be so arranged that such items as rotating elements and sheaves can be removed for repairs or replacement, either by trolley hoist and dolly, or other conventional means, without dismantling or removing other equipment components in the machine room.
- 1.7 Adequate workspace for maintenance and repair operations shall be provided around the elevator equipment in machine room with clear passage to any access or trap doors.
- 1.8 Where practical, elevator controllers shall be located near, and in the same positions relative to the driving machines they control. The driving machine shall be visible from its controller.
- 1.9 Trolley beams shall not be utilized as the normal support of elevator equipment such as sheaves for selector cable.
- 1.10 Elevator data requirements listed below shall be obtained from either the project drawings or within this specification:
- A. Elevator Data:
1. Elevator rated load lifting capacity in pounds.
 2. Elevator car rated speed in feet per minute.
 3. Car travel in feet.
 4. Number of landings.
 5. Number of openings.
 6. Platform size.
 7. Class of service, i.e., passenger or freight.
 8. Type of machine, i.e., geared or gearless.
 9. Type of control, i.e., rheostatic, generator field, or static (3vf Drive).

10. Type of operation, i.e., two stop single car selective collective, two car selective collective or group automatic.
11. Type of design of passenger car.
12. Type of hoistway doors.
13. Type of hoistway door operation.
14. Type of car door or gate.
15. Type of car door or gate operation.
16. Type of signal system.
17. Characteristics of power supply.
18. Finishes.

1.11 The elevator system shall consist of:

- A. Four (4) geared electric passenger elevators operating in one group.
- B. One (1) geared electric service elevator.

2. RELATED WORK:

2.1 The following related work is included in this section and other sections of the specification and shall be the responsibility of the Elevator Contractor:

- A. Elevator hoistways and their enclosures and venting, pit spaces, enclosed machine rooms, trolley beams.
- B. Temporary guards at all hoistway openings as required under "Accident Prevention" clause of the General Conditions.
- C. Bevel all ledges and platforms between the hoistways at each landing to not less than 75 degrees.
- D. Provide Elevator machine room energy efficient lighting and 110 GFCI outlets, energy efficient pit lighting and 110 GFCI outlets, and energy efficient hoistway lighting circuits. Pit lighting switch shall be accessible from access door.
- E. Provide pans under roof drains. (As needed)
- F. Remove sprinklers and heat detectors from the hoistways and machine rooms. Remove all sprinkler piping from machine room.
- G. Provide all car top guardrails as required.
- H. Provide HVAC for machine rooms as needed.

3. **STANDARD REFERENCES:**

- 3.1 Unless as modified herein or otherwise distinctly specified, all elevator material, design, clearances, definitions, construction, workmanship and tests shall conform to the requirements of the American National Standard Safety Code for Elevators, and, Escalators, (**ANSI A17.1-2019**) or latest edition, including errata, interpretations and revisions and hereinafter referred to as the A17.1 Code.
- 3.2 Wherever Federal Specifications, Codes, Standard Details and other standards are referenced, latest editions and amendments shall apply in accordance with the clause entitled "Standard References: in the General Conditions.
- 3.3 References to the NEC are to the 2020 **National Electrical Code** (ANSI C1) or latest edition. All electrical work specified in the A17.1 Code shall be done in accordance with the 2020 NEC.
- 3.4 References to UL standards are to standards of **Underwriters Laboratories, Inc.**
- 3.5 References to NEMA are to Standards of the **National Electrical Manufacturers Association.**
- 3.6 Referring to the requirements of clause entitled "Building Codes, Fees and Charges" in the General Conditions the work shall also comply with the applicable State and local Code requirements or regulations except the requirements of the A17.1 Code shall govern in the event of a conflict.
- 3.7 References to Handicap Provisions are to "**Uniform Federal Accessibility Standard**" (UFAS) and the "**Americans with Disabilities Act Accessibility Guidelines**" (ADAAG). In case of conflicts in the requirements, the most stringent requirements shall be required.

4. **QUALIFICATIONS:**

- 4.1 The bidder shall have had at least five years successful experience in installing and servicing the manufacturer's elevators.
- 4.2 **The prime contractor must perform a minimum of 90% of the total elevator work. Subcontractors may include fire alarm, electrical, etc.**
- 4.3 In addition, the bidder shall have comparable installations operating successfully for at least two years under bidders' maintenance. To be considered comparable, prior installations shall have not less than the same number of elevators operating together in one group as the largest number in any group specified for this project, except that a group of two may be considered comparable to a larger group specified for this project.

- 4.4 A list of the prior comparable installations by the bidder together with the names and addresses of the buildings, the names of the owners or managers thereof, and any other pertinent information required shall be submitted promptly upon request of the government.
- 4.5 The names, addresses, experience, and a statement of the work to be performed by each subcontractor will be used for performance of minor portions of the installation of elevators, shall also be submitted promptly upon request by the Government.
- 4.6 The bid may be rejected if the bidder has established on former jobs, either Government, municipal, or commercial, a record for unsatisfactory elevator installations, has repeatedly failed to complete contracts awarded to him within the contact time, or otherwise fails to meet the experience requirements of this clause.

5. SHOP DRAWINGS:

- 5.1 Shop drawings shall be submitted in accordance with the "General Conditions" and "Special Conditions" sections.
- 5.2 Shop drawings shall include the following details as applicable to the systems specified:
 - A. Full dimension layout in plan and elevation showing the arrangement of equipment and all pertinent details of each elevator unit specified including:
 - 1. Driving machine, controller, selector, motor generator, static motor drive unit, governor and other components located in machine room.
 - 2. Car, counterweight, sheaves, supporting beams, guide rails, buffers, car and counterweight guide shoes, and other components located in hoistway.
 - 3. Rail bracket spacing and maximum vertical forces on guide rails in accordance with the A17.1 Code.
 - 4. Reactions at points of support.
 - 5. Weights of principal parts.
 - 6. Top and bottom clearance and over travel of car and counterweight.
 - 7. Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder termination at controller.
 - 8. Location of outlets for connection of traveling cables for car light and

telephone.

9. Location of hoistway access switches.

- B. Hoistway entrances and doors showing their method of operation, details of construction; and method of fastening to the structural members of the building.
- C. Car designs specified, showing details of construction, fastenings to platform, car lighting, ventilation, location of all car equipment, handrails, and emergency exits including electric contacts and method of hinging and locking.
- D. Details of all signal and operating fixtures including hoistway access switches.
- E. Details of sound and vibration isolation units for generator sets, if used.
- F. Details of roller guide assemblies.
- G. Details of sill sections and supports.
- H. Details of selection, recall, and emergency operation switches including wiring diagrams.
- I. Other drawings required or hereinafter specified.

5.3 The name of manufacturer, type or style designation, and the additional information called for below shall be listed on the shop drawings for each of the following:

- A. Driving machine.
- B. Driving machine motor including hp and rpm.
- C. Elevator controller.
- D. Group supervisory system controller.
- E. Indicator panel.
- F. Car safety including maximum rated load and speed.
- G. Governor.
- H. Power door operator.
- I. Door interlocks and electrical contacts.

- J. Buffers including stroke, certified maximum and minimum loads and maximum striking speed.
- K. Car ventilation blower including c.f.m. and hp ratings.
- L. Car emergency lighting.
- M. Static motor drive unit.

6. **SAMPLES:**

- 6.1 Referring to the "Sample" requirements of the General Conditions, submit for approval, four samples of all finishes, car floor materials, operating and signal system fixtures, hoistway entrance and door materials, sills, protection pads, and light fixture lenses.

7. **MANUALS:**

- 7.1 **Three (3) sets of operating and maintenance manuals shall be furnished in bound form.** Manuals shall include:
 - A. Description of the elevator system's method of operation and control including the functions of signals, door devices and other specified features.
 - B. Written instructions for the adjustment and care of the equipment.
 - C. Replacement parts list with part numbers.
 - D. Type of lubricant required for each lubricated part.
 - E. Complete set of as-built wiring diagrams.
- 7.2 The identification label for each manual shall include the subject, building name and location, government contract number and the specific elevator numbers to which the manual applies.
- 7.3 One set of manuals shall be provided in tool cabinet in elevator machine room unless otherwise directed. The two additional sets shall be delivered to the Contracting Officer's Representative.

8. WARRANTY AND GUARANTEE:

- 8.1 All work under this section shall be subject to the terms specified under "Guarantees" in the General Conditions and the guarantee period for an elevator unit shall be one year after the date the final elevator is placed in normal use by the Government.

9. MAINTENANCE:

- 9.1 Furnish full maintenance for the elevators starting on the day the actual work begins at the site during the installation period, and for 12 months after final acceptance by the Government of the last elevator in entire project. The maintenance service shall consist of regular weekly examinations of the installation and shall include the necessary adjustments, repairs, cleaning, lubrication, and supply and replacement of all parts to keep the equipment in proper operating condition.
- 9.2 All routine adjustments and service shall be performed by trained employees of the elevator contractor and may be made during the regular working hours of the trade. All services required to ensure safe and reliable performance of the elevators shall be provided by regularly assigned maintenance personnel of the elevator contractor.
- 9.3 Weekly preventive maintenance program shall be scheduled for each elevator. The date and hours of work shall be scheduled and submitted for approval and acceptance by the Building Manager. All personnel shall register with the proper Government authority upon entering and leaving the building.
- 9.4 Provide 24-hour emergency call-back service for the maintenance period, by promptly responding to requests from the Building Manager or his authorized representative by telephone or otherwise, to restore elevator services where a shutdown or trouble should develop. This emergency call-back services shall be limited to minor adjustments required to protect the immediate safety of the equipment and persons in and about the elevator. **Contractor shall respond to emergency call backs in one hour or less.**
- A. The Contractor shall provide and keep current a suitable check chart for each elevator. The charts shall be posted in the machine rooms on which entries shall be made to indicate the status of scheduled items of maintenance work performed, and the time in man-hours. The Contractor must properly initial the chart to indicate that the work has been accomplished.
- B. The Contractor shall immediately notify the Contracting Officer (in writing) of the existence or the development of any defects in, or repairs required to the elevators which the Contractor considers he is not responsible for under the terms of the contract, and shall furnish him a written estimate of the cost to make necessary repairs. The Contracting Officer reserves the right to make

final determination as to responsibility.

