

SECTION 14 21 23
ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY AND DEFINITIONS

A. Related Documents

1. Division 01 - Supplementary General Conditions

1.2 Description

A. Work Included: The extent of the work is indicated on the drawings.

B. Work of this Section includes labor, materials, tools, equipment, appliances and services required to manufacture, deliver and install the units complete as shown on the drawings, as specified herein, and/or as required by job conditions.

C. The work and /or requirements specified in all sections is described in singular with the understanding that identical work shall be performed on all units or associated systems unless otherwise specified herein.

D. The work shall include, but is not limited to the following:

1. Modernization of three (3) 5000 lbs. capacity machine room-less traction service elevators operating at 350 fpm.
2. Modernization of two (2) 3500 lbs. capacity machine room-less traction passenger elevator operating at 350 fpm, including the addition of one (1) new 3500 lbs. capacity machine room less traction passenger elevator operating at 350 fpm.

E. Intent

1. The following outlines the scope of work covered in this Section:
 - a. Modernize three (3) existing service elevators.
 - b. Modernize two (2) existing passenger elevators and add one (1) new passenger elevator to form a three (3) car group.
2. Related equipment shall be designed, constructed, installed and adjusted to produce the highest results with respect to smooth, quiet, convenient and efficient operation, durability, economy of maintenance, and the highest standard of safety.
3. It is not the intent of these specifications to detail the construction and design of all parts of the equipment, but it is expected that the type, materials, design,

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- quality of work and construction of each part shall be adequate for the service required, durable, properly coordinated with all other parts, and in accordance with the best commercial standards applicable and of the highest commercial efficiency possible.
4. Electric and magnetic circuits and related parts shall be of proper size, design and material to avoid heating and arcing, and all other objectionable effects which may reduce the efficiency of operation, economy of maintenance and/or net-useful life of the apparatus.
 5. Minimum requirements for design, materials, etc., are for certain parts of the equipment. Equivalent requirements approved by the Consultant shall apply to such parts as are of special design, construction or material and to which the specified requirements are not directly applicable. These minimum requirements as a whole shall be considered as establishing proportionate general minimum standards for all parts of the equipment.
 6. The Consultant may permit variations from the requirement of these specifications to permit use of the Contractor's standard equipment, provided such standard equipment is in every way adequate for the intended use and meets the full intent of these specifications. All such variations proposed by the manufacturer shall be called to the attention of the Consultant and shall only be made if approved in writing prior to the award of the contract.
 7. General requirements for design, materials and construction are intended primarily to apply to the heavy-duty and important parts of the equipment specifically mentioned and to other parts of similar duty and importance. Less important and light-duty parts may be of the standard design, materials and construction provided that, in the opinion of the Consultant, such standards are in accordance with the best commercial practice and are fully adequate for the purpose of use. All such variations shall be made only on the Consultant's written approval.
 8. All equipment and component parts installed, supplied or provided under this contract shall be manufactured and distributed by a third-party, non-installer company servicing the vertical transportation industry.
 - a. Apparatus shall conform to the design and construction standards referenced herein, and shall be rated the best commercial grade suitable for this application.
 - b. Equipment and component systems shall not employ any experimental devices or proprietary designs that could hamper and/or otherwise prohibit subsequent maintenance repairs or adjustments by all qualified contractors.
 - c. Manufacturers of the apparatus shall provide technical support and parts replacements for their equipment and component systems for a minimum of twenty (20) years, and issue such guarantee of support to the purchaser with written certification naming the final Owner of their product(s) to ensure the apparatus or systems remain maintainable regardless of who may be selected for future service.
 9. All equipment provided shall be factory and field tested with a history of design reliability and net-useful life established.

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- a. Contractor must be able to demonstrate the apparatus to be installed has been used successfully in a substantially similar manner under comparable conditions.
 - b. If the apparatus proposed differs substantially in construction, material composition, design, size, capacity, duty or other such rating from the equipment previously used for the same purpose by the manufacturer, the Consultant may reject the apparatus or require the vendor test and demonstrate the adequacy and suitability for this particular situation. Any necessary tests shall be performed at the sole expense of the Contractor with no prior guarantee of acceptance after the testing procedure.
10. The Contractor shall not use as part of the permanent equipment any experimental devices, proprietary design, components, construction of materials which have not been fully tried out in at least substantially similar or under comparable service, except as may be especially approved by the Consultant. If any important equipment or devices to be used on this installation differ substantially in construction, materials, design, size, capacity or duty from corresponding items previously used for the same purpose by the manufacturer, they shall pass such tests as the Consultant may require to fully show their adequacy and suitability. These tests shall be in addition to tests herein specified and shall be made at the expense of the Contractor.
 11. Certain design limitations, tests, etc., are herein specified as a partial check of the adequacy of design, construction and materials used. These requirements do not cover all features necessary to ensure satisfactory and approved operation, etc., of the equipment.
 12. It is understood, the entire system shall be designed, fabricated, modified and/or upgraded in full compliance with applicable local laws and code standards. The absence of a particular item or requirement shall not relieve the Contractor of the full and sole responsibility for such equipment, features and/or procedures.
 13. With the exception of only those items specifically identified as being performed by others, the Specifications are intended to include all engineering, material, labor, testing, and inspections needed to achieve work specified by the Contract Documents. Inasmuch as it is understood that any incidental work necessary to complete the project is also covered by the Specifications, bidders are cautioned to familiarize themselves with the existing job site conditions. Additional charges for material or labor shall not be permitted subsequent to execution of the Contract.
 14. Bidders must report discrepancies or ambiguities occurring in the Specifications to the Consultant for resolution prior to the bidding deadline, otherwise the Specifications shall be deemed acceptable in their existing form.

F. Related Sections

1. Division 01: Protecting hoistway during installation of equipment, LEED Reporting Form, Construction Waste Management, Sustainable Design Requirements, Indoor Air Quality Management, Volatile Organic Compound Limits.

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2. Division 03: Cutting and patching.
3. Division 03: Concrete pits and slabs.
4. Section 03 60 00: Grouting under hoistway door sills.
5. Section 05 12 00: Structural steel hoistway / machine frame.
6. Section 05 50 00: Access Ladders, smoke hole grating, railing and inspection platforms, intermediate support members, sump pit covers.
7. Section 09 60 00: Finished flooring.
8. Division 23: Ventilation of hoistways and control rooms in accordance with code requirements.
9. Division 26: Power feeders to starter panels through fused main line switches for new elevator. New main line disconnects on overhead area
10. Division 26: Branch circuits for new elevator through fused disconnects for car lights.
11. Division 26: Lights and GFI receptacles in overhead, and pit.
12. Division 26: Signal wiring to initiate emergency power operation.
13. Division 26: Modification to smoke detector system. Signal wiring from smoke detectors to a junction box in the machine room.
14. Division 26: Empty conduit runs for wiring required from hoistways to fire command center.
15. Division 26: Shunt trip devices to automatically disconnect the main power supply to the elevators prior to the activation of sprinkler system.
16. Division 27: Life safety system speakers and telephone communication wiring to a junction box in the control room for each elevator.
17. Division 27: Card reader and CCTV Systems, device and their interface with the elevator system.
18. Division 27: Telephone communications wiring terminated in a junction box located next to the controller.
19. Division 27: Ethernet connection in each control room and in location designated for EMIS system.

G. Abbreviations and Symbols

1. The following abbreviations, Associations, Institutions, and Societies may appear in the Project Manual or Contract Documents:

AHJ	Authority Having Jurisdiction
AIA	American Institute of Architects
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials

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AWS	American Welding Society
IBC	International Building Code
IEEE	Institute of Electrical and Electronics Engineers
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Agency
OSHA	Occupational Safety and Health Act

H. Codes and Ordinances / Regulatory Agencies

1. Work specified by the Contract Documents shall be performed in compliance with applicable Federal, State, and municipal codes and ordinances in effect at the time of Contract execution. Regulations of the Authority Having Jurisdiction shall be fulfilled by the Contractor and Subcontractors. The entire installation, when completed, shall conform with all applicable regulations set forth in the latest editions of:
 - a. Local and/or State laws applicable for logistical area of project work.
 - b. Building Code applicable to the AHJ.
 - c. Elevator Code applicable to the AHJ.
 - d. Safety Code for Elevators and Escalators, ASME A17.1 and all supplements as modified and adopted by the AHJ.
 - e. Safety Code for Elevators and Escalators, A17.1S supplement to A17.1 as modified and adopted by the AHJ for Machine Room Less installations (MRL).
 - f. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2.
 - g. Safety Code for Existing Elevators and Escalators, ASME A17.3 as modified and adopted by the AHJ.
 - h. Guide for emergency evacuation of passengers from elevators, ASME A17.4.
 - i. National Electrical Code (ANSI/NFPA 70).
 - j. Americans with Disabilities Act - Accessibility Guidelines for Building and Facilities and/or A117.1 Accessibility as may be applicable to the AHJ.
 - k. ASME A17.5/CSA-B44.1 - Elevator and escalator electrical equipment.
2. The Contractor shall advise the Owner's Representative of pending code changes that could be applicable to this project and provide quotations for compliance with related costs.

I. Reference Standards

1. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
2. ANSI/AWS D1.1 - Structural Welding Code, Steel.

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3. ANSI/NFPA 80 - Fire Doors and Windows.
4. ANSI/UL 10B - Fire Tests of Door Assemblies.
5. ANSI/IEEE - 519-Latest Edition
6. ANSI/IEEE - Guide for Surge Withstand Capability (SWC) Tests
7. ANSI Z97.1 - Laminated/Safety Tempered Glass

J. Definitions

1. Defective Work: Operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
2. Provide: Where used in this document, provide shall mean to install new device, apparatus, system, equipment or feature as specified in this document.
3. Definitions in ASME A17.1 as amended or modified by the AHJ apply to work of this Section.

1.3 PERMITS AND SUBMITTALS

A. Submittals

1. Comply with the requirements of Division 01.
2. Submit the following

a. Samples

Item No.	Quantity	Size	Description
S1	3	12" x 12"	Exposed finishes as requested by Architect
S2	1	Actual	Each fixture as requested by the Architect
S3	1	Actual	Mitered, corner construction of entrance frame

b. The samples shall be:

- 1) Held on site after inspection and used as a standard for acceptance or rejection of subsequent production units.
- 2) Labeled to identify their intended use and relation to the documents, e.g., car finishes, control panel, etc.
- 3) Returned to the elevator contractor at the completion of the project.

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Subject to approval, where an item of equipment is a standard item, copies of the manufacturer's catalogue or brochure may be accepted provided that all dimensions and relevant information are shown in the catalogue or brochure.

- c. Shop Drawings - Submit computer generated project specific layout drawings for approval. Include the following:
 - 1) A listing of all components, devices and sub-systems including:
 - a) Manufacturer and location of plant
 - b) Size and model number
 - 2) Project Specific Control Room Plan indicating:
 - a) Location of equipment and code clearances
 - b) Service connections and disconnect switches
 - 3) Fully dimensioned project specific hoistway plan and section of each unit indicating:
 - a) Platform (with cab), hoistway and entrance dimensions
 - b) All running clearances
 - c) Location of fixtures
 - d) Buffers, service ladders and pit reactions
 - e) Location of inserts
 - f) Rail Reactions
 - 4) Entrance details
 - 5) Project specific fixture details including hall lanterns, hall pushbutton stations, car operating panel, etc.
 - 6) MRL criteria including:
 - a) Location of machine and governor
 - b) Structural requirements and reactions
 - c) Clearances
 - d) Access requirements

3. Calculations

- a. Rail loads
- b. Pit and machine room reactions
- c. Heat emissions in machine room
- d. Electrical loads including, accelerating and running currents. Include all auxiliary loads.

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- e. Submit design calculations identifying seismic design forces and support capacities. Calculations shall be certified by a registered professional engineer.

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B. Measurements and Drawings

1. Drawings or measurements included with the bidding material shall be for the convenience of the bidders only and full responsibility for detailed dimensions lies with the Contractor.
2. In the execution of the work on the job, the Contractor shall verify all dimensions with the actual conditions.
3. Where the work of the Elevator Contractor is to join other trades, the shop drawings shall show the actual dimensions and the method of joining the work of the various trades.

C. Substitutions

1. Requests for substitutions will be considered under the following time limitations and situations:
 - a. Not less than ten (10) calendar days before bids are due.
 - b. Work or equipment specified becomes unavailable through unforeseen events such as strikes, loss of manufacturer's plant through fire, flood or bankruptcy.
2. Requested substitutions will be reviewed and adjudged. Failure of the Consultant to raise objection shall not constitute a waiver of any of the requirements of the Contract Documents.
3. Request for substitutions shall include complete data with drawings and samples as required, including the following:
 - a. Quality Comparison - Proposed substitution versus the specified product.
 - b. Changes required in other work because of the substitution.
 - c. Effect on the construction schedule.
 - d. Cost Data - Resulting from the proposed substitution versus the specified product. The Contractor shall certify that the cost data presented is complete and includes all related costs under this Contract.
4. When proposing a substitution, the Contractor represents that:
 - a. They have investigated the proposed substitution and have determined that it is equal to or better than the product specified.
 - b. They will guarantee the substitution in the same manner as the product specified.
 - c. They will coordinate and make other changes as required in the work as a result of the substitution.
 - d. They waive all claims for additional costs as a result of the substitution, with the exception of those identified above under "cost data".
5. The Consultant will be sole judge of the acceptability of the proposed substitution.
6. The Consultant will have authority to approve or reject substitutions or to change the specified standards of quality. However, neither this authority to

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act under this provision nor any decision made in good faith, either to exercise or not to exercise this authority, shall give rise to any duty or responsibility of the Consultant to the Contractor, any Subcontractor, any Sub-Subcontractor, any of their agents or employees or any other persons performing the work or offering to perform the work.

D. Changes in Scope and Extra Work

1. The Owner may at any time make changes in the specifications, plans and drawings, omit work, and require additional work to be performed by the Contractor.
 - a. Each such addition or deletion to the Contract shall require the Owner and the Contractor to negotiate a mutually acceptable adjustment in the contract price, and, for the Contractor to issue a change order describing the nature of the change and the amount of price adjustment.
 - b. The Contractor shall make no additions, changes, alterations or omissions or perform extra work except on written authorization of the Owner.
 - c. Each change order shall be executed by the Contractor, Owner, and the Consultant.

E. Keys

1. Upon the initial acceptance of work specified by the Contract Documents on each unit, the Contractor shall deliver to the Owner, six (6) keys for each general key-operated device that is provided under these specifications in accordance with ASME A17.1, Part 8 standards as may be adopted and modified by the AHJ.
2. All other keying of access or operation of equipment shall be provided in accordance with ASME A17.1 Part 8 as may be adopted and modified by the AHJ.

F. Diagnostic Tools

1. Prior to seeking final acceptance of the project, the Contractor shall deliver to the Owner any specialized tools required to perform diagnostic evaluations, adjustments, and/or programming changes on any microprocessor-based control equipment installed by the Contractor. All such tools shall become the property of the Owner.
 - a. Owner's diagnostic tools shall be configured to perform all levels of diagnostics, systems adjustment and software program changes which are available to the Contractor.
 - b. Owner's diagnostic tools that require periodic re-calibration and/or re-initiation shall be performed by the Contractor at no additional cost to the Owner for a period equal to the term of the maintenance agreement from the date of final acceptance of the project.