10. **INSTRUCTIONS:**

- 10.1 The instruction period for Government employees shall be not less than one (1) eight hour day for the work under this section. Manual and wiring diagram instructions given in elevator machine room will be considered the equivalent to classroom instructions.
- 10.2 Submit outline of instructions to be given, one (1) month prior to the Instruction Period, for approval.
- 10.3 Instructions shall be completed before the warranty and maintenance period expires.
 - A. If the instructions have not been completed prior to the termination of the maintenance period, that period shall be extended as a part of the contractual requirements until the instruction requirements have been satisfied.
- 10.4 Provide, without additional expense to the Government, competent instructors to train employees of the Government, in the care, adjustment and operation and sequence functioning of the operation and the control system. Instruction shall be given during regular working hours and take place at the job site. The instruction shall be by qualified, factory trained engineering representatives possessing complete knowledge of the care, adjustment and operation of the elevator system.
 - A. Approximately half of the time shall be used for classroom instructions. All other time shall be used for instruction at the equipment. Where significant changes or modifications in equipment are made under the terms of the guarantee, additional instruction shall be provided as may be necessary to acquaint the operating personnel of the changes or modifications.
 - B. Three copies of an operating and maintenance manual, prepared by the contractor, shall be utilized by the contractor for instruction purposes. After completion of all instructions, the three copies of the manual shall be turned over to the Building Manager.
 - C. **Three sets of as-built wiring diagrams** with a complete description of operating sequences shall be furnished and delivered to the Construction Engineer fifteen (15) days prior to the start of the instructions, for use of the instructors.
 - D. The time and place of the instructions shall be coordinated with the Building Manager.

11. POWER SUPPLY:

- 11.1 The power available is 3 phase, 60 hertz, 480 volts alternating current for elevator power and single-phase, 60 hertz 120 volts alternating current for elevator car lighting.
- 11.2 Before any electrical equipment is manufactured or purchased, the characteristics available for elevator power and lighting shall be verified. Where characteristics are different from those specified above, the equipment shall be furnished for the power as verified by the contractor.
- 11.3 Failure to verify the power supply shall not relieve responsibility for the satisfactory operation of the equipment.
- 11.4 Controls shall have provisions for sequential return of all elevators and operation elevators on Emergency Power.

12. CAPACITY, SPEED, TRAVEL, PLATFORM SIZE:

- 12.1 The elevators shall have a capacity to lift the rated load at the rated speed in feet per minute, specified in the following schedule. The rated load shall be exclusive of the weight of the complete car and cables. The travel, terminal floors, number of stops and openings and the over-all car platform size given in the schedule shall be verified with requirements indicated on the drawings.

ELEVATOR SCHEDULE

ELEVATOR NUMBER	RATED LOAD LBS.	RATED SPEED F.P.M.	TERMINAL FLOORS	NO. OF STOPS	NO. OF OPENINGS	OVERALL PLATFORM SIZE WIDTH X DEPTH
1-4	3,000	350	B-6	6	6	RETAIN EXISTING
5	6,000	350	B-6	6	6	RETAIN EXISTING

13. ELECTRIC FEEDERS AND WIRING:

- 13.1 Provide new electric disconnect switches in both machine rooms for elevator power supply for all elevators rated for the new VVVF-AC drive system and new controls.
- 13.2 Provide new disconnects for the existing 110 Volt A.C. power supply for car light circuits for all elevators. New disconnects shall be **labeled, located** in the machine room, and lockable in the off position

- 13.3 Provide new LED light fixtures with guards in the elevator machine rooms. Provide all hoistways with LED fixtures with a **labeled, lockable disconnect** in the machine room. LEDs in the hoistway shall be located at each landing.

Conduits and fittings shall be in accordance with the following Federal Specifications:

- A. Threaded steel conduit WW-C-581E
 - B. Electrical metallic tubing (EMT) WW-C-563A
 - C. Flexible metal conduit WW-C-566C
 - D. Fittings for cable and flexible conduit W-F-406B
 - E. Fittings for conduit W-F-408C
- 13.4 **Couplings and connectors for EMT shall be steel or malleable iron, shall be "Concretetight" or "Raintight", and shall be of either the gland and ring compression type or the stainless steel multiple point locking type. All connectors shall have insulated throats. Fittings using set screws or indentations as a means of attachment shall not be used.**
- 13.5 All conduit connecting the various items of elevator equipment in the elevator machine room shall be run concealed where practicable. Metal wireways and auxiliary gutters shall be run exposed in readily accessible locations. All raceways embedded in concrete shall be rigid or intermediate steel conduit. At all other locations any of the other types of raceways specified may be used subject to conditions, specified. Raceway fittings shall provide conductor passageways free from burrs, shoulders or other projections which will reduce internal passage area or cause abrasion of conductors being pulled through.
- 13.6 All conductors to the car shall consist of flexible traveling elevator cables, conforming with the requirements of the NEC. Cables shall be run from the car junction box to a machine room junction box and from these boxes, conductors shall be run to various required locations. Each traveling cable conductor shall have a distinctive color code for identification of the individual conductors. Each traveling cable shall have at least 20 percent spare conductors. Junction boxes shall contain approved terminal blocks for connection of conductors. Terminal blocks shall have indelible identification numbers for each terminal connection. All connections to terminal blocks shall be made with pressure wire connectors.
- A. Traveling cables shall be so suspended, anchored and run that the strain on individual cable conductors will be reduced to a minimum and connections to terminal blocks will be free from all strain. The outer cable covering must

remain intact between junction boxes and abrupt bending of cable producing distortion of cable will not be permitted. If, due to sway or change in relative position of traveling cables, complete freedom from contact with the hoistway construction cannot be avoided, suitable shields or pads shall be provided wherever necessary to prevent chafing or damage to the cables.

B. Traveling cables shall include not less than 10% spares and six (6) spare shielded pairs.

13.7 Furnish and install all wires and cables necessary for the proper connection and operation of all equipment installed under the elevator contract. All conductors shall be in accordance with NEC requirements. The conductor size shall be such that the maximum current carried will not exceed limits prescribed by the NEC.

A. Unless otherwise specified, conductors exclusive of traveling cables, shall be annealed copper with 60° Centigrade or better insulation and shall be in accordance with Federal Specification J-C-30A. Single and multiple conductor cables shall have color coding or other suitable identification for each conductor. Unless otherwise specified, no joints or splices shall be permitted in wiring except at outlets. Tap connectors may be used in wireways provided they meet all NEC requirements. Installation of conductors in raceways shall conform to the NEC.

13.8 All conductors used for external wiring between the various items of elevator equipment shall be connected to terminal blocks which meet UL Standard 1059 (1975). Crimp-type connectors shall be applied with an appropriate setting tool to ends of all size No. 10 or smaller external wires.

14. ACCESSORIES:

14.1 **Three sets each of complete, legible field wiring diagrams**, including single line diagrams showing all electrical circuits shall be furnished. All symbols shall be listed corresponding to the identity or markings on machine room and hoistway apparatus of the systems specified. One set of diagrams shall be coated with laminated plastic, or other approved covering, suitably bound and placed in the machine room where directed. Each of the two remaining sets shall be neatly bound and delivered to the Contracting Officers Representative. The diagrams shall be revised to include all field modifications.

14.2 A complete set of tools necessary for making all system adjustments shall be furnished for each elevator machine room and delivered to the Construction Engineer. (A metal tool cabinet having two shelves and a hinged door shall be provided in each elevator machine room. Cabinet size shall be not less than 48 inches high, 18 inches wide and 14 inches deep.)

- 14.3 **Include an adjuster's level service tool or terminal with complete written installation manuals, service manuals, adjustment information and instructions for performing systems adjustments, special and emergency functions, diagnostic trouble shooting, and systems testing as required by ANSI A17.1 code. The service tool shall become the property of GSA, and if the device requires reprogramming it shall be performed at no additional cost to the government for the life of the equipment.**
- 14.4 Cylinder locks shall have a bronze cylinder with not less than five pin tumblers or shall have not less than a five-disc combination provided wafer keyways, tumblers, and springs are of stainless steel. Provide three nickel silver keys for each lock and deliver same to the Construction Engineer. Provide an identification tag on each key with stamped legend "PROPERTY OF U.S. GOVERNMENT" on reverse side. Tags shall conform to Federal Specification FF-T-77B, Type A, Class 1, engraved. Locks shall be independently keyed unless otherwise specified. Key operated switches shall be of the cylinder lock key operated type.
- 14.5 A hoistway access switch shall be provided at the top and bottom terminal landings for all elevators. Hoistway access switches shall be of the key operated type meeting all requirements of the A17.1 Code. The movement of a car by means of the hoistway access switch at the top terminal landing shall be limited to approximately 12 feet down travel and a return to the top landing. Access switches shall be mounted flush and inconspicuously in the door jamb.
- A. Faceplates, if furnished, shall be of metal of same composition and finish as the faceplates of landing call buttons for the corresponding landing. The exposed portion of each access switch or its faceplate shall have indelible legends to indicate its "Identity" and the "Up," "Down" or "Off" positions.
- 14.6 All elevators shall be provided with an operating device mounted on the car crosshead which will permit slow speed operation of the car. Separate additional means for operation of power door operators and automatic car leveling devices are not required. The operating device shall be mounted in a metal box and shall be rigidly secured in a position conveniently accessible on top of the car. Operating devices shall be shrouded or otherwise protected in an approved manner to prevent accidental movement. **Provide indication of Fire Service Operation within or adjacent to the car top operating device.**
- 14.7 Where access to elevator pit is through the bottom terminal landing, the pit stop switches shall be located 4 feet above pit floor and 18" above bottom landing floor and adjacent to the pit ladder.
- 14.8 Provide Hoistway Door Unlocking Devices at each entrance for all elevators, conforming to the requirements of the A17.1 Code.

15. PAINING AND FINISHING:

- 15.1 Unless otherwise specified the machine, motor, motor drive, controller, selector, sheaves, car frame, counterweight frame, machine and sheave beams, guide rails and buffers except their machined surfaces, door operator, cams, and other ferrous metal items furnished for each elevator shall be painted with not less than one shop priming coat and one field coat of semi-gloss enamel in the manufacturer's standard color.
- A. Holes or other imperfections in the surfaces of a machine, motor, casting, motor generator and the like shall be filled and smoothed off before the factory priming coat is applied.
 - B. The painting and finishing of governor, car, hoistway entrances and doors shall be as specified under their respective headings.
 - C. The machine room floor, pit floor and car top shall have all unused holes or defects filled and shall be painted with semi-gloss light colored gray.

15.2 Identification Markings:

- A. Elevator hoistways shall have floor designations on the walls and/or doors of hoistways in accordance with the A17.1 Code.
- B. Floor designations shall be provided at each hoistway entrance on both sides of the jamb visible from within the car and the elevator lobby at a height of 60 inches above the floor. Designations shall be on a contrasting color background, a minimum of 2-1/2 inches high and raised at least 0.030 inch. Identification markings for machines, motor generators, controllers, etc. shall be provided at locations where directed. The numbers of hoisting machines and motor generators sets shall be 4 inches high and the numbers for controllers, selectors and other auxiliary equipment shall be 2 inches high.
- C. The identification numerals or letters for floor landings, machines, etc., shall be either stencil painted or decal type of a color which will contrast with color of the surface to which the marking is applied. Decal type markings shall have a coat of clear varnish or equivalent after application.

16. MACHINE BEAMS AND OTHER SUPPORT STEEL:

- 16.1 All necessary structural steel beams or other steel members required for support of elevator machine, sheaves, rope hitches, governor, buffers, grating, and other

elevator equipment, shall be provided. Bearing plates and anchors shall be provided to mount adapter beams and other support steel securely in place. Existing beams and slabs may be reused provided the calculations reveal they are adequate for the equipment to be used and support the loads in accordance with the A17.1 Code. Otherwise, provide support as required.

- 16.2 Provide metal sleeves projecting 2 inches above the concrete slab for all hoisting rope and governor rope, selector rope or tape, and other similar openings. Sleeves shall be not less than No. 12 U.S.S. Gage and shall have inside sleeves sloped same as the ropes and tapes.
- 16.3 Fill and finish all unused holes in machine room, secondary floors, and walls, and hoistway.

17. GEARED MACHINE:

- 17.1 Existing geared hoist machine shall be retained. All components including seals, bearings, etc. shall be replaced as required for “like new” machine operation. **All “leaks” shall be repaired, and all gear cases shall have oil flushed and replaced.** Hoist motor shall be replaced with a new AC VVVF type as specified.
- 17.2 The brake shoes shall be relined with a suitable fireproof friction material shaped so the drum or disc will run free with a normal clearance. Brake application shall be automatically controlled to obtain noiseless, smooth, and gradual stops with either light or loaded car.
- 17.3 All existing drive sheaves and deflector sheaves may be reused or replaced. New bearings, if needed, shall be installed in deflector sheaves.
- 17.4 Provide guards around drive sheave and any rotating components at pinch points.
- 17.5 If needed, new vibration isolating machine pads shall be provided to prevent transmission of machine vibration to the building structure. The location and deflection characteristic of the vibration isolation units used shall produce an approximately uniform and non-excessive loading on the units under all operating conditions from minimum to maximum rated elevator load lifting capacity. The foundation shall incorporate positive means to prevent lateral displacement of the machine. Shop drawings showing details of vibration isolating foundation proposed shall be submitted for approval.

18. GEARED MACHINE MOTOR:

- 18.1 The hoisting machine motor shall be of the AC variable voltage variable frequency type, designed to develop the required high starting torque with a low starting current. The motor shall be suited in all respects to the AC used. The motor shall be ruggedly designed, and all parts shall be capable of meeting the severe requirements of elevator service. The motor shall meet the requirements of NEMA Standard MG1-1972 for elevator service. The temperature rise rating shall be consistent with the class of insulation supplied. The motor shall have sufficient capacity to meet the test requirements.
- 18.2 The armature with brake drum shall be mechanically balanced. All windings in both armature and field shall permit reasonable easy renewal. All coils shall be impregnated to prevent absorption of moisture and oil.
- 18.3 The speed of the motor when operated with controller in full speed position shall not vary more than 5 percent of the normal rated speed under all loads within the capacity range.
- 18.4 The insulation resistance between conductors and the frame of motor shall be not less than one megohm. The dielectric shall successfully pass a dielectric test of 60 Hertz alternating current applied for one minute.
- 18.5 The design of frames, end bells, etc., shall insure perfect alignment of bearings and minimize vibration
- 18.6 The motor bearings shall be either the ball or roller type arranged for grease lubrication and fitted with grease gun connections and drain plugs. The bearings and lubricant reservoirs shall be dust tight and shall incorporate effective lubricant seals or other means to prevent lubricant leakage. The fittings for lubrication may be omitted where pre-lubricated sealed for life type bearings are used.

19. CONTROLLER:

- 19.1 Furnish and install new controls for all elevators. The elevator controller shall provide operation as specified hereinafter. Controllers shall be of the floor mounted, free-standing type with NEMA 1 enclosures, with locking cabinet doors. Bolt the bottoms of the control panels to the floor.
- 19.2 The sockets or circuits boards used for the mounting of relays and electrical or electronic components shall be made of an approved moisture resisting dielectric material having dielectric and structural properties suitable for its intended usage. The material shall conform to requirements of NEMA LI 1-1971 (R 1976) for the type and grade suited for the application. The sockets and circuit boards shall be secured to panel frame with bolts, screws, or other approved demountable means.

- A. The controller panel frame shall be of rigid steel construction to provide means for mounting circuit boards or devices. Panel frames supporting controller switching devices which produce a perceptible panel frame vibration, shall be provided with an approved vibration absorbing mounting.
- 19.3 All wiring on the panels shall be neatly formed and securely fastened in place. All equipment on the panels shall be readily accessible and easily replaceable. All controller relays shall be magnetically operated. Solid state components shall be electrically sized, physically spaced, and ventilated so their heat can be adequately dissipated during operation. All controller components shall be designed and rated to provide at least 20 years of operation as specified, with recommended maintenance, before replacement is required.
- A. All mechanical switches and relays shall be opened either compression of leaf type contact springing or gravity when power is interrupted except those switches or relays which are magnetically or mechanically latched closed. All A.C. relay magnets shall be designed so residual magnetism will not interfere with proper operation. All similar switch and relay units on controllers shall be of the same manufacture.
- 19.4 Wiring for the various external control and operating circuits shall be brought to a terminal board and then shall continue to the various components on the controller panel. Terminal board may be an integral part of panel, or a separate panel mounted adjacent to same panel or terminal blocks mounted on the panel. Each terminal is to have indelible means of identification to facilitate testing of the various controller circuits. All connection of wires to terminal boards from external circuits shall be made with solderless pressure type wire connectors. When a number of external connections are made to the same terminal, stud washers shall be provided between lugs to insure uniform seating and contact.
- 19.5 Each device on the controller panels shall be properly identified by name, letter or standard symbol which shall be neatly stencil painted, (or otherwise marked) in an approved indelible and legible manner, on the device or panel. The identification markings shall be coordinated with identical markings used on the wiring diagrams.

20. SOLID STATE MOTOR DRIVE (3VF DRIVE):

- 20.1 Remove existing drives and **provide Variable Voltage Variable Frequency AC Regenerative type operation for all elevators.**
System shall be adequate size to handle to new hoist machine. **Suitable isolation**

transformer shall be provided. The system shall, during acceleration and deceleration periods, gradually change the voltage and frequency applied to the elevator motor without interruption of power to the motor to provide smooth acceleration, deceleration and running speeds, and accurate floor stops. All safety circuits shall conform to ASME 17.1 Code. Line filters, noise spike or notching suppressors and isolation transformers shall be provided to ensure electrical feedback to power source of power generated by overhauling loads shall not affect other computer operated equipment in the building. Resilient isolators shall be provided to support all drives and transformers. Audible noise shall not exceed 70 decibels under any operating condition.

- A. The motor drive shall be equipped with devices which shall limit the current applied to the hoisting motor to that required for actual specified duty, and shall prevent damage to hoist motor from overload, overvoltage, or excessive current.
 - B. In case of brake application under normal operation, the hoisting motor shall be slowed down electrically, through a dynamic braking effect, so it will be practically stopped at the instant of brake application.
- C. Motor drive components shall be installed in a NEMA 1 enclosure located in the machine room. All components shall be conservatively rated to provide a life of not less than 80,000 hours. All electric connections between the electric feeder, the motor drive, and the elevator hoist motor shall be made with suitable connectors or to suitable terminal blocks.

21. **CAR LIGHTING AND FAN CONTROL:**

- 21.1 The control system shall be equipped with an adjustable timing device which when an elevator that has remained idle at its assigned parking floor for a predetermined time after the last registered call has been answered, shall automatically extinguish the regular interior car lighting and stop the car fan or blower, if running, of the corresponding car but the power circuits to convenience lights and receptacles on top and bottom of car shall not be interrupted. Any hall or car call registration shall cause the car lighting and fan to resume their normal functions.
- 21.2 **The circuits shall be so arranged that power to the car lighting and car fan or blower shall not be interrupted by an overload, blown fuse, disconnect switch, or other abnormal conditions to the elevator controls.**

22. **GROUP AUTOMATIC OPERATION:**

- 22.1 Passenger elevators Nos. 1-4 shall have group automatic operation and shall operate as one group.

Service Elevator No. 5 shall be a simplex selective-collective operation.

- 22.2 The operating devices for group automatic operation shall include dispatch buttons in each car, landing call buttons and a group supervisory control system, all electrically connected to the control equipment governing selection of landing stops be made, direction of travel, starting, acceleration, retardation and stopping of the elevator cars and the systematic dispatching operations of the elevators.
- 22.3 A new car operating panel(s) shall be provided all elevators. The panel shall be of the swing return type and contain the following devices:
- A. A series of car dispatch buttons having designations corresponding to the landing served and an integral registration light for each button. The actuation of a dispatch button in either panel shall cause the corresponding registration light in both panels to be illuminated until the call is canceled.
 - B. Key operated emergency stop switch.
 - C. Emergency signal button connected to a 6-inch diameter bell located on car top.
 - D. Door open and close buttons.
 - E. Key operated emergency service switch, pilot light and all necessary instructions, signage, etc. in main panel.
 - F. Key operated independent service switch, on main panel only, exposed flush on faceplate.
 - G. Provisions for hands-free emergency communication system, i.e. speaker perforation, buttons, operating instructions, signage, etc.
 - H. Space and wiring for future card reader system. Terminate wiring into a "Security" junction box located on side of controllers. Provide a smoked plexiglass panel over the card reader space.**
- 22.4 All exposed car controls shall be at least 3/4-inch in size. All control buttons shall be designated by Braille and raised standard alphabet characters for letters, arabic characters for numerals, and standard symbols as required by the A17.1 Code. Identification markings for all exposed controls shall be adjacent in a contrasting color background to the left of the controls. Symbols, letters, or numerals shall be a minimum of 1/2 inch high and raised or recessed 0.030 inch. The control button for the main entrance shall be designated by a raised star to the left of the button. Symbols shall be industry recognized standard types firmly affixed without adhesives.
- 22.5 The emergency stop and emergency signal bell devices shall be approximately 35

inches above the car floor. The highest car dispatch button shall be no more than 54 inches above the floor.

- 22.6 A metal service cabinet shall be located directly below, or arranged as an integral lower section, of the main car operating panel. The service cabinet shall have a hinged door with independently keyed cylinder lock. Door shall be arranged to swing away from the elevator entrance. The following devices shall be mounted behind the metal door:
- A. Car light switch.
 - B. Car fan or blower switch.
 - C. Emergency light test button.
 - D. Keyed inspection switch to permit use of hoistway access switch.
 - E. 110 V GFI duplex receptacle complete with wiring and cover installed in service cabinet of each car.
 - F. The devices in all car operating panels shall be located in identical relative positions. Readable, indelible markings shall be provided for each device as required to indicate its identity and positions.
- 22.7 Provide new landing button signal fixtures, **with space and wiring for future card reader control for security system for all elevators** containing up and down buttons at each intermediate landing, single button fixtures at each terminal landing, and an integral registration light for each button. The group of elevators shall have landing call buttons, installed at ADA height in the existing locations.

23. MICROPROCESSOR GROUP SUPERVISORY CONTROL:

- 23.1 Microprocessor Group Automatic Control: The microprocessor dispatching shall be based on an advanced 16 bit microprocessor computer system that continuously scans and analyzes every elevator's changing position, condition and workload. It shall compute the potential arrival of every car in **REAL TIME**; it shall assign and reassign hall calls to the car that can arrive there the quickest. Supervisory and individual controllers shall be of the floor mounted, free-standing type with NEMA 1 enclosures, with locking cabinet doors.
- 23.2 REAL TIME Management” REAL TIME management of the dispatching shall permit the microprocessor to forecast the requirements for elevator service. The following elevator system information shall be taken into account to calculate the time required for each of the cars to travel to a hall call. The car with the MINIMUM RESPONSE TIME is dispatched to the hall call.