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- c. The Contractor shall provide a temporary replacement, at no additional cost to the Owner, during those intervals in which the Owner might find it necessary to surrender a diagnostic tool for re-calibration, re-initiation or repair.
 2. Contractor shall deliver to the Owner, printed instructions, access codes, passwords or other proprietary information necessary to interface with the microprocessor-control equipment.
- G. Wiring Diagrams, Operating Manuals and Maintenance Data
 1. Comply with the requirements of Division 01.
 2. Deliver to the Owner, four (4) identical volumes of printed information organized into neatly bound manuals prior to seeking final acceptance of the project.
 3. The manuals shall also be submitted in electronic format on non-volatile media, incorporating raw 'CAD' and/or Acrobat 'PDF' file formats.
 4. Manuals, as well as electronic copies, shall contain the following:
 - a. Step-by-step adjusting, programming and troubleshooting procedures that pertain to the solid-state microprocessor-control and motor drive equipment.
 - b. Passwords or identification codes required to gain access to each software program in order to perform diagnostics or program changes.
 - c. A composite listing of the individual settings chosen for variable software parameters stored in the software programs of both the motion and dispatch controllers.
 - d. Method of control and operation.
 5. Provide four (4) sets of "AS INSTALLED" straight-line wiring diagrams in both hard and electronic format in accordance with the following requirements:
 - a. Displaying name and symbol of each relay, switch or other electrical component utilized including identification of each wiring terminal.
 - b. Electrical circuits depicted shall include all those which are hard wired in both the machine room and hoistway.
 - c. Supplemental wiring changes performed in the field shall be incorporated into the diagrams in order to accurately replicate the completed installation.
 6. Furnish four (4) bound instructions and recommendations for maintenance, with special reference to lubrication and lubricants.
 7. Manuals or photographs showing controller repair parts with part numbers listed.
- H. Training

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1. Prior to seeking final acceptance of the project, the Contractor shall conduct an eight-hour training program on-site with building personnel selected by the Owner.
2. The focus of the session shall include:
 - a. Instructions on proper safety procedures to utilize in assisting passengers that may become entrapped inside an elevator car.
 - b. Explain each control feature and its correct sequence of operation.
3. Control features covered shall include but, not be limited to:
 - a. Independent Service Operation.
 - b. Attendant Service Operation.
 - c. Emergency Fire Recall Operation - Phase I
 - d. Emergency In-car Operation - Phase II.
 - e. Emergency Power Operation.
 - f. Emergency Communications Equipment.
 - g. Hospital Emergency Service.
 - h. Emergency Priority Service Operation.
 - i. Interactive Systems Management.
 - j. Remote Monitoring/Controls.
 - k. Emergency Hoistway Access and Rescue Features.

I. Patents

1. Patent licenses which may be required to perform work specified by the Contract Documents shall be obtained by the Contractor at its own expense.
2. The Contractor agrees to defend and save harmless the Owner, Consultant and agents, servants, and employees thereof from any liability resulting from the manufacture or use of any patented invention, process or article of appliance in performing work specified in the Contract Documents.

J. Advertising

1. Advertising privileges shall be retained by the Owner.
2. It shall be the responsibility of the Contractor to keep the job site free of posters, signs, and/or decorations.
3. Contractor's logo shall not appear on faceplates or entrance sills without the approval of the Owner.

1.4 QUALITY ASSURANCE

A. Materials and Quality of Work

1. All materials are to be new and of the best quality of the kind specified.
2. Installation of such materials shall be accomplished in a neat manner and be of the highest quality.

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- a. Should the Contractor receive written notification from the Owner stating the presence of inferior, improper, or unsound materials or quality of installation, the Contractor shall, within twenty-four (24) hours, remove such work or materials and make good all other work or materials damaged.
- b. Should the Owner permit said work or materials to remain, the Owner shall be allowed the difference in value or shall, at its election, have the right to have said work or materials repaired or replaced as well as the damage caused thereby, at the expense of the Contractor, at any time within one (1) year after the completion of the work; and neither payment made to the Contractor, nor any other acts of the Owner shall be construed as evidence of acceptance and waiver.

B. Materials, Painting and Finishes

1. Two (2) coats of rust inhibiting machinery enamel shall be applied to exposed ferrous metal surfaces in the pit that do not have a galvanized, anodized, baked enamel, or special architectural finishes.
2. Two (2) coats of rust inhibiting enamel paint to the machinery located within the machine room and secondary level (where applicable) as well as to the machine room floors.
3. Architectural metal surfaces of bronze or similar non-ferrous materials which are specified to be refinished, re clad and/or provided new, shall be sufficiently clear coated so as to resist tarnishing during normal usage for a period of not less than twelve (12) months after final acceptance by the Owner.
4. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalomania or stencil type.
5. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by Code at intervals not exceeding 7'-0". The color of paint used shall contrast with the color of the surface to which it is applied.

C. Accessibility Requirements

1. Locate door reopening devices at 5" and 29" above the finish floor when individual contact projection apparatus is employed.
2. Locate the alarm button and emergency stop switch at 35", and floor and control buttons not more than 48" above the finished floor. The alarm button shall illuminate when pressed for visual acknowledgement to user.
3. Provide raised markings in the panel to the left of the car call and other control buttons. Letters and numbers shall be a minimum of 5/8" and raised .03" and shall be in contrasting color to the call buttons and cover plate.
4. The centerline of existing hall push button shall be 42" to 48" above the finished floor.
5. The centerline of new hall push button shall be 42" above the finished floor.

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6. The hall arrival lanterns or cab direction lantern provided shall sound once for the "up" direction and twice for the "down" direction. Design and locate fixtures per Federal standards.
7. Provide floor designations at each entrance on both sides of jamb at a height of 60" above the floor.
8. Provide an audible signal within the elevator to tell passenger that the car is stopping or passing a floor served by the elevator.
9. Where elevators operate at a speed greater than 200 fpm, provide a verbal annunciator to announce the floor at which the elevator is stopping where required by the AHJ.
10. Provide signal control timing for passenger entry/exit transitions per Federal and/or Local standards.
11. Ensure sill-to-sill running clearances do not exceed 1-1/4" at all landings served.
12. Provide visual call acknowledgment signal for car emergency intercommunication device.

D. Qualifications

1. The work shall be performed by a company specialized in the business of manufacturing, installing and servicing conveying systems of the type and character required by these specifications with a minimum of ten (10) years experience.
2. Prior written acceptance is required for manufacturers other than those listed, before quoting this project. Requests for acceptance will not be considered unless they are submitted before bid date and are accompanied by the following information:
 - a. List of five (5) similar installations having exact equipment being proposed for this project arranged to show name of project, system description and date of completed installation. The list shall include the names, position and resumes of the construction team and field supervisor of the installations.
 - b. Complete literature, performance and technical data describing the proposed equipment. Include the names, position and resumes of the proposed construction team and field supervisor.
 - c. List of ten (10) service accounts by building name, building manager or owner, including phone numbers.
 - d. Location of closest service office from which conveying system will be maintained.
 - e. Location of closest parts inventory for this installation.
 - f. List of the names, positions and resumes of the construction teams and field supervisor for the installation.

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1.5 DELIVERY / STORAGE / HANDLING / COORDINATION

A. Delivery and Storage of Material and Tools

1. Comply with the requirements of Division 01.
2. Delivery, Storage and Handling:
 - a. Deliver materials to the site ready for use in the accepted manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name and manufacturer's name. Delivered materials shall be identical to accepted samples.
 - b. Store materials under cover in a dry and clean location, off the ground.
 - c. Remove delivered materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.
3. The Owner shall bear no responsibility for the materials, equipment or tools of the Contractor and shall not be liable for any loss thereof or damage thereto.
4. The Contractor shall confine storage of materials on the job site to the limits and locations designated by the Owner and shall not unnecessarily encumber the premises or overload any portion with materials to a greater extent than the structural design load of the Facility.

B. Work with Other Trades / Coordination

1. Coordinate installation of sleeves, block outs, equipment with integral anchors, and other items that are embedded in concrete or masonry for the applicable equipment. Furnish templates, sleeves, equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
2. Coordinate sequence of installation with other work to avoid delaying the Work.
3. Coordinate locations and dimensions of other work relating to the equipment scheduled for installation including pit ladders, sumps, and floor drains in pits; entrance subsills; machine beams; and electrical service, electrical outlets, lights, and switches in pits and machine rooms, secondary levels, overhead sheave rooms and hoistways as it relates to the specific equipment.

C. Removal of Rubbish and Existing Equipment

1. On a scheduled basis, the Contractor shall remove all rubbish generated in performing work specified in the Contract Documents from the job site.
2. Any component of the existing elevator plant that is not reused under the scope of work specified in the Contract Documents shall become property of the Contractor and, as such, shall be removed from the premises at the Contractor's sole expense.
3. The Contractor agrees to dispose of the aforementioned equipment and rubbish in accordance with any and all applicable Federal, State, and municipal environmental regulations, and further accepts all liability that may result from handling and/or disposing of said material.

D. Protection of Work and Property

1. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the Owner's property from injury or loss arising out of this contract.
2. The Contractor shall make good any such damages, injury or loss, except such as may be directly caused by agents or employees of the Owner.
3. The Contractor shall provide all barricades required to protect open hoistways or shafts per OSHA regulations. Such protection shall include any necessary guards or other barricades for employee protections during and after the modernization procedure.

1.6 WARRANTY / MAINTENANCE SERVICES

A. Contract Close-Out, Guarantee and Warranties

1. Comply with the requirements of Division 01.
2. Guarantee and Warranties:
 - a. Warrant the equipment installed under these specifications against defects in material and quality of installation and correct any defects not due to ordinary wear and tear or improper use of car which may develop within one year from the date each unit is completed and placed in permanent operation and accepted by the Owner.
 - b. This warrantee shall be written and issued at the completion of each unit prior to final payment.

B. Maintenance

1. Interim Maintenance: Provide full protective maintenance on the units that are completed and accepted by the AHJ and that may be put in service prior to the overall project completion. The maintenance service shall be as hereinafter specified under the Full Protective Maintenance Service in "3" below and include all code mandated safety and local law tests and inspections that may come due while on this service.
 - a. The price quoted shall be on a per unit per month basis.
2. Warranty Maintenance: Provide full protective maintenance on the specified equipment for a period of twelve (12) months from the date of final acceptance of the entire installation as specified under the Full Protective Maintenance Service in "3" below.
 - a. The price for this service shall be included in the base price or as otherwise specified in the contract documents.
3. Full Protective Maintenance Service: Submit a separate price for a Full Protective Maintenance Service for the specified units based on a five (5) year

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contract. The price shall be submitted on the company's own form but shall include all requirements as specified hereinafter. Note: All maintenance shall comply with Part 8 of the ASME A17.1 Code and modified or amended by the Authority Having Jurisdiction.

- a. Maintenance work shall be performed by trained personnel directly employed and supervised by the service contractor.
- b. Perform scheduled maintenance work and repairs during the regular working hours of regular working days of the trade. All work shall be coordinated with the Building Manager.

C. Alternates

1. Value Engineering Alternate

- a. It is understood that the base specification reflects minimum standards. The above Value Engineering Alternate allows individual contractors to suggest special performance criteria which may be of interest to the Owner and may reflect a degree of quality above the requirements of the base specification.
- b. Voluntary alternate prices may be acceptable as a deviation from, not a substitution for, the basis of bid work of this bid package.
- c. In order to submit a voluntary alternate, the following must be provided at the time of the bid.
 - 1) A complete bid reflecting the requirements of the base specification.
 - 2) All alternates must be accompanied with pertinent data, technical documentation and reference/installation for review.
 - 3) Along with the pricing for voluntary alternates submit the maintenance prices for each.

PART 2 - PRODUCTS

2.1 ELEVATORS

A. Service Elevators 30, 31, 32

1.	Quantity	Three (3)
2.	Type	Machine-room-less service
3.	Capacity (lbs)	5000
4.	Speed (fpm)	350
5.	Travel in Feet	Refer to Architectural Drawings
6.	Roping/Ropes	2:1
7.	Number of Landings	Cars 30, 31: Six (6) existing, five (5) new Car 32: Seven (7) existing, four (4) new
8.	Number of Openings	Same as landings
9.	Front Openings	Cars 30, 31: Six (6) existing at floors SB, B, 1-4, five (5) new at floors 5-7, ROOF, HELIPAD Car 32: Seven (7) existing at floors SB, B, 1-5, four (4) new at floors 6, 7, ROOF, HELIPAD
10.	Rear Openings	None
11.	Operation	Group automatic
12.	Control	Variable voltage variable frequency
13.	Fireman's Control	Phase I and II
14.	Emergency Hospital Service	Required
15.	Priority Evacuation Service	Required
16.	Number of Push Button Risers	Retain existing, provide new stations at new floors served
17.	Platform Size	Retain existing
18.	Guide Rails	Steel tees, retain existing. Provide new sections for additional travel
19.	Buffers	Oil, retain existing
20.	Car Door Size	4'-6" wide x 7'-0" high, provide new
21.	Hoistway Door Size	Same as car door. Retain at existing floors, provide new for new floors served
22.	Door Operation	Two speed side opening
23.	Machine Type	New Gearless PM
24.	Counterweight Safety	Not Required
25.	Compensation	Encapsulated Chain
26.	Power Supply	Field Verify
27.	CCTV and Card Reader	By Others

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28.	CCTV and Reader Cable	Required
29.	PA Speaker	By Others
30.	PA Cable	Required
31.	Entrances	Retain at existing floors, provide new brushed stainless steel at new floors served
32.	Landing Fixture	Brushed stainless steel
33.	Landing Sills	Retain at existing floors, provide extruded aluminum at new floors
34.	Car and Landing Call Buttons	Round stainless steel with concealed fasteners and LED call acknowledging lights.
35.	Car Operating Fixtures	New car operating panel in swing front returns, cast metal designation markings, flush stud mounted. LED car position indicators.
36.	Communication	Intercom with a station in each car, a master station in each machine room and a master station in each remote monitoring panel.
37.	Door Protective Device	Retain existing.
38.	Emergency Light Fixture	Two cab light fixtures will be arranged to operate as an emergency light fixture for at least 2 hours.
39.	Car Fan	Retain existing
40.	Cab Enclosure	Retain existing and modify for installation of new return panels
41.	EMIS System	Required
42.	Fire Command Panel	Required
 B. Passenger Elevators 33, 34		
1.	Quantity	Two (2)
2.	Type	Machine-room-less Passenger
3.	Capacity (lbs)	3500
4.	Speed (fpm)	350
5.	Travel in Feet	Refer to Architectural Drawings
6.	Roping/Ropes	2:1
7.	Number of Landings	Five (5) existing, two (2) additional new
8.	Number of Openings	Same as landings
9.	Front Openings	Five (5) existing at floors B, 1-4, two new landings at floors 6, 7
10.	Rear Openings	None
11.	Operation	Group automatic w/new passenger elevator
12.	Control	Variable voltage variable frequency
13.	Fireman's Control	Phase I and II
14.	Emergency Hospital Service	Required

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15.	Priority Evacuation Service	Required
16.	Number of Push Button Risers	Retain existing, provide new stations at new floors served
17.	Platform Size	Retain existing
18.	Guide Rails	Steel tees, retain existing. Provide new sections/brackets for additional travel.
19.	Buffers	Oil, retain existing
20.	Car Door Size	3'-6" wide x 7'-0" high, provide new
21.	Hoistway Door Size	Same as car door, provide new at new floors served
22.	Door Operation	Single speed center opening
23.	Machine Type	Gearless PM
24.	Counterweight Safety	Not Required
25.	Compensation	Not required
26.	Power Supply	Field verify
27.	CCTV and Card Reader	By Others
28.	CCTV and Reader Cable	Required
29.	PA Speaker	By Others
30.	PA Cable	Required
31.	Entrances	Retain at existing floors, provide new brushed stainless steel at new floors served
32.	Landing Fixture	Brushed stainless steel
	a. Landing Sills	Retain at existing floors, provide extruded aluminum at new floors
	b. Car and Landing Call Buttons	Round stainless steel with concealed fasteners and LED call acknowledging lights.
33.	Car Operating Fixtures	New car operating panel in swing front returns, cast metal designation markings, flush stud mounted. LED car position indicators.
34.	Communication	Intercom with a station in each car, a master station in each machine room and a master station in each remote monitoring panel.
35.	Door Protective Device	Retain existing.
36.	Emergency Light Fixture	Two cab light fixtures will be arranged to operate as an emergency light fixture for at least 2 hours.
37.	Car Fan	Retain existing
38.	Cab Enclosure	Retain existing and modify for installation of new return panels
39.	Entrances	Retain at existing floors, provide new brushed stainless steel at new floors served
40.	Landing Fixtures	Brushed stainless steel
41.	EMIS System	Required

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42. Fire Command Panel Required

C. New Passenger Elevator 35

43.	Quantity	One (1)
44.	Type	Machine-room-less Passenger
45.	Capacity (lbs)	3500
46.	Speed (fpm)	350
47.	Travel in Feet	Refer to Architectural Drawings
48.	Roping/Ropes	2:1
49.	Number of Landings	Seven (7)
50.	Number of Openings	Same as landings
51.	Front Openings	At floors B, 1-4, 6, 7
52.	Rear Openings	None
53.	Operation	Group automatic w/existing passenger elevators 33, 34
54.	Control	Variable voltage variable frequency
55.	Fireman's Control	Phase I and II
56.	Emergency Hospital Service	Required
57.	Priority Evacuation Service	Required
58.	Number of Push Button Risers	Retain existing, provide new stations at new floors served
59.	Platform Size	7'-0" wide x 6'-2" deep approximately
60.	Guide Rails	Steel tees.
61.	Buffers	Oil.
62.	Car Door Size	3'-6" wide x 7'-0" high
63.	Hoistway Door Size	Same as car door
64.	Door Operation	Single speed center opening
65.	Machine Type	Gearless PM
66.	Counterweight Safety	Not Required
67.	Compensation	Not required
68.	Power Supply	Field verify
69.	CCTV and Card Reader	By Others
70.	CCTV and Reader Cable	Required
71.	PA Speaker	By Others
72.	PA Cable	Required
73.	Entrances	Brushed stainless steel at all floors served
74.	Landing Fixture	Brushed stainless steel
	c. Landing Sills	Provide extruded aluminum at new floors
	d. Car and Landing Call Buttons	Round stainless steel with concealed fasteners and LED call acknowledging lights.
75.	Car Operating Fixtures	Car operating panel in swing front returns, cast metal designation markings, flush stud mounted. LED car position indicators.