ETA System Information:

- A. Elevator in or out of service
- B. Elevator in bypass mode
- C. Elevator at lobby in NEXT mode
- D. Direction and position of each elevator
- E. Condition of the car doors: open, closed, opening, or closing.
- F. Condition of each elevator: accelerating, full speed, decelerating.
- G. Number of stops required due to car calls
- H. Coincident car calls
- I. System conditions: up peak, down peak
- J. Predictive car and hall call assignments. For example, in most instances, an up-hall call causes a consequential car call to be registered. Forecasting future call movement in this manner gives the processor a more accurate "picture" of the developing traffic.

23.3 All of the above data shall be continuously scanned and hall calls shall be reassigned if the conditions change and another car can respond faster. Assignments shall be made at a rate of up to 16 times per second thus reflecting changes in the traffic on a REAL TIME basis.

23.4 Operation:

- A. Heavy Up Incoming Traffic Conditions: The microprocessor shall automatically recognize heavy incoming traffic in the morning, as well as other times during the day, by monitoring changes in car passenger loads, the number of car calls registered, and the frequency of cars departing the lobby. The incoming traffic intensity shall determine the number of cars assigned to the lobby. The system shall recognize the increasing incoming traffic early and react in a controlled manner.

23.5 Once a car completes its up trip after it has answered its car calls and any up-hall calls assigned to it, it shall then reverse and proceed to the lobby floor, provided the system is still in heavy up. The assignment of these up and down hall calls is described in the following paragraph.

- 23.6 When the incoming traffic becomes lighter, the microprocessor shall allocate cars from the lobby accordingly. The other cars park with their doors closed at the landing they last served.
- 23.7 Select Hall Waiting Time (Up Peak): The up and down hall call response time shall be preset so that these calls can be answered in an adjustable minimum/maximum time interval, permitting better service to the incoming traffic. When this feature is enabled, the microprocessor shall calculate the potential arrival of each car and assign or reassign the up and down hall calls (with the exception of the lobby floor) to the car that meets the selected service requirements, and not necessarily to the car with the best potential arrival time. If the calculated ETA's do not satisfy the minimum/maximum time interval, microprocessor shall assign the call to the car having its ETA closest to the minimum selected service. This feature shall be implemented on a per floor basis.
- A. Heavy Down Traffic Conditions. The microprocessor shall automatically recognize heavy ongoing or down traffic by monitoring the number of down hall calls, their ETA, and the actual waiting time. During this mode, the down hall calls shall be given preferential service to handle the traffic which can occur in the evening or other time during the day. All cars assigned to the lobby floor shall be released. Cars arriving at the lower dispatching terminal shall light their lantern and remain at the terminal for the same length of time as for any other floor. all down hall calls are assigned based on which car has the best potential arrival time. The assignment of the up-hall calls is described in the following paragraph. Down peak traffic mode shall have priority over up peak.
- 23.8 Select Hall Waiting Time (Down Peak): The up hall call response time shall be preset so that these calls can be answered in an adjustable minimum/maximum time interval permitting better service to the outgoing traffic. The assignments shall be made the same way as under "Select Hall Waiting Time (Up Peak)" but for the up hall calls only.
- 23.9 Two-way Traffic Conditions. All hall calls shall be given equal priority during this mode. An adjustable number of cars (usually one) is assigned at the lobby terminal. Available cars shall be parked at the last floor served and can be assigned to hall calls above or below their position. A car traveling up or a car traveling down shall not be required to travel to the terminal floor or to the main floor. All car assignments shall be made on the basis of the best forecast. Since the forecast is continually updated, reassignment of the call is also made based on the best time, always ensuring the quickest possible response.
- 23.10 Intermittent or Light Traffic. The microprocessor shall automatically keep the required number of cars in service based on the forecast waiting time. Cars shall remain parked at the last floor served.

- 23.11 Lobby Terminal Demand. The microprocessor shall always ensure that there is an adjustable number of cars at the lobby during off peak conditions. When there is no next car at the lobby, the ETA of the down traveling cars shall be calculated. If no car can reach the lobby in an adjustable time, a lobby demand is automatically placed to an available car.
- 23.12 Coincident Calls. The microprocessor shall give priority in its assignment of a hall call to a car with a corresponding car call. If this coincident hall call cannot be answered within the adjustable priority time, the car with the best potential arrival time shall then be assigned.
- 23.13 During peak conditions, the priority time is increased (adjustable) to further benefit from the elimination of a stop due to the coincident call.
- 23.14 Nonvolatile Memory
- A. A nonvolatile memory (EPROM) shall be used to store the following group adjustments:
 - B. Number of cars required at lobby
 - C. Number of cars required in the high zone
 - D. Up peak traffic detection parameters
 - E. Minimum up peak duration
 - F. Down peak traffic detection parameters
 - G. Minimum down peak duration
 - H. Traffic demand parameters to release the next car
 - I. Select hall waiting time parameters
 - J. Coincident calls maximum waiting time
 - K. The stopping table for all the cars with the direction of the stops
 - L. Security information
 - M. Special features such as dual and alternate lobby floors, V.I.P. service floor, priority floors, etc.
 - N. **Remote Monitoring Capability:**

1. **Provide all necessary items to monitor all elevator functions or diagnostics from a remote location.**

24. MACHINE ROOM AND HOISTWAY

- 24.1 Retain existing fire rated, auto locking, and auto closing machine room doors.
- 24.2 Provide all necessary LED lighting, GFI outlets and disconnects required by Code in the machine room, pit and hoistway. Provide that all light switches are accessible from the entry of pit access doors.
- 24.3 Provide all code required items.
- 24.4 Provide car top railing system
- 24.5 Provide pans under all roof drains.
- 24.6 Remove sprinklers and heat detectors from the top of the hoistways. Remove all sprinkler lines and heat detectors from machine rooms.
- 24.7 Provide HVAC system to maintain temperature and humidity at manufacturers recommended levels.

25. EMERGENCY POWER OPERATION:

- 25.1 Emergency power will be supplied to the elevator machine room at this time. All necessary controls, wiring, switches, etc, will be supplied.
- 25.2 Provide all necessary control and signal provisions as hereinafter specified for operation on emergency power. During emergency power, the cars shall automatically be returned to the lobby floor, one at a time, at full rated speed. If a car is unable to move, it is bypassed after a predetermined time interval. After all cars have been returned, the selected car shall automatically be put into operation to provide service to the building.
- 25.3 **Provide all Emergency operation controls (emergency power) in elevator life safety panel located in the Marshals Control room. Included within the life safety panel, position indicators for each elevator.**

26. GROUP CAR CONTROL FUNCTIONS:

- 26.1 Supervisory and individual controllers shall be of the floor mounted, free-standing type with NEMA 1 enclosures, with locking cabinet doors.

- 26.2 Leveling: An automatic two-way leveling device shall be provided and designed to govern the leveling of the car to within 1/4" above or below the landing sill. Any other travel or under travel or rope stretch shall return the car level to the landing sill automatically with the first movement of leveling.
- 26.3 The doors shall open automatically when the car arrives at the floor to permit transfer of passengers. After an adjustable time, interval, the doors shall automatically close.
- 26.4 Pre-opening shall be initiated as the computer calculates the correct point at which to initiate the door opening using both velocity and distance information.
- N. Door Timing: The door open time shall be field adjustable with resolution of 0.1 second. The dwell time for a car call stop shall be adjustable between one and eight seconds, and the dwell time for a hall call stop shall be adjustable between three and eight seconds. The hall call timing shall predominate. In the event the light beam is interrupted, the door open time shall be reduced to an adjustable 0.5 to ten seconds and shall be separately adjustable for a car or hall call stop.
- O. Door Protection: When the doors do not open or close perfectly according to their respective operation, they repeat or recycle the operation for a period of four minutes. After that time, the microprocessor shall shut down the car to prevent any damage to the door equipment.
- P. Nudging: In the event the doors are held open for a predetermined adjustable time interval (15-20 seconds) after automatic door closing has been initiated, a buzzer shall sound, and a signal given to close the door a reduced speed and torque.
- 26.5 Operating Controls.
- A. PIT FLOOD ALARM:**
Provide a two-stage pit flood device. Stage I shall operate when the water level exceeds two inches above the pit floor and shall activate a bell mounted in the pit.
1. Stage II shall operate when the water level exceeds six inches above the pit floor and shall activate a circuit which shall initiate Emergency Fire Service Recall Phase I to recall to the second (alternate fire) landing, and remove the elevators from operation until the pit flood device has been reset.
 2. The lowest level car call shall be blocked on Emergency Fire Service Phase II only on pit flood alarm operation to prevent operation into a flooded pit.
- B. Provide provisions for the operation of "Active Shooter Operation" to**

passenger Elevator Group.

1. Operation shall include:
Provide and install Active Shooter Operation. Upon activation of the operation by pressing either the mushroom style push-pull buttons (or key switch), in the Marshal's command and control room, the elevator will immediately return to the second floor and the doors will remain open until the button (or switch) is released back to normal operation. The designated recall floor shall be easily reprogrammable to any level. The initial designated level is the Second landing.
 2. All work under this SOW shall be performed in accordance with all local building codes and all applicable ASME A17.1-2019/CSA B44-10 Safety Code for Elevators or the most current edition.
 3. The elevator contractor shall be responsible for becoming knowledgeable of the job and all job conditions which exist and may be encountered during the accomplishment of this project.
- C. Anti-Nuisance: In the event that there are a number of car call stops (adjustable one to ten) and the light beam is not interrupted, all the car calls shall be canceled.
- D. Bypassing and dispatching due to Load Weighing: The elevator shall bypass hall calls when their respective load weighing inputs are energized at 67% of rated capacity and dispatch when inputs indicate 50% of rated capacity is loaded.
- E. Emergency Operation: The elevators shall be recalled in the event of a fire or other emergency conditions. The operation shall be according to ANSI/ASME A17.1 - 2019.
- F. Independent Service: The control shall provide for operation of each elevator from car buttons only. Under this operation, door closing shall be initiated by constant pressure of the car buttons or the door close button.
- G. Continuity of Service: In case of malfunction of the group computer or of the network, the individual car computer shall provide continuity of service. Hall button circuits shall be "bussed" to each car. The floors and the direction of the stops under this operation shall be field adjustable on a per car basis.

-
- H. Out of Group Operation: In the event the car does not start for a hall call dispatch signal, the car shall remove itself from group operation after an adjustable period (10 to 45 seconds).
- 26.6 Nonvolatile Memory: A nonvolatile memory (EPROM) shall be used to store the adjustable parameters which include:
- A. Drive: Soft start, acceleration, deceleration, leveling velocity, and response and all offsets.
 - B. Doors: Long door time, short door time, nudging, door open protective time and door close protective time.
 - C. Selector: The floor reference position and the slowdown limit reference position with associated operation velocity.
 - D. Dispatch: The out of service time due to dispatch loss and the emergency floor stops.
 - E. Others: anti-nuisance stops, etc.

27. INDIVIDUAL CAR CONTROLLER:

- 27.1 The microprocessor based individual car controller shall be designed and constructed with the following minimum requirements:
- A. Controller: The car controller shall be based on a 8/16-bit microprocessor using 4K bytes of static Random Access Memory (RAM) a minimum of 16K of Erasable Programmable Read Only Memory (EPROM). Provisions shall be made to expand the on-board RAM to 12K and the EPROM to 48K.
 - B. Switch and Relay Designs: All switches and relays shall have contacts designed for maximum conductivity and wiping action.
- 27.2 The microprocessor-based group management controller, and the communications network shall be designed and constructed with the following requirements:
- A. Controller: The dispatch controller shall be based on an 8/16-bit microprocessor using minimum 8K bytes of static Random Access Memory (RAM) a minimum of 16K of Erasable Programmable Read Only Memory (EPROM) Provisions shall be made to expand the on-board RAM to 16K and the EPROM to 48K.
 - B. Communications Network: A full duplex RS-422 multidrop network shall be utilized for the communications link between each car.

28. **COMPUTING ENVIRONMENT:**

28.1 Design Specifications: Where computing devices are used, such as microprocessors along with associated devices, the following design specifications shall be provided:

- A. All inputs from external devices (such as pushbuttons) and all outputs to external devices (such as indicators, relays) shall be isolated with opto-isolation modules.
- B. All external connections to the opto-isolation modules shall be fused.
- C. All opto-isolation modules and associated fuses shall be plug-ins.
- D. Crystal frequency regulation shall be used for the main processor clock.

28.2 Printed Circuits and Solid-State Hardware:

- A. All printed circuit boards shall be fabricated with G10 glass epoxy material with a minimum equivalent two-ounce copper.
- B. All printed circuitry shall be coated with tin-lead.
- C. A solder mask screen shall be provided.
- D. A silk screen with outline and component identification shall be used on all printed circuit boards.
- E. All printed circuit board edge connections shall be gold plated.
- F. All solid-state hardware shall have built in noise suppression devices which provide a high level of noise immunity.

29. **GUIDE RAILS:**

29.1 The existing car and counterweight guide rails for all elevators may be reused. **All rails and bracket fastenings shall comply with requirements of the A17.1 Code.** The contractor shall submit for approval the required seismic calculations. **Main and counterweight rails for all elevators shall be realigned and painted.**

- A. Guide rails shall be realigned plumb and parallel with a maximum deviation of 1/16 inch. All shimming required shall be of metal securely held in place. Splice plates shall not interfere with supporting clamps and brackets in place. Splice plates shall not interfere with supporting clamps and brackets. Each

splice plate bolt shall be drawn up tight. The guide rail anchorage in pit shall not reduce the effectiveness of the pit waterproofing.

B. Plumb lines shall not be removed without Government inspector's approval.

- C. Before the cars are placed in service, rails shall be thoroughly cleaned and smoothed and painted. When the car is tested the rails shall be clean, free from rust and any signs of abrasion.

30. SAFETY AND GOVERNOR:

30.1 Provide new governor-actuated safety devices mounted under the car platform and securely bolted to the car sling for all cars. The car safety shall be Type B, Sliding Type conforming with the A17.1 Code identification and classification of car safety devices.

30.2 Car safety marking plate shall be of corrosion resistant metal and, in addition to the date required by the A17.1 Code, shall indicate the manufacturer's name and manufacturer's catalog designation number.

Suitable provision shall be made to release the car safety. The safety shall be so arranged as to permit release without going under the car. The car safety device shall not require an opening in car floor to permit releasing the device.

30.3 Provide new bi-directional speed governors, located overhead, driven by a new governor rope suitably connected to the governor rope releasing carrier for all cars. The governor shall be equipped with rope grip jaws designed to clamp the governor rope so as to activate the car safety upon a predetermined overspeed downward. The rope grip must be positively tripped within the permitted range of speeds. Rope grip jaws which float with governor movement will not be permitted.

- A. Governor sheave shall be of hard alloy cast-iron, cast steel or semi-steel of approved composition with true running machine finished groove and flanges. Sheave shall be free from cracks, sand holes or other imperfections.
- B. The governor sheave shaft shall be manufacturer's standard. Suitable bearings and means of lubrication shall be provided for all other rotating parts, link pins, etc.
- C. Governor rope gripping device shall be so designed that no appreciable damage to or deformation of the governor rope shall result from the stopping action of the device in operating the car safety. The rope grip jaws for a governor using a Type B safety shall be of the parallel jaw type of such shape and length that pull through action of governor rope as required by A17.1 Code will result in a minimum amount of rope abrasion.

- D. The governor, governor rope and weighted tension sheave shall be mounted in such locations as to minimize danger of accidental injury to the equipment. Metal guards shall be provided to protect the governor rope, gears, and rope gripping device from accidental fouling by maintenance personnel.
- 30.4 The governor overspeed switch shall be so located and enclosed that excess governor lubricant will not enter switch enclosure.
- 30.5 Governor parts (with the exception of finished bearing surfaces, screw threads, etc.) shall be finished at the factory with machine enamel. No painting of governor parts at the building will be permitted. Painting shall consist of a priming coat and not less than one factory finishing coat of machine enamel.
- 30.6 Reuse existing new governor rope tension sheaves for all passenger elevators. The governor rope weighted tension sheave in pit shall operate in steel guides which shall permit free vertical movement of sheave while maintaining a uniform predetermined governor rope tension. Tension sheave shall be similar to governor sheave and shall be provided with similar type bearings.

31. HOISTING AND GOVERNOR ROPES:

- 31.1 The existing hoisting ropes on Elevator Nos. 1-5 shall be replaced. The existing governor ropes on Elevator Nos. 1-5 shall be replaced.
- A. Provide rope data tags of corrosion resistant metal.
- B. Provide new “staggered” wedge clamp type shackles, suitably hobbled.
- 31.2 Shop drawings shall indicate the number and size of hoisting ropes, the name of manufacturer, type, ultimate strength in tons, and the factor of safety.
- 31.3 Where hoisting ropes run around a sheave or sheaves on car and counterweight, suitable guards shall be provided.
- 31.4 The governor rope shall be 6 by 19 or 8 by 19 wire rope, iron or traction steel, uncoated, fiber core suitable for the governor furnished. The appropriate shackling, socketing and inspection procedures outlined in "Practice for the Inspection of Elevators, Escalators, and Moving Walks, Inspector's Manual" (ANSI A17.2) shall be followed.
- A. The governor rope data tag shall be of corrosion resistant metal.
- 31.5 Hoisting and governor ropes shall conform to the applicable requirements of Federal Specification RR-W-410C for the particular type of wire rope suitable for

the service involved.

32. COUNTERWEIGHT:

32.1 The existing counterweights and frames shall be retained on all Elevators. Existing spring-loaded roller guide assemblies shall be replaced. Counterweights shall be provided for the elevator equal to approximately the weight of the complete car and **40 percent** of the specified rated load. Cracked or broken sub-weights will not be accepted. Material for weights shall be steel.

33. CAR AND COUNTERWEIGHT BUFFERS:

33.1 Provide New oil buffers for the car and counterweight.

33.2 The partial compression of return oil buffers when the car is level with terminal landings shall not be acceptable.

33.3 Buffer marking plates shall be of a corrosion resistant metal. In addition to the data required by A17.1 Code, the marking plates for oil buffers shall indicate the manufacturer's name, buffer identification number and the buffer stroke.

33.4 Elevator shop drawings shall indicate the name of buffer manufacturer, buffer identification number, buffer stroke, certified maximum and minimum loads, and certified maximum striking speed.

33.5 Buffer marking plates shall be of a corrosion resistant metal. In addition to the data required by A17.1 Code, the marking plates for oil buffers shall indicate the manufacturer's name, buffer identification number and the buffer stroke.

33.6 Paint all buffers, pit channels and pit equipment with finish coat of machinery enamel paint, in manufacturer's standard color.

34. TERMINAL STOPPING DEVICES:

34.1 Terminal stopping devices located in hoistway or on the car and operated by cams shall be fitted with rollers having a rubber or other approved composition tread to provide practically silent operation when actuated by the cam. Location of devices shall be as determined by the A17.1 Code.

35. ROLLER GUIDE ASSEMBLIES:

35.1 Existing roller guide assemblies on cars and counterweights for all Elevators, shall be replaced with new spring-loaded guides to provide a smooth and vibration free

ride within the elevator. Roller guide assemblies shall be provided with adjustable mountings and shall be rigidly secured in accurate alignment.

A. Each roller type guide assembly shall consist of rollers assembled on a metal base and designed and mounted to provide continuous contact of all rollers with the corresponding three finished rail surfaces under all conditions of load and operation. Each roller shall be tired with a resilient oil resistant material and shall rotate on precision grade ball bearings. Ball bearings shall be pre-lubricated and sealed for life. The roller guide assemblies shall operate quietly under all conditions.

35.2 Adjust roller guides on all cars and counterweight frames. All elevator cars shall be balanced in both post-wise and front-to-back directions.

36. CAR FRAME AND PLATFORM:

36.1 Retain existing Structural Steel car frame and platforms for all Elevators.

36.2 Retain existing cab sills, provide new cab returns, new car stations, transom and car doors

37. ELEVATOR CABS:

37.1 Refinish existing stained cab interiors for all passenger elevators Nos. 1-4 to match existing stain and color. Retain existing cab interior for Service No. 5.

37.2 Retain the existing cab shell enclosures except return panels for all elevators. Provide new car return panels at entrance side including integral entrance columns, head frame and transom panel shall be No. 14 U.S.S. gage stainless steel for all passenger elevators. Stainless steel shall have No. 4 brushed finish.

A. **Retain existing wooden cab interior and refinish to match the existing wooden cab interior. New fronts and car doors shall be No. 4 brushed stainless steel.**

1. Provide new LED lighting in the existing canopy.

2. Retain existing car flooring.

B. The cab for service elevator No. 5 shall be retained.

1. Provide new LED lighting in a new standard canopy.
2. Retain existing car flooring.

37.3 N/A

37.4 Unless other wise specified, the top emergency exit panel shall be of sheet steel with finish to match car interior walls and shall meet the seismic requirements of the A17.1 Code. When car has plenum chamber ventilation, removable panel sections shall be provided in both car ceiling and plenum chamber and shall be so constructed that the entire top emergency exit may be removed as a unit. An electric contact shall be provided for top emergency exit (to prevent operation of elevator when exit panel is open).

A. The car top shall be of not less than No. 14 U.S.S. gage sheet steel suitably braced to meet requirements of the A17.1 Code. Exit details including hinging and locking arrangement of emergency exit door where required, shall be shown on shop drawings.