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76.	Communication	Intercom with a station in each car, a master station in each machine room and a master station in each remote monitoring panel.
77.	Door Protective Device	Full height infra red door screens
78.	Emergency Light Fixture	Two cab light fixtures will be arranged to operate as an emergency light fixture for at least 2 hours.
79.	Car Fan	2 speed fan
80.	Cab Enclosure	Provide new to match existing elevators 33, 34
81.	Entrances	Provide new brushed stainless steel at new floors served
82.	Landing Fixtures	Brushed stainless steel
83.	EMIS System	Required
84.	Fire Command Panel	Required

2.2 MANUFACTURERS

A. Pre-Approved Equipment Manufacturers

1. The following manufacturer's equipment and materials have been pre-approved for use on this project.
2. Other equipment not specifically mentioned shall be considered for approval on an individual basis.
3. Certain Original Equipment Manufacturers equipment is acceptable unless otherwise specified.
 - a. Machine Room Less Elevators - Otis GEN2 Oversluing
 - b. Controller - Otis
 - c. Tracks, Hangers, Otis
 - d. Door Protective Device - Janus, Adams, G.A.L., T.L. Jones, Tri-Tronics.
 - e. Cabs and Entrances/Entrance Door Panels - Otis, EDI/ECI, National Cab & Door, Tyler, Gunderlin, Columbia Elevator Products.
 - f. Machines - Otis.
 - g. Motors - Otis.
 - h. VVVF Power Drives - Mitsubishi, MagneTek, Yaskawa, TorqMax.
 - i. Guide Rails - AFD Industries, Savera, Monteferro.
 - j. Electrical Traveling Cables - Draka, James Monroe
 - k. Guide Shoes/Rollers - Otis.
 - l. Suspension Means - Otis.
 - m. Intercommunications/Telephones - Webb Electronics, K-Tec, Ring, Wurtec, Janus, approved equal.
4. Original Equipment Manufacturers may substitute their own branded equipment subject to the following:

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- a. All requirements of the specifications are met regarding performance, appearance, serviceability and support.
- b. A full stock of all regular and critical replacement parts required for this project are maintained at a facility within fifty (50) miles of the project site.
 - 1) Any parts not stocked at the above referenced facility shall be identified with the location of the nearest source and shall be available for next-day delivery upon demand.
- c. All parts and software shall be made available for purchase to a qualified elevator maintenance firm with one-business day delivery without direct Owner involvement.
 - 1) Provide details of parts supply facility and a list of current parts pricing for all major components required for the installation.
- d. All specialized tools, equipment, software, and passwords, required to maintain, repair, adjust the operation, and perform code mandated inspections are provided to the Owner as part of the base installation.
 - 1) Updates to these items shall be available via the parts supply facility referenced above.
- e. Technical support of the product(s) shall be available to the Owner's elevator service provider.

2.3 CONTROL FEATURES / OPERATION

A. Cross Cancellation (Passenger Elevators)

1. A temporary dispatch signal control interface shall be provided during the interim modernization period between the existing dispatching control panel and the new microprocessor supervisory control system.
2. The overlay interface shall allow either system to cross cancel corridor calls registered in both systems and maintain an acceptable level of group dispatching operations.
3. The existing equipment that is retained on a temporary basis shall undergo a complete maintenance restoration to ensure improved reliability and performance during the primary work implementation period.

B. Motion Control

1. Smooth stepless acceleration and deceleration of the elevator car shall be provided in either direction of travel during both single and multiple floor runs.
2. Use digital logic to calculate optimum acceleration and deceleration patterns during each run.

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- a. The amplitude of acceleration and deceleration shall not exceed 2.6 - 2.8 ft./sec² for geared and MRL traction, and 3.5 - 4 ft./sec² for gearless traction elevators.
 - b. The maximum jerk rate shall be 1.5 to 2.0 times the acceleration and deceleration.
 - c. The maximum velocity which the elevator achieves in either direction of travel while operating under load conditions that vary between empty car and full rated load shall be within $\pm 3\%$ of the rated speed.
 3. Floor leveling accuracy of $\pm 1/4"$ as measured between the car entrance threshold and the landing sill on any given floor shall be provided.
 - a. This accuracy standard shall be maintained under varying load conditions and without need for releveling corrections caused by overshooting or stopping short of the floor.
 4. Elapsed flight time during a typical elevator one floor run shall not exceed values as further specified.
 - a. Timing, as measured between the moment door closing operations begin and when the doors are 3/4 open at the next adjacent floor, shall remain consistent under varying load conditions in either direction of travel.
- C. Automatic Group Operation / Conventional Dispatch
1. Provide a microprocessor based group supervisory control system for the operation of the elevators.
 2. Elevators shall be arranged to operate with or without attendants as an automatic group.
 - a. The group shall remain capable of sustaining balanced service and continuing operation with one or more cars removed from the system.
 - b. Elevators shall operate from pushbutton panels located inside each car and from a riser or corridor pushbutton fixtures located on each landing served.
 3. Elevators shall automatically travel to landings for which a call demand exists.
 - a. Stops in response to calls that are registered at either the car or hall push button stations shall occur in the natural order of progression in which the floors are encountered, depending on the direction of car travel, and irrespective of the order in which calls are registered.
 4. Call acknowledgment lights provided in both the car and hall push button fixtures shall become extinguished as the car responding to a particular call begins its slowdown approach to the corresponding landing.
 5. In the event no demand for elevator service exists, the first car to satisfy its assigned calls shall be dispatched to park at the main landing.

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- a. In the event additional cars should also complete their call assignments, those cars shall be individually dispatched to previously designated parking floors.
 - b. Parking assignments shall be accomplished without door operation.
 - c. Should the elevator parked at the main landing receive a call assignment, another free car in the group shall immediately assume that parking assignment.
 - d. The number of elevators assigned to park at any particular landing shall be programmable.
6. The group supervisory controller shall, through a dispatching algorithm along with artificial intelligence parameters, continuously scan the system in order to determine the load each car is transporting and to monitor the number of corridor calls registered, the duration of each call, and the intended direction of travel, the number of loaded lifts, etc.
 - a. Based upon that data, the supervisory system shall automatically devise a strategy for call assignment with preference given to calls registered in the following order:
 - 1) lobby demand
 - 2) long waiting times - down
 - 3) long waiting times - up
 - 4) up calls
 - b. Long wait calls shall be considered those which have remained unanswered for at least forty (40) seconds. The long wait call threshold time shall be programmable.
7. If a car with no car calls arrives at a landing where both up and down hall calls are registered, it will answer the call in the direction of travel.
 - a. If no car call is registered, the car shall be assigned to respond to the call registered for opposite direction.
 - b. The doors shall close and immediately re-open when responding to this call.
 - c. Hall lantern operation shall always correspond to direction of service.
8. In the event that any car is delayed for more than a predetermined time interval after it received a start signal, the system shall automatically permit the remaining cars in the group to respond to signals and be dispatched in the specified manner.
9. In the event the group dispatching or supervisory system should malfunction so that elevators are not assigned to calls within a predetermined interval and in accordance with the conditions of the operating strategy in effect, the system shall automatically assume a back-up mode of operation whereby the elevators shall be arranged to provide continuous service to each landing in a predetermined pattern without regard to actual corridor demand.

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- a. Failure of the automatic dispatching system will be indicated by an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.
 10. In the event of failure of the landing call button circuit, provide a means to enable the elevators to service each floor without registration of a call within the elevators.
 - a. When emergency operation is in effect, provide an illuminated signal in the Lobby Elevator Control Panel or Elevator Information and Management System where applicable.
 11. When a car arrives at its last stop and reverses direction of travel, all previously registered car calls shall be automatically cancelled.
 12. When a car has responded to the highest or lowest call, and hall calls are registered for the opposite direction, the car shall reverse direction automatically and respond to those registered calls.
 13. When an empty car reverses direction at a landing with no hall calls, doors shall not open and the hall lantern shall not operate.
 14. Main Lobby Operation:
 - a. Only the "Next" designated car shall have its hall lantern illuminated and its doors open.
 - b. When a "down" traveling car which is not designated "Next" arrives at the main lobby with a lobby car call registered, it will open its door to discharge the passengers, close the doors, and shall not illuminate its lantern.
 - c. When a "down" traveling car with no car calls arrives at the main lobby and is not designated "Next", it shall park without opening its doors.
 15. Coincident Calls:
 - a. The dispatching system shall be designed with a 20 second parameter whereby an elevator with a car call will receive priority to answer a corresponding corridor call if it can do so within 20 seconds.
 - b. If the elevator cannot answer the call within the prescribed time, the first available car shall be assigned.
 - c. A continuous reassessment of calls shall be made.
- D. Independent Service Operation
1. The car operating station shall be equipped with a key-operated switch labeled "IND SER".
 2. Locate the switch in the locked access compartment.
 3. When placed in the "on" position the following shall occur:
 - a. Group elevator - the elevator shall bypass corridor calls and travel directly to any floor chosen by registration of a car call. Hall calls shall remain registered for service by another elevator in the group.

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4. During Independent Service Operation, the elevator doors shall remain open at any landing until the door close or a car call push button is pressed and maintained until the doors are fully closed.
5. If more than one (1) car call is registered, all registered car calls shall extinguish when the elevator stops in response to the first call.
6. Fire Emergency Recall shall automatically override Independent Service Operation and engage Phase I - Fire Emergency Recall Operation following a period of approximately forty-five (45) seconds.

E. Inspection Service Operation

1. Provide a key operated switch in the main car operating panel that, when turned to the 'ON' position, shall cause the elevator to be removed from service and placed in Inspection Service Operation.
2. Limited operation of the car shall be provided through pressing the Attendant Service up and down push buttons (if provided) or the highest or lowest car call push buttons (if up and down buttons are not provided) in the main car operating panel only.
3. The car shall move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with both the hall and car door panels in the closed and locked position.
4. The Inspection Service switch shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. The top of the elevator car shall be equipped with a control for limited operation of the car during repairs, maintenance and inspection conducted in the hoistway. The transfer of control to the top of car operating device shall cause that device to be the sole means of control for the elevator.
 - a. Visual and audible indication shall be provided on the top of the car when Firefighters' Emergency Operation is initiated.
6. Power door operating equipment shall be rendered inoperative while the car is being operated in the Inspection Service mode with the exception of power closing of the door. The control system shall maintain closing power on the door while the elevator is moving under Inspection Service Operation.
7. The in-car Inspection Service switch shall be rendered ineffective when the top of car inspection control is activated.
8. Machine Room Inspection Operation and Inspection Operation with open door circuits shall be provided in accordance with A17.1 Safety Code, as modified and adopted, where required or allowed by the AHJ.

F. Hoistway Access Operation

1. Provisions shall be made to allow access to the hoistway through the use of hoistway access switches.
2. Operating the access switch shall permit the car to move at a speed not to exceed 150 feet per minute (0.75 meters per second) as per code with the hall

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and car doors in the open position to obtain access to the top of the car or climb-in pit.

3. The car shall automatically stop motion when the car top is level with the hoistway door sill for access to top of car.
4. The access key switch(es) shall be keyed differently than other typical keys used in the operation of the elevator. Keying shall be in accordance with Security Group Classifications as required by applicable code.
5. Access operation shall be disabled when top of car inspection operation is in effect.

G. Load Weighing Operation

1. A positive means shall be provided to continuously monitor the amount of load being transported by the elevator car.
2. The system shall be used to;
 - a. Preload static motor drives
 - b. Activate control features that include:
 - 1) anti-nuisance operation
 - 2) load dispatch operation
 - 3) load dependent non-stop operation where applicable.
3. The anti-nuisance feature shall operate at loads not exceeding 200 lbs., whereas load dispatch and load non-stop shall be set to function at 65% of the rated loading capacity for the initial set up and adjustment procedure.

H. Anti-Nuisance Operation

1. In the event car loading is not commensurate with the number of car calls registered, all car calls shall be canceled.
 - a. The system shall monitor the door protection device to determine if passenger transfer has occurred.
 - b. If after the third stop a passenger transfer has not occurred, the system shall cancel all remaining registered car calls and respond to assigned hall call demand.
 - c. The number of calls registered with no passenger transfer that will trigger anti-nuisance shall be adjustable and initially set to 3 calls.

I. Firefighters' Emergency Operation

1. Phase I Emergency Recall Operation shall be provided for each car in accordance with ASME A17.1 code as modified under the applicable local or State law.
2. Each main or auxiliary car operating station shall be provided with an indicator light and warning buzzer, each of which shall become activated whenever Phase I Operation is engaged.

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- a. The warning buzzer shall cease to function once the car has completed the recall sequence and is positioned at the designated recall landing.
 - b. The indicator light shall remain illuminated as long as Phase I Operation is activated.
 3. A three-position, key-operated switch shall be provided on the designated recall landing to manually activate Phase I Operation.
 - a. When activated, Phase I Operation shall be arranged so that in order to reset normal service, all cars must first be returned to the designated recall landing, after which the Phase I key-switch must be turned to the "OFF" position.
 4. A standardized Fire Recall Key shall be used where required by the codes and standards applicable to the AHJ.
 5. Phase II Emergency Recall In-Car Operation shall be provided for each car in accordance with ASME A17.1 code as modified under local or State law.
 6. Locate controls required for Phase II In-Car Operation in a locked access cabinet in the main car operating panel.
 - a. The cover of the locked access panel shall be engraved as required by local or State law.
 - b. The locked access panel shall contain:
 - 1) Phase II key switch.
 - 2) Fire indicator light.
 - 3) Call cancel push button.
 - 4) Door open push button.
 - 5) Door close push button.
 - 6) Run/Stop switch.
 - 7) Other devices as may be required by local law.
 - c. Engrave the Firefighters' Service operating Instructions on the inside of the locked cabinet door.
- J. Emergency Power Operation / All Elevators Operational
 1. Upon loss of normal power, and establishing of emergency power, all elevators shall automatically resume normal operation.
 - a. Elevators shall start sequentially so as to prevent overloading of the emergency power system.
 - b. Sequential transformer connection operation shall be employed where necessary to reduce half-cycle inrush currents.
 2. An illuminated signal marked "ELEVATOR EMERGENCY POWER" shall be provided in the elevator lobby at the designated level to indicate that the normal power supply has failed and the emergency power is in effect.

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3. Prior to return to normal power, the building ATS shall provide a "pre-transfer" signal to the elevator equipment that will initiate the landing of elevators prior to transfer from emergency power to normal power.
 - a. Timer of the pre-transfer signal shall be adjustable from 15 to 30 seconds.
 4. The following additional requirements apply:
 - a. Firefighters' Service Operation, if in effect, will remain active at all times during emergency power operation.
 - b. Car lighting will remain active with car lighting on separate emergency power feeders in addition to battery back-up.
 - c. Communications will remain active at all times on emergency power feeders in addition to battery back-up.
 - d. Remote monitoring, where provided, will be active from each group dispatcher for selected elevators using an uninterrupted power supply (UPS) to maintain the central processing unit during power transfers.
 - e. Position indicator for each elevator will be active in the selected elevator and security room (where applicable), as well as lobby display panels.
 5. Testing of elevators under emergency power shall be accomplished with the building ATS providing necessary "pre-transfer" signals to the elevator control apparatus.
 - a. Prior to testing, the building ATS shall provide a "pre-transfer" signal to initiate the landing of the elevators prior to the transfer from normal to emergency power.
 - b. After testing, the building ATS shall provide a "pre-transfer" signal to initiate the landing of the elevators prior to the transfer from emergency to normal power.
- K. Elevator Safety Requirements for Seismic Zone 2
1. Guarding of equipment, machine supports, guide rail systems, the design of counterweight car frame and platform, safeties and signaling devices shall meet the requirements of ASME A17.1 as may be modified by the AHJ.
 2. Guide rails, guide rail supports and their fastenings shall meet requirements for the seismic zone.
- L. Floor Lockout Feature - Card Reader Control / Wiring Provisions
1. Wiring: Provide six (6) pair of 20 gauge two (2) flexible conductor low voltage cables with an overall braided shield in the traveling cable of all elevators for card reader interface.
 - a. The cables shall extend from the security interface terminal cabinet in the elevator machine room to behind the elevator return panel above the space allotted for the card reader.
 - b. Terminate the cable to dual screw barrier terminal strips on each end.

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2. Card Reader Space: Allocate card reader space in each main car station as directed by the Architect.
3. Interface: For floor programmable card access control in all elevators, provide a pair of terminals for all floors such that application of a momentary dry (no voltage present) contact closure across those terminals by the security system shall enable the selection of the corresponding floor from the floor selector button in the elevator cab.
 - a. Locate the terminals inside an interface terminal cabinet in the elevator machine room.
 - b. Provide all relays required to interface the elevator control system to the momentary dry contact closures provided for under another section of these specifications.
 - c. If applicable, the card reader shall be operable and compatible with the issued card keys used building wide.
 - d. Coordinate system requirements with the manufacturer of the issued card key system.
4. Card Reader "Secure/Bypass" Switch: Provide separate card reader control bypass key switches for each elevator.
 - a. The bypass key switches shall be located in the Director's Control Panel.
 - b. The bypass key switches shall be a maintained contact type key switch with the key removable in the secure or bypass position.
 - 1) When the key switch is in the secure position, the card reader control mode shall be initiated.
 - 2) When in the bypass position, the card reader control mode shall be bypassed and the elevator shall return to normal operation, permitting free access to any floor.
5. The card reader operation shall bypass floor cut-out switches.
6. Firefighters' Service Operation shall override Floor Lockout Feature.

M. Hospital Emergency Service Operation

1. Activation of any individual corridor hospital emergency service operation key switch shall remove the car from automatic group operation for immediate response to the emergency demand floor.
2. An emergency demand shall cancel or override all registered car calls for this elevator unless the system is functioning under fire emergency control operations, attendant service or independent service.
3. When "Hospital Emergency Service" is activated while this elevator is operating under a special mode as specified above, the "in-car" audible and visible signals shall alert the operator to place the car back in automatic mode for immediate response.
4. Upon arrival at an emergency activated floor, the elevator shall remain parked for an adjustable timed period of one (1) to five (5) minutes or until the "in-

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car" emergency switch is activated for emergency service independent operation.

5. The elevator shall remain on emergency independent service until the "in-car" switch is returned to the normal operating mode.

N. Executive Priority Service Operation / More than One Elevator Responding

1. Executive Priority Service shall be initiated by a landing key switch at the main egress floor.
2. The car able to respond in the shortest time shall answer the registered call after answering prior car calls.
3. When the car reaches the landing at which the call was registered, one of the following shall occur:
 - a. If no car call is entered within a preset (adjustable) time, the car shall close its doors and resume normal operation.
 - b. If a car call is entered and the Door Close Button is pressed, the car shall serve the car call then resume normal operation.
 - 1) This operation shall be adjustable so that more than one (1) car call may be entered and the car remains in Executive Priority Service until no further car calls are present.
4. This feature shall include a priority service light in the hall and will activate the "Please Exit When Doors Open" message indicator in the car when the car responds to the priority key switch signal.
5. Override the Priority Service feature with fire emergency control in accordance with code and local law.

O. Passenger Rescue Feature

1. Provide a device in the control room to move the elevator car to a floor landing in the event of controller or power failure.
 - a. This device must be speed controlled to prevent an overspeed condition.
 - b. A line of sight must be provided between the Passenger Rescue Feature device and the elevator car.
 - 1) Coordinate line of sight requirements with the control room requirements.
2. Provide a manual brake release lever attached to the control cabinet for rescue of passengers.
 - a. A visual display shall be provided with the control cabinet, which indicates car position, speed and directions.

P. Door Operation

1. Car and hoistway doors shall be arranged to operate in unison without excessive noise or slamming in either direction of travel.
 - a. Door opening speeds of two (2) feet per second shall be provided in conjunction with closing speeds of 1.0 feet per second in accordance with governing code.
 - b. Door operation shall commence as the car stops level at the floor and the machine brake is applied. Pre-door opening shall not be permitted.
2. Where the hoistway door and the car door are mechanically coupled, the kinetic energy of the closing door system shall be based upon the sum of the hoistway and the car door weights, as well as all parts rigidly connected thereto, including the rotational inertia effects of the door operator and the connecting transmission to the door panels.
3. The force necessary to prevent closing of the car and hoistway door from rest shall not exceed 30 lbf. This force shall be measured on the leading edge of the door with the door at any point between one third and two thirds of its travel.
4. Door open and door close time shall be measured between the moment car door operation in either direction begins and the instant at which that cycle is completed.
5. When responding to either a car or corridor call, the amount of time that the elevator door remains stationary in the open position shall be adjustable up to sixty (60) seconds.
 - a. Door open dwell time for a corridor call shall be separate of that for a car call, and in both cases, dwell time shall be canceled whenever the car door protection device is momentarily interrupted by passenger transfers, followed by a reduced door open dwell time of approximately one (1) second (adjustable) after the door protection device is cleared of obstructions.
6. The operation of the door protective device by physical contact (mechanical safety-edge) or the interruption of one or more infrared light beams (dual or multi-beam non-contact) during the close cycle shall cause the immediate reversing of the doors to the full open position.
7. The door closing cycle shall be arranged so that, in the event the door protective devices become continually obstructed after the normal door open dwell time has expired, and following a time interval of approximately thirty (30) seconds (adjustable), a warning tone shall sound and the door closing cycle shall commence at reduced speed and torque per applicable Code requirements.
8. Each car operating station shall be provided with a "door open" and "door close" push button.
 - a. Pressure on the "door open" button shall cause doors in the full open position to remain so and doors engaged in the close cycle to reverse

- direction and assume the full open position so long as pressure remains applied to the button.
- b. The "door open" buttons shall also control the open cycle during Phase II - Emergency In-car Operation.
 - c. The "door close" push button shall function on Independent Service, Attendant Service and Phase II - Emergency In-car Operation as well as during normal automatic operations.
9. Repeated attempts by the power door operator to open or close the door at any landing shall be monitored by the control system.
 - a. In the event the door fails to cycle properly after a preset (adjustable) number of attempts, the car shall either travel to the next stop or remove itself from service, depending upon whether the malfunction is in the open or close cycle.
 10. Each hoistway door shall be provided with an automatic self-closing mechanism arranged so that the door shall close and lock if the car should leave the landing while the hoistway door is unlocked.
 11. Car doors shall be arranged to prevent their being manually opened from inside the car unless the elevator is positioned within a floor landing zone.

2.4 CONTROL ROOM / OVERHEAD EQUIPMENT

A. Controller / Dispatcher

1. The elevators shall have microprocessor based controller/dispatchers.
2. Digital logic shall calculate optimum acceleration, deceleration and velocity patterns for the car to follow during each run.
3. Closed-loop distance and velocity feedback shall monitor the actual performance of the elevator car with the desired speed profile.
4. System operating software shall be stored in non-volatile memory.
5. Elevator control relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, electronic circuit boards, microprocessors, static motor drive units, wiring terminal blocks and related components shall be totally enclosed inside a free-standing metal cabinet with hinged access doors.
 - a. Provide natural or mechanical ventilation for the controller cabinets.
 - b. Equip the vent openings and exhaust fans with filters.
6. Mount equipment to moisture-resistant, noncombustible panels supported from the steel frame.
7. Provide "noise filter" between hoistway wiring and controller/dispatchers to eliminate interference.
8. Optically isolate communication cables between components.
9. Wiring: Wiring on the units, whether factory or field wiring, shall be done in neat order, and all connections shall be made to studs and/or terminals by

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- means of grommets, solderless lugs or similar connections. All wiring shall be copper.
10. Terminal Blocks: Provide terminal blocks with identifying studs on units for connection of board wiring and external wiring.
 11. Marking: Identifying symbols or letters shall be permanently marked on or adjacent to each device on the unit, and the marking shall be identical with marking used on the wiring diagrams. In addition to the identifying marks, the ampere rating shall be marked adjacent to all fuse holders.
 12. A 17" flat-panel LCD monitor shall be provided inside the elevator machine room for diagnostic purposes. The monitor shall be permanently mounted in a cabinet, on a shelf immediately adjacent or attached to or in a control cabinet of at least one car of a group. By means of graphic depiction, information available on the screen shall include:
 - a. An overview of car and corridor calls currently existing within the system.
 - b. Elevator operating status.
 - c. Elevator position, direction of travel and velocity.
 - d. The open/close status of elevator door.
 - e. The current operational status of each CPU input and output.
 - f. A sequential history of faults detected within the control system over the previous thirty (30) days.
 13. In the event diagnostics and monitoring is accomplished via Field Service Tools, provide the required Field Service Tools with related control system appurtenances for diagnostic evaluations, system monitoring and field adjustments.
 - a. Provide instructions for proper use of such diagnostic tools and/or equipment with all coding and other operational requirements.
 - b. Maintain and calibrate the diagnostic tools, and update the associated instructions and other related documents under the service agreement.
 - 1) Should the agreement be cancelled for any reason by either party, maintenance and updating of diagnostic tools shall be provided to the Owner at the Contractor's cost without the need to purchase or lease additional diagnostic devices, special tools or instructions from the original equipment provider.
 - 2) The Owner may request field and technical instructions be provided by the original installation contractor or manufacturer for proper servicing by other qualified elevator company personnel.
 - 3) The established cost plus profit, as previously specified, shall be applicable for the life of the system.
 - a) If the equipment for fault diagnosis is not completely self-contained within the controllers but requires a separate detachable device, that device shall be furnished to the Owner as part of this installation.
 - b) Such device shall be in possession of and become property of the Owner.

14. Microprocessor Documentation

- a. Provide and/or obtain complete information on systems' design, component parts, installation and/or modification procedures, adjusting procedures and associated computer conceptual logic circuitry and field connection.
- b. Provide microprocessor upgrading and/or modifications to programs that have been assigned to enhance the operation of the equipment for a period of 10 years after project approval.

B. Gearless Elevator Hoisting Machine

1. Provide a permanent magnet synchronous motor (PMSM) gearless traction machine for all elevators, specially designed and manufactured for elevator service. The machine shall have high starting torque and low starting current, rated for 50⁰ C (90⁰ F) continuous operation, and a minimum of 240 starts per hour.
 - a. The traction driving sheave and brake drum shall be cast integral and bolted securely to the main armature shaft.
 - b. Securely mount the machine frame, including motor fields, bearing stands and brake on a heavy steel bedplate.
 - c. The armature shaft shall be supported in ball or roller type bearings.
 - d. The driving sheave shall be cast from the best grade of metal with a Brinell hardness of 215 to 230 and shall be machined with grooves, providing maximum traction with a minimum of rope and sheave wear.
 - 1) Roping requirements and type of steel rope used as suspension means shall be engineered by the contractor and manufacturer of the equipment for maximum life of ropes and sheave.
 - e. Ensure that adequate ventilation of internal stator windings and rotating element is provided to prevent overheating with thermal overload protection. (Constant velocity fan for constant cooling.)
 - f. Equip housing with eyebolt(s) for lifting.
 - g. Provide a spring applied and electrically released electro-mechanical brake.
 - h. Swivel type brake shoes shall be applied to the braking surface simultaneously and with equal pressure by means of helical compression springs.
 - i. Design the brake for quick release to provide smooth and gradual application of the brake shoes.
 - 1) An emergency brake shall be an integral part of the machine design.
 - j. Provide 14-gauge hoist cable guards at the car-drop and counterweight-drop side of the machine sheave.

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- 1) Guards shall cover cables from the point of slab penetration to the point where the hoist cables contact the sheave.
- 2) Guards shall prevent access to cables at pinch points.
- 3) Guards shall have no sharp edges.
- 4) Guards shall be properly mounted to prevent vibration.

C. VVVF AC Drive

1. Provide a solid-state, variable voltage, variable frequency (VVVF), 3-phase AC hoist motor drive system as part of the microprocessor-based equipment.
 - a. VVVF drive system shall be a low-noise, flux-vector inverter device.
 - b. Include a digital LED readout and touch-key pad to facilitate software parameter adjustments, monitor system operation and display fault codes.
2. The drive shall utilize a 3-phase, full wave rectifier and capacitor bank to provide direct current power for solid-state inversion.
3. The inverter shall utilize IGBT power semiconductors and duty cycle modulation fundamental frequency of not less than one kilohertz to synthesize 3-phase, variable voltage variable frequency output.
4. The system shall be designed and configured with the following countermeasures for noise generated by the pulse-width modulated (PWM) inverters.
 - a. Control of radiated noise via inverter and/or motor cables.
 - b. Conducted noise through power lines.
 - c. Induction noise and ground noise.
5. Inverter shall be encased in metal and independently grounded.
6. A noise filter for the input power line shall be provided to prevent penetration into radios, wireless equipment and smoke detectors.
7. A 3% three-phase line reactor shall be provided on the power system rated at the utility voltage input to the drive and sized for the rated drive current.
8. The drive shall:
 - a. Be configured as a complete digital drive system.
 - b. Be totally software configurable.
 - c. Interface with external equipment/signals via either discrete local I/O connections or high speed Local Area Network (LAN).
 - d. Be located within the limits of the control cabinet (where system size allows) or separately mounted in an appropriate chassis with hinged swing-out doors with clearances equal to the cabinet width dimensions.
 - e. Provide programmable linear or S-curve acceleration.
 - f. Provide free run or programmable linear or S-curve deceleration.
 - g. Have controlled reversing.

9. Operating and Environmental Conditions:

- a. Have a service factor of 1.0.
- b. Rated for continuous duty.
- c. Humidity - 90% rated humidity non condensing.
- d. Cooling - forced air when required.
- e. Digital display for:
 - 1) Running - output frequency, motor RPM, output current, voltage.
 - 2) Setting - Parameters values for setup and review.
 - 3) Trip - separate message for each trip, last 30 trips to be retained in memory.

10. Protective Features:

- a. Motor overspeed.
- b. Adjustable current limit.
- c. Isolated control circuitry.
- d. Digital display for fault conditions.
- e. Selectable automatic restart at momentary power loss.
- f. Manual restart.
- g. Over/Under Voltage.
- h. Line to line and line to ground faults.
- i. Over-temperature.

D. VVVF AC Drive - Regenerative Module

- 1. The system shall provide full regenerative capabilities to control overhauling motor speed and reduce hoist motor deceleration time by allowing overhaul power to be discharged back into the power lines.
 - a. The regenerative section may be an integral part of the drive or a stand-alone unit mounted in a separate cabinet with proper ventilation as required by the manufacturer.

E. Overspeed Governor

- 1. Provide a speed governor, located overhead, to operate the car safety.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
 - 1) Springs used to develop the tension are not acceptable.
 - b. Provide rope grip jaws, designed to clamp the governor rope to actuate the car safety upon a predetermined overspeed downward.