37.5 A ventilation system of exhaust type shall be provided for each elevator arranged to exhaust air through opening around suspended ceiling.

A. The system shall include a blower driven by a direct connected motor and mounted on top of car with isolation to effectively prevent transmission of vibration to the car structure. The blower shall have not less than two operating speeds with a rated free delivery air displacement of approximately 380 and 265 c.f.m. at the respective speeds. The unit design and installation shall be such that the maximum noise level when operating at high speed shall not exceed 55 dba approximately three feet above the car floor. A three-position switch to control the blower unit shall be provided in the car service cabinet.

37.6 Passenger car interior lighting shall be of the LED Downlighting type. LED light fixtures with plastic guards shall be provided on top of car and also beneath the car platform. Duplex receptacles shall be provided on the top of the car and beneath the car platform to supply 120 V.A.C. outlets shall be 2 pole, 3 wire grounded type rated for 15 amperes at 125 volts conforming to Federal Specification W-C-596/12A.

37.7 Car interior lighting for elevators Nos. 1-4 shall be of the Low Voltage LED type Downlighting with flush mounted recessed fixtures. The fixtures shall have open bottoms with an aperture of approximately three (3") inches mounted in mirror finished panels. Provide manufacturer's standard panels as required by layout of ceilings. Panels shall be formed of brushed .032" stainless steel. Each panel shall

be covered with an adhesive coated protective paper until installation is complete.

Car interior lighting for elevator No. 5 shall be a new manufacturers standard canopy with new LED energy efficient lighting.

- 37.8 The lighting system for all elevators shall be required to achieve initial output of 20-foot candles at any point on the floor. Lighting shall be controlled by on/off switch located in car station control panel.
- 37.9 The finished car floor for elevator Nos. 1-4 shall be retained.
- The finished floor for elevator No. 5 shall be retained.
- 37.10 N/A
- 37.11 Car doors shall be hollow metal flush panel **insulated** construction, not less than seven-eighths inch thick. The doors shall be hung on two-point suspension sheave type ball bearing hangers similar to those specified for hoistway doors except that sheaves shall be of sound reducing design. The door panels shall be rigid and reinforced for installation of hangers, door operating equipment, door re-opening device and hardware. Door panels shall be guided at the bottom by nylon or composition gibs engaging door threshold grooves with a minimum clearance. Gibs shall be easily replaceable without removing doors from hangers. Rubber bumpers shall be provided for door similar to those specified for hoistway door. Minimum clear width shall be existing. The exposed interior surfaces and edges of car door panels for all elevators shall be faced with not less than No.16 USS gage stainless steel, with No. 4 brushed finish.
- 37.12 The car capacity plate shall be of stainless steel for passenger elevators and in addition to data required by A17.1 Code shall bear the name of elevator manufacturer.
- 37.13 Sheet steel shall be in accordance with Federal Specification QQ-S-698 for cold rolled Commercial Quality and shall be stretcher level or cabinet quality. All sheet steel surfaces shall be cleaned and then shall receive a rust preventive treatment by bonderizing or other equally serviceable approved process. Sheet steel work exposed on car interior shall receive a six-coat baked enamel finish consisting of three coats of primers and surfacing material and three finish coats of enamel. Each coat shall be evenly applied in sufficient quantity to completely cover the preceding coat, baked at proper temperature, and then rubbed smooth. The final coat shall be rubbed to an eggshell gloss. The finish and colors shall be as follows:
- A. Interior of canopy in manufacturer's standard baked enamel finish.
 - B. Interior of steel car walls in baked enamel color as selected.

- C. The exterior of canopy and car doors shall receive at least a priming and two finished shop coats of manufacturer's standard enamel, except exterior of car doors may be the same color specified for interior side.
 - D. The exterior of steel car walls and steel shell except mounting flanges and surfaces less than 3 inches in width shall receive a factory applied coating of a mastic sound insulation material approximately 3/32-inch thick followed by a prime coat of manufacturer's standard paint. Mastic material shall conform to Federal Specification SS-S-111B, Type I, Class (a).
 - E. Upon completion, all factory finished surfaces shall be touched up and restored where damaged or defaced.
- 37.14 Stainless steel shall be in accordance with Federal Specification QQ-S-763D (and INT AMD-1) for bars and QQ-S-766c for sheets, Class 302 or 304, Condition A, with a No. 4 or approved satin finish on exposed surfaces.
- 37.15 Bronze sheets shall be in accordance with Commercial bronze, Copper Development Association Alloy No. 220 with exposed surfaces in natural lacquered finish to match approved sample.
- 37.16 Nickel Silver sheets shall be in accordance with Copper Development Association Alloy No. 754 with exposed surfaces in satin finish to match approved sample.
- 37.17 Aluminum work shall have a uniform fine satin finish (180-220 emery) on exposed plain surfaces and shall be anodized in natural color. Anodized aluminum shall be in accordance with alloy of applicable section of Federal Specification QQ-A-250D/GEN.

38. FINISH OF CAR FIXTURES:

- 38.1 Unless otherwise specified, all exposed metal fixtures in the elevator cars, including face plate and frame for car operating panel, telephone cabinet and the like shall be of **stainless steel, No. 4 brushed** finish for all elevators. Ceiling panels with low voltage downlighting shall be **No. 4 brushed stainless-steel** finish.

39. EMERGENCY CAR LIGHTING:

- 39.1 An emergency car lighting and alarm bell system shall be provided in each passenger and freight elevator consisting of a rechargeable battery, charger, controls, and light fixture. The system shall automatically provide emergency light in the car upon failure or abnormal interruption of the normal car lighting service and shall function irrespective of the position of the light control switch in the car.
- 39.2 The battery shall be 6 volt minimum, sealed, maintenance free of either lead acid or

nickel cadmium construction and designed to give a life expectancy of not less than ten years. The term "sealed" shall mean sealed against the loss of electrolyte and against gassing except for over-pressure vents which shall be leak-proof. Batteries using adapter type water conserving or catalytic devices are not acceptable.

- 39.3 The charger including rectifier and controls shall be solid state except load relay, if used, shall be hermetically sealed. The charger shall be of the two-rate type and capable of:
- A. Restoring the battery to full charge within 16 hours after resumption of the normal power supply following a continuous discharge of 4 hours through the connected lamp load.
 - B. Automatically maintaining the battery in a full state of charge under normal power supply conditions.
- 39.4 The battery, charger and controls shall be housed in a enclosure of either sheet steel or molded plastic with a dust-tight removable cover. The enclosure shall be designed for permanent mounting on the elevator car top and shall be of sufficient strength to support the full weight of a 200-pound man without causing any malfunction or damage.
- 39.5 A constant pressure switch that automatically returns to the "Off" position when released, and pilot light, for the periodic testing of battery and lamps shall be provided on the exterior of the battery enclosure. **An emergency light test switch shall also be located in the locked service cabinet inside each car.**

40. TELEPHONE:

- 40.1 The new communication device shall meet the requirements of the A17.1-2019.

To comply with current A17.1 Code elevators shall be equipment with emergency voice and messaging system for in car communication. Note the use of multiple company's voice and messaging systems are currently being reviewed by GSA IT for network and security vulnerabilities. The MAD MosaicONE VMS is the only system cleared for trial use in GSA facilities and the GSA network. Until other systems are cleared this system will be the only product available for use on this project.

- A. Provide "hands free" telephone device in each car integral within car control station with programmable auto-dialer and tracking and recall features to meet requirements of ADAAG and drilled speaker pattern.
- B. Auto dialer shall be programmable to call more than one number, at different times of the day.

- C. All telephones shall have a dedicated phone line.
 - D. Provide push to talk button with identification plate and all signage required adjacent to alarm button.
 - E. Telephone dialer shall utilize a prepared message with building and elevator information, then shall allow voice communication. Illuminate button to indicate call registration and provide means to cause indicator light to flash when call is answered.
- 40.2 Furnish and install all traveling cables, conductors, conduit, etc., required for the telephone service from the telephone cabinet in the car to the telephone outlet box at the hoistway halfway junction box of machine room.

41. CERTIFICATE FRAME:

- 41.1 Provide engraving stating "Elevator Inspection Certificate on File in Building Manager's Office" on main car operating panel.

42. WALL PROTECTION PADS:

- 42.1 Stainless steel pad hooks shall be provided near soffit of car interior walls. Pad hooks shall be as inconspicuous as possible and spaced not over 18 inches apart. Wall protection pads shall be provided for car arranged to cover entire wall surface of car except operating devices. The pads shall be provided with heavy stainless-steel eyelets properly spaced to suit pad hooks. The pads shall consist of 1-inch-thick glass fiber insulation securely sewed between a flame resistant vinyl coated covering as specified.
- 42.2 The insulation shall conform to Federal Specification HH-I-558B for Form B, Type I, Class 6 or 7 plain.
- 42.3 The physical properties of the covering shall conform to Federal Specification CCC-W-408A(1) for a type II covering.
- 42.4 Upon request, certified laboratory test reports of either or both the insulation and covering shall be submitted for approval.
- 42.5 Furnish one (1) set of pads for the group of passenger elevators and one (1) set for

the service elevator.

42.6 Building manger shall select color of wall protection pads.

43. SIGNAL SYSTEM:

43.1 The elevator signal system shall, either be adapted to the electric service at the building, or necessary transformers with overload protection shall be provided in the elevator machine room. In all cases, where lamps are used, a voltage not exceeding 120 volts shall be provided.

43.2 A digital car electric position indicator with direction arrows shall be provided in the car for all elevators. Electric position indicator shall be mounted within each car operating panel to indicate the location of the car in the hoistway. The indicator face plate shall be of metal and shall contain an indication for each floor served by the elevator. The floor indications shall be a minimum of 1-3/4 inches high. The change illumination from one indication to another shall occur rapidly when car is approximately midway between floors. A position indicator of the digital readout type of manufacturer's approved standard shall be used. In addition, an audible signal (chime) shall sound in the interior of a car whenever it passes a floor served by an elevator or stops at a floor.

43.3 The existing lanterns shall be replaced with new electronic chimes and LED lighting. The direction indication shall be distinguishable only when illuminated. Each lens shall be illuminated from the rear by an individual lamp to provide a non-glaring readily distinguishable indication. Each lamp shall be effectively shielded to illuminate only its own lens. Lanterns shall contain a single stroke chime to signal the approach of a stopping car. The chime for passenger cars shall sound once for a car traveling in the up direction and twice for the down direction. The lantern lenses shall signal the approach of a stopping car when car is a predetermined distance away from a landing. The lantern lenses shall not be illuminated when the car passes that floor without stopping. The chime shall sound momentarily and simultaneously with the illumination of a lantern lens.

A. A landing lantern at least 2-1/2" in size for passenger elevators shall be provided at each floor for all elevators.

43.4 All signal fixture cover plates for all elevators shall be stainless steel with No. 4 brushed finish on all floors. (If needed)

43.5 A Car Emergency Signal Bell shall be provided for each elevator. The car emergency signal bell shall be of the monitor type suitable for outlet box mounting and shall have a six (6) inch diameter gong. The bell shall sound when emergency signal push button in the car operating panel is pressed and also when emergency stop switch in the car operating panel is operated.