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- 1) The centrifugal type governor shall trip and set rope jaws within 60 degrees of governor sheave rotation after reaching rated tripping speed.
- c. Design the governor rope tripping device so 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.
- d. Provide an electrical governor overspeed protective device which shall remove power from the driving machine motor and brake before or at the application of the safety.
 - 1) The setting for the overspeed switch shall be as prescribed in the ASME A17.1 Safety Code.
 - 2) Locate and enclose the switch to insure that excess lubrication will not enter the switch enclosure.
 - 3)** Overspeed switch shall operate in both direction of travel on systems employing a static power drive unit.
- e. Seal and tag the governor with the running speed, tripping speed and date last tested.
- f. Design the governor to prevent false tripping due to conditions caused by rope dynamics.
- g. Governor shall be mounted to the guide rail system or machine beam supports in the hoistway overhead.
 - 1) Coordinate access requirements and testing procedures with the AHJ.
 - 2) Where governor access is not required by the AHJ, governor shall be capable of being manually reset from outside the hoistway.

F. Equipment Isolation

1. Provide sound reducing vibration isolation elements at all support points of elevator controller, solid-state motor drives, isolation transformers, reactance units, hoisting motors and machines.
2. The elements for controllers, solid-state motor drives and isolation transformers shall be similar to double deflection neoprene-in-shear mounts, as manufactured by Mason Industries, Type ND, with 0.35" static deflection under design load ratings.
3. Elements between the hoisting machine unitized base and machine support beams shall be similar to triple layer ribbed neoprene pads, separated by appropriate steel shims as manufactured by Mason Industries, Type W pads, at 50 durometer, loaded for 40 psi or approved equal.
4. All bolts through isolation elements, where necessary, are to incorporate resilient washers and bushings.
5. Isolation of existing hoisting machine and motor is contingent on the OEM design of the apparatus.
 - a. Existing isolation pads shall be replaced with new.

G. Ascending Car Overspeed Protection Device

1. Provide a device designed to prevent an ascending elevator from striking the hoistway overhead structure.
2. The device shall decelerate the car with any load up to the rated capacity by applying an emergency brake.
 - a. The device shall detect an ascending car overspeed condition of not greater than 10% higher than the speed that the car governor is set to trip.
 - b. The device, when activated, shall prevent operation of the car until the device is manually reset.
 - c. The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.

H. Unintended Car Movement Protection Device

1. Provide a device to prevent unintended car movement away from the landing when the car and hoistway doors are not closed and locked.
 - a. The device shall prevent such movement in the event of failure of:
 - 1) The electric driving machine motor.
 - 2) The brake.
 - 3) The machine shaft or shaft coupling.
 - 4) Machine gearing.
 - 5) Control system.
 - 6) Any component upon which the speed of the car depends.
 - 7) Suspension ropes and the drive sheave of the traction machine are excluded.
 - b. The device shall prevent operation of the car until the device is manually reset.
 - c. The device shall meet the requirements of the ASME A17.1 Safety Code as may be modified by the AHJ.

I. Emergency Brake

1. Provide a mechanical device, independent of the normal braking system, that will stop the elevator should it overspeed or move in an unintended manner.
2. The device used may be arranged to apply force to the car or counterweight rails, suspension or compensation ropes, drive sheave or brake drum.
3. The emergency brake shall be provided with a marking plate indicating the range of total masses (car with attachments and its load) for:
 - a. The range of speeds at which it is set to operate.
 - b. The criteria such as rail lubrication requirements that may be critical to the performance.

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2.5 HOISTWAY EQUIPMENT

A. Guide Rails / Inserts / Brackets (Where existing guide rails are being re-used)

1. Provide machined, standard size steel "T" section guide rails with tongue and grooved joints for the car and counterweight. Use not less than 15.0-pound car rails.
2. Guide rails shall match existing for the extension of travel.
3. Use not less than 3/4" thick machined steel fishplates to form rail joints. Connect rails to fishplate with four (4) bolts.
4. The section modulus and moment of inertia of the fishplates shall not be less than that of the rail. Connect rails to fishplate with four (4) bolts.
5. For concrete and concrete block hoistways furnish rail brackets and provide inserts and an insert location drawing to Construction Manager or General Contractor.
6. Brackets shall be used to support the rails from the hoistway framing and/or inserts.
 - a. The rails shall be attached to the brackets by heavy clamps or clips.
 - b. Bolting or welding rails to brackets shall only be allowed in certain instances.
 - c. Do not attach brackets to the top flange of hoistway framing steel.
7. Provide rail backing where the vertical distance between support framing is greater than 14'-0" and no intermediate support framing is shown on the drawing.
8. All guide rails shall be erected plumb and parallel to a maximum deviation of 1/8 inch (plus or minus 1/16 inch).
9. Provide oversized steel members and brackets for the rails where the distances exceed the manufacturer's standard dimensions.

B. Guide Rails / Inserts / Brackets (Reuse where existing, provide new for travel extension and new elevator)

1. Existing car and counterweight guide rails, fish plates, rail brackets, backing support and related attachments shall be inspected to determine if unfavorable conditions exist that diminish the structural integrity of any component.
 - a. In the event substandard conditions are disclosed by means of this inspection, the Contractor shall immediately inform the Consultant as to the exact nature of said problems and then undertake whatever repairs and/or replacements the Consultant may deem appropriate to remedy the situation.
2. Each stack of guide rails shall be individually examined to determine if excessive compression has occurred from building settlement.
 - a. In the event such conditions are found to exist, each affected stack shall be cut off enough to relieve pressure.

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- b. Jacking bolts shall be provided underneath each stack of both car and counterweight guide rails.
 3. Each stack of guide rails shall be realigned so that total deviation from plumb in any direction does not exceed 1/8" over the entire length of the hoistway and that DBG measurements never vary more than .030".
 4. As required, car guide rails joints shall be individually filled, filed and sanded in order to eliminate minor variations in adjoining machined surfaces.
- C. Guide Rails / Inserts / Brackets (Where new are being provided)
 1. Provide machined, standard size steel "T" section guide rails with tongue and grooved joints for the car and counterweight. Use not less than 15.0-pound car rails.
 2. Use not less than 3/4" thick machined steel fishplates to form rail joints. Connect rails to fishplate with four (4) bolts.
 3. The section modulus and moment of inertia of the fishplates shall not be less than that of the rail. Connect rails to fishplate with four (4) bolts.
 4. For concrete and concrete block hoistways furnish rail brackets and provide inserts and an insert location drawing to Construction Manager or General Contractor.
 5. Brackets shall be used to support the rails from the hoistway framing and/or inserts.
 - a. The rails shall be attached to the brackets by heavy clamps or clips.
 - b. Bolting or welding rails to brackets shall only be allowed in certain instances.
 - c. Do not attach brackets to the top flange of hoistway framing steel.
 6. Provide rail backing where the vertical distance between support framing is greater than 14'-0" and no intermediate support framing is shown on the drawing.
 7. All guide rails shall be erected plumb and parallel to a maximum deviation of 1/8 inch (plus or minus 1/16 inch).
 8. Provide oversized steel members and brackets for the rails where the distances exceed the manufacturer's standard dimensions.
 9. Provide isolation type car and counterweight rail brackets at all locations.
 - a. Design the brackets to isolate the rails from the building structure through the use of neoprene sleeves, bushings and pads as manufactured by Mason Industries or approved equal. Provide details for review.
- D. Counterweight Assembly (Reuse on existing elevators)
 1. The existing counterweight assembly shall be refurbished to as new condition and reused.
 2. Individual counterweight frame members shall be inspected for any indication of damage and to determine if the overall assembly is twisted, racked, or otherwise distorted.

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- a. All fastenings between counterweight frame members shall be individually examined, tightened and if necessary renewed.
 - b. In case any of these conditions are found to exist, the Contractor shall immediately inform the Consultant about the exact nature of the problem and undertake whatever corrective action the Consultant may deem appropriate to remedy the situation.
 3. The amount of filler weight placed within the counterweight frame shall be adjusted so the weight of the entire counterweight assembly is equal to that of the renovated elevator car, plus 40-42% of its rated loading capacity unless otherwise required by a manufacturer where new hoisting machinery is employed.
 - a. Filler weights shall be held securely in place at all times with tie rods passing through holes in both the weights and the counterweight frame with tie rods secured on each end with double lock nut and a cotter pin arrangement.
 4. The existing 2:1 rope sheave mounted to the counterweight frame shall be washed clean of accumulated grease and oil, then examined for any indication of bearing or bearing seal failure.
 - a. Bearings which are found to be worn or emit unusual noises, vibration, heat, or other unfavorable characteristics shall be replaced.
 - b. Defective grease retention seals shall be replaced.
 - c. Provide means to ensure that hoist ropes cannot jump out of their respective grooves in case of a slacken-rope condition.
- E. Counterweight Assembly / Frame (New Passenger Elevator)
1. Counterweight shall consist of a steel frame welded or bolted together and necessary steel sub-weights.
 - a. Sub-weights shall be held within the frame by not less than 2 tie-rods passing through holes in all weights with rods equipped with locknuts, secured by washers and cotter pins at each end.
 - b. The counterweight shall be equal to the weight of the elevator car and approximately 40% of the contract (specified) capacity.
 - c. Provide the required pit counterweight guard where no compensation is used.
 - d. Where a counterweight is a full located between elevators, provide a guard between the counterweight and the adjacent elevator extending the full height of the shaft as required by Code.
 - e. The bottom of the counterweight shall have a buffer striking plate and means to attach knock-off blocks to compensate for varying rope length.
 - f.

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F. Roller Guides (Reuse on existing elevators)

1. The existing roller guide assemblies shall be retained and rebuilt for new.
 - a. Replace all worn rollers, bearings, shafts, pivot pins, tensioning devices, shock absorbers and adjustment hardware.
 - b. Realign guide stands to frame mountings.
 - c. Reset roller tensioning in conjunction with static balancing of the car enclosure after cab or other apparatus are installed.
 - d. Replace roller guide assemblies as necessary to meet the performance criteria specified herein.
2. Contractor may provide new roller guide assemblies, of equal or greater quality, in lieu of rebuilding the existing, as part of the base bid subject to the approval of the Consultant. Costs associated with replacement shall also be included in the base bid cost.

G. Roller Guides (For New Passenger Elevator)

1. Provide roller guide shoes with adjustable mounting base, rigidly bolted to the top and bottom of each side of the car and counterweight frame.
 - a. Roller guides shall consist of a set of sound reducing polyurethane wheels in precision bearings held in contact with the three finished rail surfaces by adjustable stabilizing springs.
 - b. The bearings shall be sealed or provided with grease fittings for lubrication.
 - c. Equip roller guides with adjustable stops to control postwise float.
 - d. Fit the top car roller guides with galvanized, painted or powder coated steel guards.

H. Hoist Ropes

1. Provide coated steel belts with steel cords embedded in polyurethane.
 - a. Fastenings shall be accomplished by use of individual tapered sockets with adjustable shackles.
 - b. General design requirements for rope shackles and the method of securing wire rope shall conform with ASME A17.1 elevator safety code as modified by, and/or in addition to codes and standards accepted by the AHJ.

I. Governor Rope

1. Pre-formed wire rope specifically constructed for elevator applications, shall be provided for governor ropes.
 - a. Rope shall be traction steel or iron in accordance with OEM design requirements.

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- b. Rope diameter and method of fastening shall be in accordance with ASME A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.
- J. Electrical Conduit / Wiring / Traveling Cable
1. Electrical wiring shall be provided.
 - a. All wiring shall be stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - b. Electrical wiring provided for hoistway interlock shall be of a flame retardant type, capable of withstanding temperatures of at least 392 degrees Fahrenheit. Conductors shall be Type SF or equivalent.
 - c. Each run of electrical conduit or duct shall contain no less than 10% spare wires and, in any case, no fewer than two (2) spare wires.
 - d. Crimp-on type wire terminals shall be used where possible.
 2. New Traveling cable shall be provided.
 - a. Each traveling cable shall be provided with a flame and water resistant polyvinyl chloride jacket.
 - b. Electrical wiring shall consist of stranded copper conductors, manufactured in compliance with ANSI/ASTM B174-71 and UL 62 requirements, and polyvinyl chloride insulation complying with ETT requirements of UL 62 and Article 400 of the National Electric Code.
 - c. Each traveling cable shall contain no less than 10% spare wires.
 - d. Traveling cable exceeding 100' in length shall be provided with a steel wire rope support strand from which the cable shall be suspended.
 - e. Traveling cable must be contained within an approved electrical conduit to within 6' of the final suspension point in the hoistway.
 - f. Each traveling cable shall be arranged to provide no fewer than six (6) individually shielded pairs of 20 gauge wire and arranged to contain no less than one (1) coaxial cable for CCTV remote monitoring.
 - g. Traveling cable conductors that terminate at a hoistway center box shall be connected to stud blocks provided for that purpose.
 - 1) Each wiring terminal shall be clearly identified by its nomenclature as shown on the "as built" wiring diagrams and solderless, crimp-on type wire terminals shall be used where possible.
 - h. The attachment of a traveling cable to the underside of the elevator car shall be performed so that a minimum loop diameter of 30x the cable diameter is provided.
 - i. Pre-hang the cables for at least 24 hours with ends suitably weighted to eliminate twisting during operation.
 3. Rigidly supported EMT conduit, flexible metal conduit and galvanized steel trough shall be utilized throughout the hoistway.

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- a. Both EMT and flexible conduit shall be connected on either end by use of compression fittings and secured in place with metal clamps sized in accordance with the diameter of conduit utilized.
 - 1) Wire or plastic wire ty-raps shall not constitute an acceptable means of fastening.
- b. The use of flexible metal conduit shall be limited to runs not greater than 3' in length.
- c. All abandoned or unused electrical conduit shall be removed from the hoistway.
- d. Existing conduit and wiring duct may be reused if suitable for the application.
 - 1) Reuse of existing conduit/duct shall be at the discretion of the Consultant.

K. Normal and Final Terminal Stopping Devices

1. Provide normal terminal stopping devices to stop the car automatically from any speed obtained under normal operation within the top and bottom overtravel, independent of the operating devices, final terminal stopping device and the buffers.
2. Provide final terminal stopping devices to stop the car and counterweight automatically from the speed specified within the top clearance and bottom overtravel.
3. The terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated by the cam fixed to the top of the car.
 - a. Terminal stopping devices that are not mechanically operated (i.e.: magnetic proximity) shall be provided by the manufacturer of the control equipment, intended for use as a terminal limit, and designed for reliable operation in the hoistway environment.
4. Final terminal limits shall be pinned so as to prevent movement after final adjustment where required by the AHJ.

2.6 PIT EQUIPMENT

A. Car and Counterweight Buffer (Reuse)

1. Existing car and counterweight buffers shall be reused.
 - a. Pit channels, related supports and fastenings shall be inspected for damage and to determine if the structural integrity of any component is diminished by the affects of rust or other unfavorable conditions.

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- 1) In the event defects are found, the Contractor shall immediately inform the Consultant and undertake whatever repair and/or replacement the Consultant may deem appropriate.
 - b. Surface rust shall be removed from all reused components.
 - c. Where hydraulic buffers are used:
 - 1) Buffer plunger shall be honed free of all surface rust and blemishes and provided with a protective coating of machinist bluing.
 - 2) The hydraulic fluid reservoir on each buffer shall be drained, flushed and refilled with fresh oil. The grade and amount of fluid added to each buffer shall conform to O.E.M. specification.
 - d. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
 - e. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby in accordance with ASME A17.1 as may be modified by, and/or in addition to codes and standards accepted by the AHJ.
 - f. The buffer shall undergo testing in accordance with ASME A17.1 Code as modified by, and/or in addition to codes and standards accepted by the AHJ.
- B. Car and Counterweight Buffers (New Passenger Elevator)
1. Provide buffer with necessary blocking and horizontal steel braces under the car and counterweight.
 2. Provide spring type buffers for elevators with operating speeds of up to and including 200 fpm. Use oil buffers for elevators with operating speeds over 200 fpm.
 3. Oil buffer shall bring the car and counterweight to rest from governor tripping speed at an average rate of retardation not exceeding gravity (32 ft/s²).
 4. Oil buffer shall be of the spring return type and shall have means of checking oil supply level.
 5. Use reduced stroke buffer with associated terminal slowdown devices where runby is restrictive.
 - a. Buffer and emergency terminal slowdown device shall operate in accordance with applicable codes.
 6. The buffer shall be tested and approved by a qualified testing laboratory.
 7. Provide a permanent buffer marking plate which indicates the manufacturer's name, identification number, rated impact speed and stroke.
 8. Provide a permanent data plate in the vicinity of the counterweight buffer indicating the maximum designed counterweight runby.
 9. Support buffers from the pit floor level with all required blocking and bracing steel members.

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10. Coordinate the installation of the buffer inspection platform and ladder with the Architect and Construction Manager.

C. Governor Rope Tension Assembly

1. Reuse governor rope tension assemblies on existing elevators
2. Provide a new governor rope tension assembly for the new passenger elevator.
 - a. Maintain the proper tension in the governor rope with a weighted tension sheave located in the pit.
 - 1) Springs used to develop the tension are not acceptable.
 - b. The sheave shall be of proper diameter and set directly plumb with the governor rope drop to prevent the rope from pulling off of the sheave at an angle.
 - c. Lubrication fittings shall be provided on the assembly.
 - d. The assembly shall have necessary rope guards to prevent accidental contact of the rope/sheave by service personnel and to prevent the governor rope from jumping off of the sheave.

D. Pit Stop Switch

1. The elevator pit for the new passenger elevator shall be provided with a push/pull or toggle switch that is conspicuously designated "EMERGENCY STOP" and located so as to be readily accessible from the hoistway entrance on the lowest landing served at a height of approximately 18" above the floor.
 - a. This switch shall be arranged to prevent the application of power to the hoist motor and machine brake when placed in the "OFF" position.
2. Existing stop and/or pit door switch conforming to the requirements set forth herein may be refurbished to as new condition and reused subject to approval of the Consultant.

2.7 HOISTWAY ENTRANCES

A. Hoistway Entrances (At New Landings and New Passenger Elevator)

1. Provide new frames at new openings constructed of 16-gauge sheet steel. Provide standard bolted type construction having matching end caps. Provide 2" wide square profile.
2. Finish new door frames in brushed stainless steel.

- ### B. Doors
- The doors shall be constructed of 16-gauge sheet steel, not less than 1-1/4" thick, reinforced to accept hangers, interlocks or door closers.

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1. Equip all new hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.
2. New door panels shall be finished in brushed stainless steel
3. New entrances shall bear 1 ½ hour label of Underwriters Laboratories, Inc.
4. Provide each new door panel with two removable laminated plastic composition guides, arranged to run in sill grooves with a minimum clearance, replaceable without removing the door from the hangers and incorporating a steel fire stop.
5. Provide the leading edge of center opening door panels with continuous black rubber astragal bumper strips.
 - a. The strips shall be relatively inconspicuous when the doors are closed and shall be easily replaced.
6. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
7. Provide rubber bumpers at the top and bottom of the door to stop them at their limit of travel in opening direction.
8. Sills - Provide narrow-type, extruded aluminum sills with the nosing approximately one (1) inch deep and running the full length of door travel.
 - a. The sills shall be at least 3/8 inch thick.
 - b. The wearing surface shall be of a non-slip type.
 - c. Rigidly secure the sills to the building construction by means of steel sill support brackets or blocking with necessary metal shimming or adjustments.
 - d. Sill for all new landings shall be extruded aluminum type
 - e. If formed sheet steel struts are used, the structural properties of formed struts shall match or exceed the structural properties of 3" x 3"x 1/4" steel angle.
 - f. Extend the struts from top of sill to either the bottom of floor beam or intermediate framing above.
 - g. Bolt struts in place with not less than two (2) bolts at each end.
 - h. Strut clip angles or brackets shall have a thickness not less than the thickness of the supported strut.
9. Track Support - 3/16-inch-thick steel track support plate shall extend between and be bolted to the vertical steel struts with no less than two (2) bolts at each end.
10. Track Covers – 14 gauge steel cover plates shall extend the full travel of the doors.
 - a. Covers shall be made in sections for service access to hangers, sheaves, tracks and interlocks.
 - b. The sections above the door opening shall be movable from within the elevator car.
 - c. Cover fastening devices shall be non-removable from the cover.

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11. Fascias – 14 gauge steel fascia plates shall extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
 - a. Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
12. Toe Guards – Provide 14 gauge steel toe guards to extend 12 inches below any sill not protected by fascia.
 - a. The toe guards shall extend the full width of the door and shall return to the hoistway wall at a 15-degree angle and be firmly fastened.
13. Dust Covers – Provide 14 gauge steel dust covers to extend 6 inches above any header not protected by fascia.
 - a. The dust covers shall extend to a full width of travel of the doors, return to the hoistway wall at a 15-degree angle and be firmly fastened.

C. Hoistway Entrances (Reuse at existing landings)

1. Hoistway entrance sills, sill supports, entrance frames, headers and header supports shall be reused and refurbished.
 - a. Hoistway entrances that have become distorted or bent shall be straightened, plumbed, reset to the proper width dimension and reinforced as necessary.
 - b. Provide 14-gauge steel fascia plates that extend at least the full width of the door and be secured at hanger support and sill with oval head machine screws.
 - 1) Reinforce fascia to allow not more than ½" of deflection.
 - 2) Provide fascia plates where the clearance between the edge of the loading side of the platform and the inside face of the hoistway enclosure exceeds the code allowed clearance.
 - c. Provide 14-gauge steel toe guards that extend 12" below any sill not protected by fascia.
 - 1) The toe guards shall extend the full width of the door and shall return to the hoistway wall at a 15-degree angle and be firmly fastened.
 - d. Remove oil, dirt and impurities on new and existing apparatus and give a factory coat of rust inhibitive paint to all exposed surfaces of struts, hanger supports, covers, fascias, toe guards, dust covers and other ferrous metal.

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D. Slide Type Hoistway Entrance Door Panels (Reuse at existing landings)

1. Hoistway entrance door panels shall be reused and refurbished.
 - a. Provide each door panel with two removable laminated plastic composition guides, arranged to run in existing sill grooves with a minimum clearance.
 - 1) The guide mounting shall permit their replacement without removing the door from the hangers.
 - 2) A steel wear indicator shall be enclosed in each guide.
 - b. Provide the meeting edge of center opening doors with necessary new continuous rubber astragal bumper strips.
 - 1) Astragal shall be relatively inconspicuous when the doors are closed.
 - 2) Provide rubber bumpers at the top and bottom of each section of door to stop them at their limit of travel in the opening direction.
2. In multi-speed door arrangements, provisions shall be made to interlock the individual panels so all panels close should the normal door panel relating means fail.
3. Provide a special key so that an authorized person can open any landing door when the car is elsewhere.
 - a. The key hole shall be not less than 3/8" in diameter and shall be fitted with a stainless steel or bronze ferrule to match related equipment.
 - b. Where applicable, plug the abandoned hoistway door access hole in each door panel, secured from the hoistway side of the door, finished to match existing or as otherwise directed by the Owner/Architect.
4. Where conditions warrant, or where otherwise required by code, equip all hoistway landing doors with one-piece full height non-vision wings of material and finish to match hall side of door panels.

E. Tracks / Hangers / Closers / Interlocks (Reuse at existing landings)

1. The existing hoistway door hangers, tracks and interlocks shall be reused and rehabilitated.
2. Roller/hanger assemblies, consisting of the roller and eccentric, shall be cleaned, degreased and adjusted for proper operation.
3. Up-thrust shall be minimized through adjustment of the eccentric roller.
4. Worn rollers and eccentrics shall be replaced where needed.
5. Thoroughly clean the track of all dirt and grease accumulations to provide a smooth surface.

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6. The interlock shall be disassembled and checked for contact wear.
 - a. Worn contacts shall be replaced as required.
 - b. The interlock wiring shall be replaced with new.
 - c. The entire assembly shall be adjusted and checked for proper operation.
 7. Closers at each entrance shall be cleaned and pivot pins lubricated. Worn and/or defective sill closers as well as noisy spirators shall be replaced as required to maintain self-closing of the hoistway doors should the elevator leave the floor for any reason with the car door open.
- F. Hoistway Door Bottom Guides / Safety Retainers
1. The bottom of each side sliding type hoistway door panel shall be equipped with a minimum of two (2) guiding members.
 - a. Metal mounting angles shall be secured to the integral panel frame structure; and when conditions warrant, additional external metal support plates or angles shall be installed to ensure the integrity of the panel frame is not compromised.
 - b. Guides shall be manufactured of low friction non-metal material with sufficient strength to withstand forces placed on door panels per ASME A17.1 Standards.
 - c. Each guide assembly shall incorporate a steel wear indicator and be so designed to permit sliding member replacements without removal of door panel(s) from top hanger devices.
 - d. Panels shall be hung with a maximum vertical clearance of 3/8 inch between top of sill and bottom of panel and the guide shall engage the sill groove by not less than 1/4 inch.
 2. The bottom of each side sliding type hoistway door panel shall be equipped with a guiding member safety retainer to prevent displacement in the event of primary guide means failure.
 - a. A metal reinforcement (12 gauge stainless or galvanized steel) shall be installed between the two (2) primary guiding members (a.k.a. "Z" bracket).
 - b. The reinforcement shall be designed with a minimum length of 8 inches or the maximum possible length that will fit between the primary members and a minimum overall height of 2.5 inches secured on the internal face of the door panel. (Hoistway side)
 - c. The retainer shall be set with the supplemental safety angle 3/8 inch into the corresponding sill groove; and be capable of preventing displacement of the panel no more than 3/4 inch with an applied force of 1125 lbf at right angles over an area 12 inches x 12 inches at the approximate center of the door panel.

2.8 CAR EQUIPMENT / FRAME

A. Car Frame (Reuse Existing)

1. The existing car frame assembly shall be refurbished to as new condition and reused.
2. Individual car frame members, platform isolation framework, door operator support structure, related bracing and hardware shall be inspected for any indication of damage or distortion.
 - a. Where damage is detected, the Contractor shall immediately inform the Consultant and then undertake corrective action deemed appropriate by the Consultant to remedy the condition.
3. Provide new elastomer isolation pads for all existing platforms where pads are presently installed.
4. The car frame, door operator support and related bracing shall be modified or reconfigured as necessary in order to accommodate new cab enclosure and/or master door operating equipment specified herein.
5. The elevator car shall undergo static balancing upon substantial completion of all work described in the project specifications and subsequent to any car interior refinishing or cab replacement work performed in conjunction with the project.
6. The 2:1 sheave shall be refurbished:
 - a. The sheave shall be washed clean of accumulated grease and oil.
 - b. Bearings which are found worn or to emit unusual noises, appreciable vibration, excessive heat, or other unfavorable characteristics shall be replaced.
 - c. Defective grease retention seals shall be replaced as needed.
 - d. Provide means to ensure that hoist ropes cannot jump out of their respective grooves in case of a slack rope condition.

B. Car Platform (Reuse existing)

1. The existing platform shall be modified to accommodate the new apparatus specified herein.
 - a. Where necessary, the underside of platform shall be refurbished and treated with fire-rated material.
 - b. Top of platform shall be refurbished with a marine grade plywood set to receive new finished floor covering as selected by Owner.
 - c. Where necessary, provide a new safety access hole ring and cover assembly to match selected cab finishes.
 - d. At Contractor's option or when conditions warrant, provide a totally new platform in lieu of repairs, modifications and upgraded specified above.

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C. Car Safety (Reuse existing)

1. The existing governor actuated car safety device shall be retained, overhauled and upgraded for current code compliance.
2. Readjust safety for proper operation in accordance with current ASME A17.1 design standards.
3. Check the existing safety operated switch (plank-switch) for proper adjustment and operation.
4. A new safety shall be provided where the existing is not suitable for reuse due to overall condition or in conjunction with an increase in the elevator speed or full load capacity.

D. Car Frame and Platform (New Passenger Elevator)

1. The car frame shall be made of steel members, with the required factor of safety.
2. The car platform shall consist of a steel frame with necessary steel stringers, all securely welded together.
3. The frame and platform shall be so braced and reinforced that no strain will be transmitted to the elevator car.
 - a. Provide platform with two (2) layers of 3/4" thick marine grade plywood.
 - b. Cover the underside of the car platform with sheet steel.
4. The support frame shall carry rubber pads on which the platform shall rest without any connection to the steel frame for sound and vibration isolation.
5. Provide extruded aluminum thresholds having non-slip surface, guide grooves.
6. Sound isolate all passenger elevator platforms with vibration isolation pads. The support frame shall carry rubber pads on which the platform shall rest without any connection to the steel frame.
7. Recess the passenger elevator platforms to receive finished flooring as selected by the Architect and specified under another section of their specification.
8. The car frame shall be sized for an 8'-0" overall cab height.
9. Design the elevator car frame and platforms for elevators for a Class A freight loading.

E. Car Safety (New Passenger Elevator)

1. Provide a governor actuated mechanical safety device mounted under the car platform and securely bolted to the car sling.
2. The car safety shall be sized for the capacity and speed noted herein.
 - a. When tripped, the safety mechanism shall engage the rails with sufficient force to stop a fully loaded car with an average rate of retardation within the limits given in A17.1 Safety Code as adopted and/or otherwise modified by the AHJ.

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3. Install a car safety marking plate of corrosion resistant metal and, in addition to the data required by Code, indicate the manufacturer's name and manufacturer's catalog designation number for safety.
4. Make provisions to release the car safety. In no event shall the safety be released by downward motion of the car. Raising the car to reset the safety shall be allowed.
5. Provide an electrical safety plank switch that will interrupt the power to the hoist machine and apply the machine brakes when the safety is set.
- 6.

F. Automatic Leveling / Releveling / Positioning Device

1. Equip the elevator with a floor leveling device which shall automatically bring the car to a stop within 1/4" of any floor for which a stop has been initiated regardless of load or direction of travel.
2. This device shall also provide for releveling which shall be arranged to automatically return the elevator to the floor in the event the elevator should move below or above floor level in excess of 1/4".
3. This device shall be operative at all floors served and whether the hoistway or car door is open or closed provided there is no interruption of power to the elevator.
4. A positioning device shall be part of the controller microprocessor systems.
 - a. Position determination in the hoistway may be through fixed tape in the hoistway or by sensors fitted on each driving machine to encode and store car movement.
 - b. Design the mechanical features and electrical circuits to permit accurate control and rapid acceleration and retardation without discomfort.

G. Top-of-Car Inspection Operating Station (New Passenger Elevator)

1. An inspection operating station shall be provided on top of the elevator car.
2. This station shall be installed so that the controls are plainly visible and readily accessible from the hoistway entrance without stepping on the car.
3. When the station is operational, all operating devices in the car shall be inoperative.
4. Provide the following control devices and features:
 - a. A push/pull or toggle switch designated "EMERGENCY STOP" shall be arranged so as to prevent the application of power to the hoist motor or machine brake when in the "off" position.
 - b. A toggle switch designated "INSPECTION" and "NORMAL" to activate the top of car Inspection Service Operation.
 - c. Push button designated "Up", "Down" and "Enable" to operate the elevator on Inspection Service (the "Enable" button shall be arranged to operate in conjunction with either the "Up" or "Down" button).
 - d. An indicator light and warning buzzer that are subject to activation under Phase I - Fire Emergency Recall Operation.

H. Load Weighing Device (New Passenger Elevator)

1. Provide means to measure the load in the car within an accuracy of $\pm 4\%$ of the elevator capacity.
2. Provide one of the following types of devices:
 - a. A device consisting of four strain gauge load cells located at each corner of the car platform and supporting a free floating car platform and cab with summing circuits to calculate the actual load under varying conditions of eccentric loading.
 - b. A strain gauge device located on the crosshead, arranged to measure the deflection of the crosshead and thus determine the load in the car.
 - c. A device consisting of four strain gauge load cells, supporting the weight of the elevator machine with summing circuits to calculate the actual load under varying conditions of load.
 - d. A device to measure the tension in the elevator hoist ropes and thus determine the load in the car.
3. Arrange that the output signal from the load weighing device be connected as an input to the signal and motor control systems to pre-torque of the hoisting machine motors where applicable.
4. Provide audible and visual signals in connection with the load weighing device when used as an "overload" device.

I. Emergency Exits

1. Ensure existing emergency exits operate as per code and have proper electrical contacts and mechanical locks on the exterior of the cab enclosure.
2. The top of all car emergency exits shall be so arranged that it can be opened from within the car by means of a keyed spring-return cylinder-type lock having not less than a five-pin or five-disk combination and opened from the top of the car without the use of a key.
3. No other key to the building shall unlock the emergency exit lock except access switch keys which may be keyed alike.
 - a. Keys shall be assigned in accordance with ASME A17.1 Group 1 Security requirements.
4. Seismic Zone 2 - The top emergency exit shall be provided with an electric contact so located as to be inaccessible from the inside of the car. The opening of the electrical contact shall limit the car speed to not more than 150 ft/min (0.76 m/s).