- 43.6 New Landing Call Button riser shall be provided as required under the method of operation specified for all elevators. The landing call button fixture face plates shall be of stainless-steel No. 4 brushed finish for all elevators. Where "UP" and "DOWN" buttons are specified, the "UP" button shall be the top button for intermediate landings and the fixtures at the terminal landings shall have only the "UP" or "DOWN" button as required. The buttons shall be of substantial construction with contacts and wearing parts of materials and sizes to meet the severe requirements of elevator service. Depressible type buttons shall be so designed that a spring will take up the initial pressure from which contact is made and further pressing shall seat the button on or in the face plate. Landing call buttons shall have integral illuminated registered call signal indicators and shall have their function indelibly and legibly identified on the face plate by legend or arrows. Buttons shall be at least 3/4 inch in size. When a landing call button is operated the corresponding signal indicator shall be illuminated to indicate that a call has been registered for that direction of travel. Signal indicators shall be extinguished when a car serves the registered call. The centerline of the highest hall call buttons shall be 42 inches above the floor. **Provide space and wiring for future keypad control for security system in hall button faceplates at all landings. Lobby level faceplate also shall include a fire service key switch. Include a smoked plexiglass panel where the future card reader space is located.**
- 43.7 The existing hall call buttons shall be lowered on all floors to a height of 42" maximum for elevator Nos. 1-5. The new fixture cover plates shall be designed to completely cover the existing push button box and extend to cover the new push button fixture box. The top of the cover plates shall have engraved into the metal and colored to match the pictograph in the A17.1 Code.
- 43.8 All fixtures shall be grouted in solid, and walls patched, painted or neatly finished to match existing surfaces.
- 43.9 **Provide new security panel in the Marshal's Control Room. Provide emergency power controls, fire service key switch controls, and position indicators for all elevators. (Including service elevator)**
Provide Active Shooter switches in panel.
- 44. EMERGENCY RECALL OPERATION:**
- 44.1 Phase I and Phase II operation required during a fire or other emergency shall be provided for all automatic elevators in accordance with the A17.1 Code except as modified herein.
- 44.2 Manual Control of the recall operation shall be from one Recall Switch, located in the Lobby Hall button fixture at the first-floor landing. The lobby (first floor) landing shall be the main recall floor, and the second-floor landing shall be the designated alternate floor for all elevators. The Recall Switch at the Main Floor

shall be specially keyed to match the in-car fire Service Switch Key. The recall switch shall be permanently identified with recall (ON), Normal (OFF), and bypass positions.

- 44.3 Each Recall Switch shall be clearly and permanently identified and provided with a red "fire hat" pilot light which shall be illuminated when the switch is placed in the "Recall" position.
- 44.4 When placed in the "Recall" position, the cars shall return to the Main Floor. Elevators standing at a floor other than the Main Floor, with doors open, shall close entrance doors without delay and travel non-stop to the Main Floor when this switch is activated. If there is a fire at the Main Floor, elevators shall travel non-stop to the Designated Alternate Floor as specified herein. These cars will remain out-of-service unless placed in Phase II Emergency Service or returned to Normal Service.
- 44.5 When the Recall Switch is placed in the "Bypass" position, the elevators shall operate normally despite any signals received for automatic recall.

45. SMOKE DETECTORS AND ANNUNCIATORS:

- 45.1 The Fire Detection System shall be coordinated with the elevator control equipment to assure automatic elevator recall as specified.
 - A. **The Fire Alarm company that is the certified distributor of the manufacturer of the fire alarm system shall be the only company allowed to access the fire alarm system.**
 - B. Incorporate elevator recall into the existing fire protection system. Each detection system shall include a photoelectric type of detector, and/or heat detectors located in each elevator lobby, and machine room, and appropriate connections to the elevator system. The activation of a detector at any elevator lobby shall cause the elevator serving that lobby to return non-stop to the Main Floor, except the activation of a detector device at the Main Floor shall cause the car to travel to the Alternate Floor. After activated detectors have been reset or replaced, placement of the recall switch in the "Normal" position shall prepare the elevator system for automatic recall by the detection system.
 - C. **Remove all sprinklers located in top of the elevator hoistways, pits, machine rooms and secondary spaces. Remove all heat detectors in**

the machine room and pits. Retain all smoke detectors in the machine rooms.

- D. Smoke and heat detectors, conduit, wiring and junction boxes shall be provided by this section to interconnect the elevator recall controls to the detectors in the elevator lobbies at the various floors, and to an annunciator control panel.

- 45.1 Provide any additional fire alarm devices needed for elevator to perform to all latest fire and elevator codes.
- 45.2 Signs which will inform occupants not to use the elevators in case of fire shall be engraved in the cover plate of each elevator corridor call station. Signs shall be in accordance with ANSI-A17.1.

46. PASSENGER ELEVATOR HOISTWAY ENTRANCES:

- 46.1 **Each elevator hoistway entrances for all Elevators shall be retained, and existing hoistway doors shall be retained.**

The existing wooden entrances shall be refinished (along with the cab interiors) to match existing stain.

All door and entrance units may reuse door tracks, hanger assemblies, and interlock assemblies. The door pickup rollers, interlock contacts and gibs shall be provided new. Existing bucks, headers, sills, struts, hanger supports with cover plates, fascia plates, and toe guards may also be reused. Metal work not otherwise indicated shall be of steel or iron.

- 46.2 Re-use all existing headers, sills, frames, struts, hanger supports with cover plates, and fascia plates. **Provide new door rollers, door drive rollers, upthrust rollers, gibs, closures, interlocks, and other related hardware for all passenger elevator entrances. Provide emergency keyways and door unlocking devices at all entrances in accordance with ANSI A17.1.**

- 46.3 Retain existing hoistway doors at all landings.

- A. Doors shall be constructed of not less than 16 USS gage sheet steel and be of

flush type construction. Door panels shall be labeled as evidence of conformance with the construction, installation, fire test, and labeling requirements of the A17.1 Code.

- B. Metal doors shall have natural metal finish in stainless steel and consist of a flush type of steel door as hereinbefore specified with an applied facing of the natural metal applied to surfaces exposed on the landing side of the door. The natural metal facing shall be not less than 0.0478 inch in thickness and shall be secured by concealed fastenings to present smooth leveled surfaces.
- 46.4 A sight guard shall be provided on the leading edge of single-slide and two-speed hoistway doors, and on each meeting edge of center-opening hoistway doors. The sight guards shall be 0.06-inch-thick formed metal of the same material and finish as the landing side of doors.
- 46.5 Each section of door shall be provided with removable synthetic bottom guides arranged to run in sill grooves with a running clearance not exceeding 0.02 inch. The guide mounting shall permit the easy replacement of guides without removing the door from the door hangers. Guide inserts shall be provided with metal retainers to hold doors in position if synthetic guides are destroyed by fire.
- 46.6 The meeting edge of center opening doors shall be provided with easily replaceable continuous rubber bumper strip. Bumper strip shall be of tongue construction. Bumper strip shall be relatively inconspicuous when doors are closed. Rubber bumpers shall be provided at the top of each section of doors to stop doors at their limit of travel in opening direction.
- A. Single-speed and two-speed doors shall be provided with rubber bumpers at the top of doors for stopping doors at their limits of travel in the opening direction. In addition, when door closer or operating mechanism will permit door overtravel in the closing direction, bumpers shall be provided on strike jamb at the top of doors.
- 46.7 The doors shall be provided with two-point suspension sheave type hangers. The hangers shall be securely fastened to the door sections which shall be provided with reinforcements at the point of attachment, or the hanger may be built as an integral part of the door panel. The hangers shall have provisions for vertical and lateral adjustment.
- A. Door Track and Sheave Hanger Assemblies shall consist of hardened steel or approved resilient tread sheaves equipped with ball or roller bearings mounted on steel brackets. The sheaves shall roll on a high carbon cold rolled or drawn steel track so shaped as to permit free movement of sheaves without regard to vertical adjustment of sheave bracket or housing. The hanger track may be formed of steel plate as an integral part of the hanger support and the running surface may be provided with a nylon covering. The hanger sheaves shall be

not less than 2-3/4 inches in diameter.

- B. Beneath the track and each sheave wheel a hardened up-thrust roller shall be provided capable of withstanding a vertical thrust equal to the carrying capacity of adjacent upper sheave. The up-thrust roller shall be subject to fine vertical adjustment and shall permit free radial movement of the hanger sheaves. The up-thrust roller shall have ball or roller bearings.

46.8 Steel structural members shall be given a shop coat of rust inhibitive paint.

46.9 Sheet steel shall be in accordance with Federal Specification QQ-S-698 Commercial Quality, cold rolled and shall be stretcher level or cabinet quality. All sheet steel surfaces shall be cleaned and then shall receive a rust preventive treatment by bonderizing or other equally serviceable approved process. Sheet steel work exposed after erection including work on the hoistway side shall have baked enamel finish at the factory unless otherwise specified. Baked enamel finish shall consist of three coats of primers and surfacing material and three finish coats of enamel. Each coat shall be evenly applied in sufficient quantity to completely cover the preceding coat, baked at proper temperature, and then rubbed smooth. The final coat shall be rubbed to an eggshell gloss. The color of exposed finished surfaces shall be as follows:

- A. The hanger covers, facias, toe guards, dust aprons and like items on the hoistway side may be reused and painted with one finished enamel coat similar to existing color.
- B. Upon completion, all finished surfaces shall be touched up and restored where damaged or defaced.

46.10 Stainless steel sheets shall be in accordance with Federal Specification QQA-S-766C, Class 302 or 304, Condition A, with a No. 4 or approved satin finish on exposed surfaces to match approved samples. Thickness to be not less than 16 gauge.

46.11 Bronze sheets shall be in accordance with Commercial bronze, Copper Development Association Alloy No. 220 with exposed surfaces in oxidized statuary lacquered finish to match approved sample. Thickness to be not less than 16 gauge.

46.12 Nickel silver sheets shall be in accordance with Copper Development Association Alloy No. 754 with exposed surfaces in satin finish to match approved sample.

46.13 The work shall be erected with accuracy and all supporting members shall be rigidly secured to the structural parts of the building. All parts shall be plumbed and leveled.

- A. Erection preferably shall be started at the top of the shaft. Hanger supports

shall be erected in perfect alignment with the edges of the sills, sill grooves and head jambs to insure smooth operation of the doors.

- B. Doors and hangers shall be accurately adjusted and all working parts carefully cleaned and greased. Guide grooves in the thresholds shall be cleaned. The entire installation shall be cleaned after erection.