J. Master Door Power Operator System (Reuse on existing elevators))

1. The master electric power door operator shall be refurbished and adjusted.
2. The door shall be adjusted to operate at an average opening speed of 2 feet per second.

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3. Automatic closing of the car and hoistway doors shall be required, and the closing speed shall be approximately 1foot per second.
 - a. The speed shall be reduced as required to limit the kinetic energy of the closing doors to the values permitted by the ASME A17.1 Code.
 4. The door shall operate smoothly without a slam in both the opening and closing direction.
 5. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
 - a. The hoistway door shall continue to be self-locking and self-closing.
 - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.
 - c. Provide zone-lock devices as required by applicable local codes and ASME A17.1 standards.
 6. Thoroughly clean and fully rehabilitate the existing car door hangers and tracks for reuse with new or existing car door panel.
 - a. Replace hanging rollers where necessary with similar manufactured high-quality components.
 - b. Where conditions warrant, provide necessary new tracks.
 - c. New equipment shall be fully compatible with existing apparatus.
- K. Master Door Power Operator System – VVVF/AC
1. Provide a heavy-duty master door operator on top of the elevator car enclosure for power opening and closing of the cab and hoistway entrance door panels.
 2. Operator shall utilize an alternating current motor, controlled by a variable voltage, variable frequency (VVVF) drive and a closed-loop control with programmable operating parameters.
 - a. System may incorporate an encoder feedback to monitor positions with a separate speed sensing device or an encoderless closed-loop VVVF-AC control to monitor motor parameters and vary power applied to compensate for load changes.
 3. The type of system shall be designated as a high speed operator, designed for door panel opening at an average speed of 2.0 feet per second and closing at approximately 1.0 foot per second.
 - a. Reduce the closing speed as required to limit kinetic energy of closing doors to within values permitted by ASME A17.1 as may be adopted and/or modified by the AHJ.
 4. The door shall operate smoothly without a slam or abrupt motion in both the opening and closing cycle directions.

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- a. Provide controls to automatically compensate for load changes such as:
 - 1) Wind conditions (stack effect)
 - 2) Use of different weight door panels on multiple landings
 - 3) Other unique prevailing conditions that could cause variations in operational speeds.
 - b. Provide nudging to limit speed and torque in conjunction with door close signaling/closing and timing devices as permitted by ASME A17.1 as may be adopted and/or modified by the AHJ. Nudging shall be initiated by the signal control system and not from the door protective device.
5. In case of interruption or failure of electric power from any cause, the door operating mechanism shall be so designed that it shall permit emergency manual operation of both the car and corridor doors only when the elevator is located in the floor landing unlocking zone.
- a. The hoistway door shall continue to be self-locking and self-closing during emergency operation.
 - b. The door operator and/or car door panel shall be equipped with safety switches and electrical controls to prevent operation of the elevator with the door in the open position as per ASME A17.1 Code Standards.
 - c. Provide zone-lock devices as required by ASME A17.1 as may be adopted and/or otherwise modified by the AHJ.
6. Construct all door operating levers of heavy steel or reinforced extruded aluminum members, designed for stress and forces imposed on the related parts, linkages and fixed components during normal and emergency operation functions.
- a. All pivot points shall have either ball or roller-type bearings, oilite bronze bushings or other non-metallic bushings of ample size.
7. Provide operating data / data tag permanently attached to the operator as required by applicable code and standards.
- L. Car Door Zone Lock Restrictor (New on Existing Equipment)
1. Retrofit the existing car door operator to incorporate a car door zone lock restrictor.
 2. In case of interruption or failure of electric power from any cause, the door operating mechanism shall permit emergency manual operation of both the car door and the hoistway door within the floor landing zone.
 - a. The hoistway door shall continue to be self-locking and self-closing.
 - b. The door operator shall operate in conjunction with or be equipped with all gate switches and safety contacts required by ASME A17.1 Code.

M. Car Door Gate Switch (New Passenger Elevator)

1. Provide a car door electrical safety (gate) switch that connects directly to the car door track.
 - a. The gate switch shall prevent movement of the elevator until such time as it signals the control equipment that the car door has physically closed.

N. Door Reopening Device (Reuse on existing elevators)

1. The existing multi-beam infrared door reopening device shall be refurbished and reused in place.
2. The device shall be cleaned and adjusted for proper operation.
3. Replace missing or damaged lens and/or controller cover where necessary.
4. Flexible connecting cable shall be replaced with new and properly suspended to prevent excessive bending.
5. At the Contractor's discretion, a new infrared door protection system may be installed in lieu of rehabilitating / reusing the existing unit.

O. Door Reopening Device / "3D" (New Passenger elevator)

1. Provide a combination infrared curtain and 3D door protection system.
2. The door shall be prevented from closing and will reopen when closing if any one of the curtain light rays is interrupted or should an object enter the 3D detection zone.
3. The door shall start to close when the protection system is free of any obstruction.
4. The infrared curtain and 3D zone protective system shall provide:
 - a. Protective curtain field not less than 71" above the sill.
 - b. 3D protective zone field not less than 61" above the sill.
 - c. Accurately positioned infrared lights to conform to the requirements of the applicable handicapped code.
 - d. Modular design to permit on board test operation and replacement of all circuit boards without removing the complete unit.
 - e. Self-contained, selectable 3D zone timeout feature to allow for closing at nudging speed with audible signal.
 - f. Automatic turning-off of the 3D zone in the event of three (3) consecutive 3D triggers.
 - 1) Light curtain shall continue to operate after 3D system timeout.
 - g. Selectable control of the 3D zone operation on an "always-on" or "as doors close" basis.
 - h. Controls to shut down the elevator when the unit fails to operate properly.

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2.9 FINISH / MATERIALS / SIGNAGE

A. Material, Finishes and Painting

1. General

- a. Cold-rolled Sheet Steel Sections: ASTM A366, commercial steel, Type B
- b. Rolled Steel Floor Plate: ASTM A786
- c. Steel Supports and Reinforcement: ASTM A36
- d. Aluminum-alloy Rolled Tread Plate: ASTM B632
- e. Aluminum Plate: ASTM B209
- f. Stainless Steel: ASTM A167 Type 302, 304 or 316
- g. Stainless Steel Bars and Shapes: ASTM A276
- h. Stainless Steel Tubes: ASTM A269
- i. Aluminum Extrusions: ASTM B221
- j. Nickel Silver Extrusions: ASTM B155
- k. Bronze Sheet: ASTM B36(36M) alloy UNS No. C2800 (Muntz Metal)
- l. Structural Tubing: ASTM A500
- m. Bolts, Nuts and Washers: ASTM A325 and A490
- n. Laminated / Safety Tempered Glass: ANSI Z97.1

2. Finishes

a. Stainless Steel

- 1) Satin Finish: No. 4 satin, long grain
- 2) Mirror Finish: No. 8 non-directional mirror polished

b. Sheet Steel:

- 1) Shop Prime: Factory-applied baked on coat of mineral filler and primer
- 2) Finish Paint: Two (2) coats of low sheen baked enamel, color as selected by the Architect.
- 3) Steel Equipment: Two (2) coats of manufacturer's standard rust-inhibiting paint to exposed ferrous metal surfaces in both the hoistway and pit that do not have galvanized, anodized, baked enamel, or special architectural finishes.

3. Painting

- a. Identify all equipment including buffers, crosshead, safety plank, machine, controller, drive, governor, disconnect switch, etc., by 4" high numerals which shall contrast with the background to which it is applied. The identification shall be either decalcomania or stencil type.
- b. Paint or provide decal-type floor designation not less than six (6) inches high on hoistway doors (hoistway side), fascias and/or walls as required by A17.1 as may be adopted and/or modified by the AHJ. The color of

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paint used shall contrast with the color of the surface to which it is applied.

B. Designation and Data Plates, Labeling and Signage.

1. Provide an elevator identification plate on or adjacent to each entrance frame where required by the AHJ.
2. Provide floor designation plates at each elevator entrance, on both sides of the jamb at a height of 60 inches to center line of plate.
 - a. Floor number designations and Braille shall be 2" high, 0.03" raised and stud mounted.
3. Identify the designated medical emergency services elevator with 3" high international symbol at each elevator entrance on both sides of the jamb.
4. Provide raised designations and Braille markings to the left of the car call and control buttons of the car operating panel(s).
 - a. Designations shall be a minimum of 5/8" high, 0.03" raised and stud mounted.
5. Provide elevators with data and marking plates, labels, signages and refuge space markings complying with A17.1 Elevator Safety Code as may be adopted and/or otherwise modified by the AHJ.
6. Architect shall select the designation and data plates from manufacturer's premium line of plates.

2.10 FIXTURES / SIGNAL EQUIPMENT

A. General - Design and Finish

1. The design and location of the hall and car operating and signaling fixtures shall comply with the ADAAG.
2. The operating fixtures shall be selected from the manufacturer's premium line of fixtures.
3. Mount passenger elevator fixtures with tamperproof fasteners. The screw and key switch cylinder finishes shall match faceplate finish.
4. Where key-operated switch and or key operated cylinder locks are furnished in conjunction with any component of the installation, four keys for each individual switch or lock shall be furnished, stamped or permanently tagged to indicate function.
5. All caution signs, pictographs, code mandated instructions and directives shall be engraved and filled with epoxy.

B. Main Car Operating Panel

1. Provide a new main car operating push button panel on the inside front return panel of all elevators car.

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2. Car operating panel shall be incorporated in the swing-front return of the elevator cab.
 - a. Coordination with car front manufacturer shall be the responsibility of the Elevator Contractor.
3. The push buttons shall become individually illuminated as they are pressed and shall extinguish as the calls are answered.
4. The operating panel shall include:
 - a. A call button for each floor served, located not more than 48" above the cab floor.
 - b. "Door open" / "Door close" buttons.
 - c. "Alarm" button, interfaced with emergency alarm. The alarm button shall illuminate when pressed.
 - d. "Emergency Stop" switch per local law located at 35" above the cab floor.
 - e. Self-dialing, hands-free telephone and / or intercom with call acknowledging feature and A.D.A. design provisions.
 - f. Three (3) position firefighter key operated switch, call cancel button and illuminated visual/audible signal system with mandated signage engraved per ASME A 17.1 Standards as modified by the AHJ.
 - g. Components for Emergency Hospital Service and Priority Service
5. Locked Firemen's' Service cabinet, keyed in accordance with local Code, containing required devices and signals in accordance with ASME A17.1 Standards.
 - a. Automatic opening of the locked cabinet door may be provided with signals initiated by the fire detection and alarm system where approved by the Authority Having Jurisdiction.
6. Provide a locked service cabinet flush mounted and containing the key switches required to operate and maintain the elevator, including, but not limited to:
 - a. Independent service switch with associated operating buttons and signal indicators.
 - b. Light switch.
 - c. Fan switch.
 - d. G. F. I. duplex receptacle.
 - e. Emergency light test button and indicator.
 - f. Inspection Service Operation key switch.
 - g. Port for hand-held service tool where applicable.
 - h. Dimmer for cab interior lighting.
7. Car operating panel shall incorporate:
 - a. An integral (no separate faceplate) digital L.E.D. floor position indicator

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- b. Emergency light fixture (without a separate faceplate) and black-filled engraved unit I.D. number or other nomenclature, as approved by Owner
 - c. A "No Smoking" advisory and the rated passenger load capacity.
 8. Post Inspection Certificate behind an opening in the car operating panel or behind flush window in service cabinet door that is fitted with a flush-mounted clear Plexiglas without a frame. Opening shall be sized for displaying a standard issued State of Maine operating certificate
- C. Car Position Indicator
1. The position of the car in the hoistway shall be indicated by the illumination of the position indicator numeral corresponding to the floor at which the car has stopped or is passing.
 - a. Provide 2" high, 10-segment LED type position indicator with direction arrows, integral with the car operating panel.
 - b. Provide Lexan cover lens with hidden support frame behind fixture plate to protect the indicator readout.
 - c. Provide audible floor passing signal per ADA standards where not provided by the elevator signal control.
 - d. Flush mount fixture with cover to match selected car front or car operating panel finish as directed by the Owner.
- D. Hospital Emergency Service Car Operating Devices
1. The car control key switch shall be of the two (2) position type with key removal in the "OFF" position only.
 2. Provide an illuminated advisory indicator with audible signal in the car operating panel.
- E. Corridor Push Button Stations / Riser (For new Landings)
1. A riser of push button signal fixtures shall be provided on all floors.
 2. Each signal fixture shall consist of the following:
 - a. A flush-mounted faceplate.
 - b. Illuminating tamper-resistant push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
 - c. A recessed mounting box, electrical conduit and wiring.
 - d. Key switches for emergency hospital service
 3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
 4. Provide a new main floor hall push button station including the following components:
 - a. Illuminating call buttons.

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- b. Firefighters recall switch with visual signal and engraved operating instructions.
 - c. Emergency power visual signal
 - d. Code required pictograph
 - e. Key switches for emergency hospital service and emergency priority service
 5. Push button signal fixtures shall be installed at a centerline height of 42" above the floor and shall be installed both plumb and flush to the finished wall.
 - a. Standardize the final distance on all floors.
 6. New fixture faceplates shall be installed in adjacent to the entrance frame on front wall.
- F. Corridor Push Button Stations – Existing Landings/ Reuse Back Boxes
 1. Push button signal fixtures shall be provided on each landing.
 2. Each signal fixture shall consist of:
 - a. Up and down illuminating push buttons measuring 3/4" at their smallest dimension as selected by the Owner.
 - b. A recessed mounting box, electrical conduit and wiring.
 3. Intermediate landings shall be provided with fixtures containing two (2) push buttons while terminal landings shall be provided with fixtures containing a single push button.
 4. Include firefighter key switch in the main lobby level station or other designated recall landing.
 5. Where existing fixtures are located greater than 48" above the floor:
 - a. The existing back boxes shall be retained and used to attach the oversized fixture faceplate to locate the new buttons with a centerline between 35" and 48" above the finished floor.
 - 1) The Contractor has the option of providing a single oversized back box in lieu of retaining existing for faceplate attachment.
 - b. Standardize the new centerline distance on all floors.
 6. All cutting, patching, grouting and/or plastering of masonry walls resulting from the removal or installation of corridor fixtures shall be performed by the Contractor so as to maintain the fire rating of the hoistway.
 - a. Finished painting or decorating of wall surfaces shall be by Others.
 7. All faceplates shall be engraved with fire logo and "In Case of Fire Use Stairs" to help fill the void created by the use of oversized covers.

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- G. Hospital Emergency Service Corridor Operating Devices [NYC]
1. A two-position key-operated corridor Hospital Emergency Service switch shall be provided at one or more landings to activate the special control function by authorized or designated personnel.
 - a. The two-position switch shall be marked "NORMAL" and "HOSPITAL EMERGENCY SERVICE". Keys shall be removal only in the "NORMAL" position.
 2. The color of the Hospital Emergency Service switch halo, located in a corridor at the designated level(s) and inside the patient elevator operating panel, shall be "BLUE".
- H. Floor Position Indicator (Reuse)
1. The existing digital floor position indicator(s) shall be reused.
 - a. Replace damaged, clouded or missing lenses.
 - b. Interface displays for use with new signal control apparatus installed under the base scope of work.
 - c. Program the position indicators to accommodate new lanings being served
- I. Hall Direction Lanterns (New passenger elevator and new landings for existing elevators)
1. Provide a visual and audible signal at each entrance to indicate the direction of travel and, where applicable, which car shall stop in response to the hall call.
 - a. Design the lantern to match existing with up and down indication at intermediate landings and a single indication at terminal landings.
 - b. Lanterns shall sound once for the up direction and twice for the down direction.
 - 1) Provide an electronic chime with adjustable sound volume.
 - c. Provide adjustable signal time (3 to 10 seconds, with 1 second increments) to notify passengers which car shall answer the hall call and preset per ADAAG distance standards.
 2. Main Lobby fixture shall incorporate a 2" high LED floor position indicator in the hall lantern fixture with direction arrows located on both sides of the indicator.
- J. Hall Direction Lanterns (Reuse at existing landings)
1. The existing hall lantern/gong fixtures shall be reused.
 - a. Intermediate floor fixtures shall have both "up" and "down" indicators.