47. DOOR OPERATORS:

- 47.1 New “closed loop” electric power door operators shall be provided for all elevators. The operators shall be of the high (3 ft/sec) speed type. Speeds noted are minimum averages.
- 47.2 The doors shall operate smoothly without slam in both the opening and closing directions and they shall be cushioned in their final movement in both directions of travel.
- 47.3 Provide new door protective device for all elevators which shall consist of a multiple-beam door detector that initiates a door reversal if any one of the beams is interrupted. The infrared beams shall provide a pattern of beams across the door opening that covers an area from the sill to a height of about 64 inches. Beams shall scan the opening at a scan rate of not less than 10 times a second

48. INTERLOCKS AND CONTACTS:

- 48.1 Clutches used to actuate interlocks shall be securely fastened to car construction and shall be designed to operate without objectionable noise, shock, or jar. Car door and gate and car top emergency exit electric contacts shall be designed to prohibit accidental contact with energized electrical components.
- 48.2 Submit for approval, engineering test reports showing that the hoistway door interlocks, car door or gate electric contacts, or car top emergency exit electric contacts proposed meet the requirements of A17.1 Code and have been so certified by a qualified testing laboratory.
- 48.3 The name of the manufacturer and type or style letter or number of hoistway door interlocks and electric contacts proposed to be used shall be indicated on elevator shop drawings submitted for approval.
- 48.4 The type of approved door restrictor devices shall be of the fixed angle type mounted in the hoistway and the spring-loaded angle type mounted on the car doors.

49. SECURITY:

44.1.1 Provide space and wiring for future card key security in all elevator car and hall landing fixtures. Provide a smoked plexiglass cover under space for future security system.

A. Provide junction box on side of controllers for termination of car and hall station wiring. Provide labeled and easy access for future security additions.

44.2 **Provide provisions for the operation of “Active Shooter Operation” in the Marshals Control Room security fixture.**

1. Operation shall include:

Provide and install Active Shooter Operation. Upon activation of the operation by pressing either the mushroom style push-pull buttons (or key switch), in the Marshal’s command and control room, the elevator will immediately return to the alternate fire recall level (second floor) and the doors will remain open until the button (or switch) is released back to normal operation. The designated fire recall floor shall be easily reprogrammable to any level. The initial designated level is the Second landing (alternate fire recall level).

2. All work under this SOW shall be performed in accordance with all local building codes and all applicable ASME A17.1-2019/CSA B44-10 Safety Code for Elevators or the most current edition.

3. The elevator contractor shall be responsible for becoming knowledgeable of the job and all job conditions which exist and may be encountered during the accomplishment of this project.

50. INDEPENDENT SERVICE:

50.1 A two position key operated INDEPENDENT SERVICE SWITCH, with Normal and Independent markings shall be provided in each elevator.

50.2 When this switch is placed in the Independent Position, the operation shall be the same as that required for Emergency Service, except the doors shall open automatically as elevator arrives at landing. Doors shall close when a car button or door close button is activated.

50.3 When the independent service switch is returned to the position marked Normal, the elevator shall return to normal service.

51. TESTS:

51.1 The proper operation of every part of the elevator system and compliance with

contract requirements, including compliance with all applicable requirements of the A17.1 Code, shall be demonstrated to the Contracting Officer. The inspection procedure outlined in Part II of the "Practice for the Inspection of Elevators, Escalators, and Moving Walks, Inspectors' Manual" ANSI A17.2, shall form a part of the final inspection. Furnish all test instruments and materials, required at the time of final inspection, to determine compliance of the work with the contract requirements.

51.2 The following tests shall be made on each elevator at the time of final inspection:

- A. Full Load-Run Test: The elevator shall be subjected to a test for a period of one-hour continuous run, with full specified rated load in the car. During the test run, the car shall be stopped at all floors in both directions of travel for a standing period of 10 seconds per floor.
- B. Speed Test: The actual speed of the elevator car shall be determined in both directions of travel and with full contract load and no-load in the elevator car. Speed tests shall precede and follow the full load run test. Speed shall be measured by applying a tachometer to the car hoisting cables. The measured speed of elevator car with all loads in any direction shall be within 5 percent of specified rated speed for an elevator with generator field or static control and 10 percent of specified rated speed for an elevator with alternating current rheostatic control.
- C. The temperature rise of the hoisting motor, motor generator, and exciter shall be determined during the full load test run. Temperatures shall be measured by thermometers inserted into the various windings and shielded by cotton waste or by other means as approved by the Contracting Officer. The temperature rise shall be less than the ratings of the class of insulation provided. Test shall be started only when all parts are within 5 degrees C of the ambient temperature.
- D. Car Leveling Test: Elevator car leveling devices shall be tested for accuracy of landing at all floors with no load in car and with full load in car, in both directions of travel. Accuracy, as specified in paragraph 31, shall be determined both before and after the full load run test.
- E. Emergency Operation Test: Functional tests of the automatic and manual recall systems and the operation of the cars on emergency power (where provided) shall be performed.
- F. Insulation Resistance Test: All field wiring of elevator systems shall be free from short circuits and grounds and the insulation resistance of systems shall be determined by use of a "Megger". All conductors shall have an insulation resistance of not less than one megohm with respect to both ground and each other.

- G. Car Safety and Governor Tests: The car safety and governor shall be tested as outlined in the A17.1 Code.
- H. Oil Buffer Tests: Oil buffers for car and counterweight shall be tested as outlined in the A17.1 Code.
- I. Motor Overcurrent Protection Test: All motor overcurrent protection devices shall be tested using portable test equipment approved by the Government. Test results showing the motor full load current and the current at which the overcurrent devices operate shall be submitted to the Contracting Officer. Elevator drive equipment shall not be used to simulate an electrical overload condition for testing the overcurrent devices.
 - 1. The following data for each overcurrent protection devices shall be submitted:
 - (a) Ambient conditions in which device should be tested.
 - (b) Reliability normally obtained.
 - (c) Time/current characteristic curves.
 - (d) Actual trip time during the overcurrent test prescribed by manufacturer.
 - 2. Each overcurrent device shall have its trip characteristics identified by a calibration sticker indicated test results and date of test.

51.3 Car Safety Drop Test: In addition to the car safety tests specified above, the Contractor shall, before the installation of permanent car enclosure, make a Drop Test at the building of each type of sliding car safety installed unless, prior to such time, as satisfactory Type Drop Test, as described herein, has been performed and the required information has been filed with and accepted by the Public Buildings Service. Where Drop Tests at the building are required, one of each type of sliding safety installed under this specification shall be selected and tested in the presence of a Government Representative.

- A. Drop tests shall be made with a total suspended load equal to the dead weight of the completed elevator plus the maximum rated load of the elevator being tested. The superimposed platform load shall be located on each quarter of the platform symmetrically with relation to the centerline of the platform.
- B. The safety shall be activated by the governor during the drop test. The governor tripping speed shall be adjusted and set in accordance with the requirements of the A17.1 Code for the rated speed of the elevator being

tested. The safety shall be adjusted in accordance with the manufacturer's standard practice for the specified load and speed of the elevator. Safety activation due to inertia at a speed less than the governor tripping speed will be acceptable provided the distance ratio and out-of-level requirements hereinafter specified are met.

- C. The elevator shall be suspended at an appropriate beginning rest position and then allowed to drop freely with only the governor rope attached until safety application brings the elevator to a stop in the final rest position. In the final rest position, the elevator platform shall not be out-of-level more than 0.375 inch per foot in any direction.
- D. The ratio between the sliding distance for the safety, as indicated by the markings on the rail, and the total distance from rest to rest shall be not less than 0.30 nor more than 0.75 for safeties of the rigid jaw type and not less than 0.40 nor more than 0.75 for flexible jaw safeties. The length of the safety shoe shall be deducted from the length of the marks on the rails, where necessary, to determine the actual sliding distance.
- E. The following information and data for each Drop Test shall be submitted to the Contracting Officer for approval:
 - 1. Manufacturer's name.
 - 2. Safety identification number.
 - 3. Governor identification number.
 - 4. Test load on safety.
 - 5. Rated elevator speed.
 - 6. Ratio of sliding distance to the distance from rest to rest.
 - 7. Measured amount, in inches per foot, by which the platform was out-of-level at final rest position.
- F. Type Drop Tests shall be made by a qualified testing laboratory equipped to make such tests, or by the manufacturer of the safety, and witnessed by a representative of such a qualified testing laboratory or a registered professional engineer acceptable to the Public Building Service.
- G. Type Drop Tests shall be made with the maximum load for which the safety is rated and with a car frame of conventional design that would be used for normal elevator service within the capacity and speed limitations for which the safety is designed. The test may be made without a cab on the platform

provided the total suspended weight equals the maximum rated gross load of the safety. One quarter of the load shall be located on each quarter of the platform symmetrically with relation to the center lines of the platform.

- H. During the test, the jaws of a speed governor shall be used to develop the retarding force on the governor rope. The governor shall be of a type suitable for normal operation with the safety being tested and shall have parallel jaws. For flexible guide clamp safeties, the governor jaws shall be preset on the governor rope with a slack loop of rope provided between the governor jaws and the rope attachment on the elevator car frame. The slack in the loop shall be the exact amount required to permit the car to attain the maximum speed for which the safety is rated before the governor rope becomes taut. For wedge clamp and gradual wedge clamp safeties, the safety action shall be initiated by the normal functioning of the governor, which shall be set to trip at the maximum speed for which the safety is rated.
- I. The car shall be suspended at an appropriate beginning rest position and then allowed to drop in a free fall with only the governor rope attached until such time as the governor and safety application brings the car to a stop in final rest position. The car platform shall not be out-of-level more than 0.375 of an inch per foot in any direction in the final rest position.
- J. Instrumentation shall be utilized to collect necessary data to permit plotting curves showing velocity, acceleration, and travel versus time. The ratio between the sliding distance for the safety as indicated by the markings on the rail and the total distance from rest to rest shall be not less than 0.30 nor more than 0.75 for safeties of the rigid-jaw type and not less than 0.40 nor more than 0.75 for flexible jaw safeties. The length of the sliding shoe shall be deducted from the length of the marks on the rail, where necessary, to determine the actual sliding distance.
- K. After the test, the car frame, car platform, and safety must show no signs of permanent distortion or damage. The safety shall be completely dismantled to permit a detailed examination for damage.
- L. If of the drum-operated type, the safety shall be wound and rewound several times to verify that the safety design and lead sheave location are such that the safety rope will wind and unwind smoothly, provided tension is maintained on the safety rope.
- M. The following information and data on each Type Drop Test made shall be submitted to the Public Buildings Service for review, acceptance and file:
 - 1. Assembly and detail drawings of the car frame and safety, identifying use and composition of the component parts.

2. Identifying data of the governor utilized to initiate the safety action during the Type Drop Test.
3. Curves plotted to show the velocity, acceleration, and travel versus time for the entire test, rest to rest.
4. Certificate from testing laboratory or registered professional engineer attesting to the satisfactory performance of the safety during the Type Drop Test. In addition, the certificate shall include the following information:
 - (a) Manufacturer's name.
 - (b) Safety identification number.
 - (c) Governor identification number.
 - (d) Maximum rated load of safety.
 - (e) Maximum tripping speed for which safety may be used.
 - (f) Ratio of sliding distance to the distance from rest to rest.
 - (g) Measured amount, in inches per foot, by which the platform was out-of-level at final rest position.

END OF SECTION 14210