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- b. Existing terminal floor hall lanterns shall be removed and reinstalled at the new upper terminal landings.
 - c. A new multi-stroke electronic chime shall be incorporated in the existing lantern fixture.
 - d. Clean each faceplate of rust or paint.
 2. New fixtures duplicating existing materials and finishes shall be provided where existing fixtures have been modified and/or damaged beyond repair.
- K. Hoistway Access Switch (New Passenger Elevator)
 1. Install a cylindrical type keyed switch at top terminal in order to permit the car to be moved at slow speed with the doors open to allow authorized persons to obtain access to the top of the car.
 2. Where there is no separate pit access door, a similar switch shall be installed at the lowest landing in order to permit the car to be moved away from the landing with the doors open in order to gain access to the pit.
 3. Locate the switch in a separate fixture with a flush cover plate at a height of 78" above the finished floor.
 4. This switch is to be of the continuous pressure spring-return type and shall be operated by a cylinder type lock having not less than a five (5) pin or five (5) disc combination with the key removable only in the "OFF" position.
 - a. The lock shall not be operable by any key which operates locks or devices used for other purposes in the building and shall be available to and used only by inspectors, maintenance men and repairmen in accordance with A17.1 applicable Security Group.
- L. Hoistway Access Switch (Existing Elevators)
 1. Existing lower terminal hoistway access switches shall be retained in place.
 2. Existing upper terminal hoistway access switches shall be removed and reinstalled at new upper terminal landings. Patching of opening left behind shall be performed by others.
- M. Fire Command Panel
 1. Provide a Control Panel to be located in the building Fire Command Center.
 2. Provide brushed stainless steel finish faceplate with tamperproof screws.
 3. The panel shall include:
 - a. 2" high LED position and direction indicators.
 - b. Remote fire recall switches for each elevator group, including engraved operating instructions and visual signal.
 - c. Emergency power visual signal.
 - d. Car to Lobby key switches for each elevator

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N. Remote Monitoring System (EMIS)

1. Provide a desk type interactive computer-based Elevator Management Information System (EMIS) with multi-display terminals for all traction elevators. The system shall include:
 - a. The desk type interactive computer-based Elevator Management Information System (EMIS) shall have:
 - 1) A desktop PC with the most current high-performance processor, Windows 7 (64-bit version) or later operating system
 - 2) A 23" flat panel LED HD monitor
 - 3) A color laser printer with 16 ppm B/W and 12 ppm color printing speed
 - 4) A 104-key USB keyboard
 - 5) Locate the system as directed by the Architect
 - 6) Locate the system as directed by the Owner
 - 7) Locate a 17" LED monitor and computer in each machine room for monitoring and trouble shooting of the elevator equipment.
2. Design the system with split screen to display the information in graphic or tabular form as follows:
 - a. Graphic Status Display: Display of an elevation representation of every car in a group.
 - 1) Floor status
 - 2) Group operational mode
 - 3) Car status
 - 4) Hall calls
 - 5) Date and time, building and group identification
 - b. The information indicated above (except for registered hall and car calls and floor security status) shall be displayed on screen simultaneously for each group connected to the EMIS for tabular format.
 - c. EMIS shall monitor various discrete signals from the elevator system and retain a log of up to the last 200 alarms/events.
 - d. The system shall display current status on screen and, from the keyboard, shall allow modification of the security status of each car in the group, including car and hall call registration security lock-out.
3. The EMIS shall be capable of sending information to and receiving instructions from the building security computer (BMS).
4. The system shall provide the ability to use the keyboard to initiate and display interactive elevator operations, including but not limited to the following:
 - a. Display faults and events
 - b. Display alarm messages
 - c. Car and hall calls

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- d. Modifications of some elevator parameters such as door times, etc.
 - e. Any other special operations.
 - f. Security car and hall push button locks shall be controlled on a per unit, per landing, per car or per group basis with fire control over-rides per code.
5. The system shall allow ability to view and print performance data for each group connected to the EMIS through the following screens:
- a. Car operations screen showing the number of door operations, door reversals and car runs.
 - b. Car timing averages screen, showing averages for flight time, door opening and closing.
 - c. Hall calls screen shall show per group basis the number of hall calls in each direction broken down into the number answered in specified intervals.
 - d. Landing summary screen.
 - e. Any additional screens required.
6. The system shall provide the capability to view various reports generated from the data.
- a. The following information for each group shall be shown in reports:
 - 1) Total number of hall calls (up/down)
 - 2) Average waiting times (up/down)
 - 3) Maximum wait and time at which it occurred
 - 4) Number of car calls per car
 - 5) Number of hall and car calls per landing (up/down)
 - 6) Average waiting time per landing
 - 7) Histogram of registration times
 - 8) For preset, adjustable time intervals for each car, a summary will be given of:
 - a) The number of door operations
 - b) Car runs
 - c) Averages of flight times and door times
 - 9) Record of every car and hall call registered
 - 10) Record of all events and alarms.

2.11 CAR ENCLOSURES

A. Existing Elevator Cab Enclosures

1. Provide new car doors for all existing elevators finished in brushed stainless steel.

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2. Provide new swing return panels from 14 ga. brushed stainless steel for all existing elevators, to accommodate new car signal fixtures specified.
3. Provide new car transoms from 14 ga. brushed stainless steel

B. Elevator Cab Enclosure (New Passenger Elevator)

1. Car Shell and Panels

- a. The car sides and rear wall shall be constructed of No. 14 gauge furniture steel.
- b. Apply sound deadening material to the outside face of the shell.
 - 1) Sound deadening material shall be of the rubberized type and shall be of either brush or spray-on consistency.
 - 2) Material shall be applied to a minimum of 1/8" thickness.
- c. The car top shall be of no less than No. 12 gauge sheet steel suitably braced to meet the requirements of the A17.1 Code.
- d. Top of car emergency exit shall include hinging and locking arrangements with electrical safety switch to prevent operation with door open.
 - 1) Attach the top of car exit to the dome of the cab via sash-chain or other suitable means, where the exit cover is not hinged or otherwise permanently attached to the dome.

2. Front Return Panels and Transom: Use 14 gauge furniture sheet steel with proper reinforcing to prevent oil canning.

- a. Swing front return panels shall have required cutouts for the car call buttons, keyed switches, indicators, emergency light fixture, cabinets and the specified special control and signaling devices.
 - 1) Provide concealed full height stainless steel piano hinges of sufficient strength to support the panel, without sagging, in the open position.
 - 2) The concealed locks shall secure the panel at two points with linkage that shall be free of vibration and noise when in the locked position.
 - 3) When locked in the closed position, the front return panel shall be in true alignment with the transom and base.
 - 4) Lock release holes shall be not more than 1/4" diameter and be located at the return side jamb of the panel.
 - 5) Engrave the elevator identification number and capacity, no smoking sign, firefighter instructions, and other code mandated instructions and caution signs directly in the front return panel. Applied panels are unacceptable.
- b. Transom shall be 14 gauge, and be reinforced and constructed the same as the front return panels.
- c. The wall panels shall be constructed of 3/4" thick marine grade plywood.

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- d. Each panel section shall be faced with a selected laminate/veneer or other material and framed in 1/16" thick stainless steel or bronze.
 - e. Frame members shall be separated by 1/2" thick polished metal trim and fitted with 3-1/2" by 3-1/2" polished metal plates at corners.
 - f. Apply furniture steel or suitable laminate to shaft side of panels to prevent warping or other deformations.
3. Cab Doors: Standard 1" thick, 14 gauge hollow metal flush construction, reinforced for power operation and insulated for sound deadening. Paint hatch side of doors black and face cab side with brushed stainless steel.
 - a. The door panels shall have no binder angles. All welds shall be continuous, ground smooth and invisible.
 - b. Drill and reinforce doors for installation of door operator hardware, door protective device, door gibs, etc.
4. Base:
 - a. Provide a finished metal base with a 1/4" wide continuous vent slot above the base to allow the proper amount of air to infiltrate the cab based on the CFM of the exhaust fan and car interior size.
 - b. Prepare base to accept finished floor as selected by the Owner.
5. Removable Wall Panels
 - a. Provide removable type wall panels, faced and edged in laminate to match existing elevators.
6. Entrance Sill:
 - a. Provide car door entrance saddle using an [extruded aluminum sill.
7. Suspended Veiling/Lighting:
 - a. Provide suspended ceiling and lighting to match existing.
8. Flooring:
 - a. Provide finish floor covering to match existing
9. Handrail:
 - a. Provide handrails to match existing.
 - b. Use three (3) points of attachment designed for interior access servicing with exterior support plates.
10. Protection Pads:
 - a. Provide floor-to-ceiling vinyl pads for all wall surfaces with associated hanging hardware.

C. Elevator Cab Enclosure Fan

1. Provide an exhaust type two-speed fan unit with cover grill, mounting accessories and necessary cab enclosure modifications.
 - a. Fan unit shall include self-lubricating motor with housing rubber mounted for sound vibration isolation.
2. Provide a key switch in the elevator cab enclosure for control of fan unit.
3. Provide necessary wiring and approved conduit to properly connect fan unit with power source and control key switch.

2.12 EMERGENCY LIGHTING / COMMUNICATIONS / SIGNALING

A. Battery Back Up Emergency Lighting Fixture and Alarm

1. Provide a self-powered emergency light unit.
 - a. Arrange two (2) of the cab light fixtures to operate as the emergency light system.
2. Provide a car-mounted battery unit including solid-state charger and testing means enclosed in common metal container.
 - a. The battery shall be rechargeable nickel cadmium with a 10-year minimum life expectancy. Mount the power pack on the top of the car.
 - b. Provide a 6" diameter alarm bell mounted directly to the battery/charger unit and connected to sound when any alarm push button or stop switch in the car enclosure is operated.
 - c. The bell shall be configured to operate from power supplied by the building emergency power generator. The bell shall produce a sound output of between 80-90 dBa (measured from a distance of 10') mounted on top of the elevator car.
 - 1) Activation of this bell shall be controlled by the stop switch and alarm button in the car operating station
 - 2) The alarm button shall illuminate when pressed.
3. Where required by Code for the specific application, the unit shall provide mechanical ventilation for at least one (1) hour.
4. The operation shall be completely automatic upon failure of normal power supply.
5. Unit shall be connected to normal power supply for car lights and arranged to be energized at all times so it automatically recharges battery after use.

B. Emergency Voice Communication / Telephone

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1. A hands-free emergency voice communication system shall be furnished in each car mounted as an integral part of the car operating panel.
 - a. Necessary wires shall be included in the car traveling cable and shall consist of a minimum of one shielded pair of 20AWG conductors.
 - b. 120V power shall be provided to power the hands-free device.
2. The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and begin to flash when the call has been answered.
 - a. Engraving shall be provided next to the indicator which says "When lit help is on the way".
3. In addition to the standard "Alarm" button, a separate activation button shall be provided on the car operating panel to initiate the emergency telephone and place a call.
 - a. The telephone must not shut off if the activating button is pushed more than once.
 - b. The telephone shall transmit a pre-recorded location message only when requested by the operator and be provided with an adjustable call time which can be extended on demand by the operator.
 - c. Once two-way communication has been established, voice prompts shall be provided which instruct the operator on how to activate these functions as well as alerting the operator when a call is being attempted from another elevator in the building.
4. The system shall be compatible with ring down equipment and PBX switchboards.
5. The system shall be capable of serving as the audio output for an external voice annunciation system.
 - a. Conversation levels shall measure 60 dbA or higher and measure 10 dbA above ambient noise levels.
 - b. Each device shall be provided with a self-diagnostic capability in order to automatically alert building personnel should an operational problem be detected.
6. The phone shall be able to:
 - a. Receive incoming calls from any On-Site Rescue Station (when provided or required).
 - b. Receive incoming calls from other off-site locations via the public telephone system.
 - c. Acknowledge incoming calls and automatically establishing hands-free two way communications.

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- 1) If no On-Site Rescue Station is provided, each hands-free device shall have built in line consolidation which will allow up to 6 elevators to be called individually from outside the building over a single telephone line and up to 80 elevators if an On-Site Rescue Station is provided.
7. The emergency elevator communication system shall require a maximum of one telephone line.
 - a. The system must provide line sharing capability to eliminate the need for a dedicated telephone line.
 - b. The line sharing function must ensure that the emergency telephones always receive dialing priority even if the line is in use and that the emergency telephones can be called into from an off-site location.
 8. The system shall provide its own four-hour backup power supply in case of a loss of regular AC power.
 9. The system must provide capability for building personnel to call into elevators and determine the charge state of any backup batteries provided for the emergency telephones.
 10. Pushing the activation button in any of the elevator car stations will cause any on-site Rescue Station (where provided or required) or security telephone to ring.
 - a. If the on-site call is not picked up within 30 seconds, the call will be automatically forwarded to a 24-hour off-site monitoring service.
 - b. The arrangements and costs of the off-site monitoring and telephone line shall be by others.
 11. All connections from the junction box to the telephone system shall be done by the Elevator Contractor where existing provisions can be reused.
 12. New telephone lines, where required, shall be provided and interfaced by others.
- C. Firefighters' Two-Way Telephone Communications System
1. Provide a complete two-way telephone communications system for point-to-point communications between authorized personnel.
 2. Provide firefighter telephone jack in the car operating panel in accordance with the requirements of the local authorities. The box shall be fitted with a flush mounted door having hairline joints.
 3. Connection devices (jacks) and all associated wiring shall be provided by the elevator Contractor as part of the base bid.
 4. The handsets shall be self-powered and not require an external power source for operation.
- D. Life Safety System
1. Install Life Safety System speaker in each elevator cab.

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2. Provide all necessary wiring and interfacing between the elevator system and the Life Safety System as required.
3. The Life Safety System speaker shall be furnished under Division 16.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Inspection

1. Study the Contract Documents with regard to the work as specified and required so as to ensure its completeness.
2. Examine surface and conditions to which this work is to be attached or applied and notify the Owner in writing if conditions or surfaces are detrimental to the proper and expeditious installation of the work. Starting the work shall imply acceptance of the surfaces and conditions to perform the work as specified.
3. Verify, by measurements at the job site, dimensions affecting the work. Bring field dimensions which are at variance with those on the accepted shop drawings to the attention of the Owner. Obtain the decision regarding corrective measures before the start of fabrication of items affected.
4. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

3.2 INSTALLATION / PROJECT PHASING

A. Installation

1. Install / Modernize the elevators, using skilled personnel in strict accordance with the final accepted shop drawings and other submittals.
2. Comply with the code, manufacturer's instructions and recommendations.
3. Coordinate work with the work of other building functions for proper time and sequence to avoid delays and to ensure right-of-way of system. Use lines and levels to ensure dimensional coordination of the work.
4. Accurately and rigidly secure supporting elements within the shaftways to the encountered construction within the tolerance established.
5. Provide and install motor, switch, control, safety and maintenance and operating devices in strict accordance with the submitted wiring diagrams and applicable codes and regulations having jurisdiction.
6. Ensure sill-to-sill running clearances do not exceed 1 ¼" at all landings served.
7. Erect guide rails plumb and parallel with a tolerance of 1/8" (plus or minus 1/16")
8. Install rails so joints do not interfere with brackets.
9. Set entrance plumb in hoistway and in alignment with guide rails prior to erection of the front walls.
10. Arrange door tracks and sheaves so that no metal-to-metal contact exists.
11. Reinforce hoistway fascias to allow not more than 1/2" of deflection.

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12. Install elevator cab enclosure on platform plumb and align cab entrance with hoistway entrances.
13. Sound isolate cab enclosure from car structure. Allow no direct rigid connections between enclosure and car structure and between platform and car structure.
14. Isolate cab fan from canopy to minimize vibration and noise.
15. Prehang traveling cables for at least 24 hours with ends suitably weighted to eliminate twisting after installation.
16. After installation, touch up in the field, surfaces of shop primed elements which have become scratched or damaged.
17. Lubricate operating parts of system as recommended by the manufacturer.

B. Removal of Elevators

1. If extenuating circumstances (i.e. separating controller interconnections, inspection, testing, etc.), require that multiple cars of a single elevator group be removed from service simultaneously, the work shall be performed outside of the normal business hours at a time mutually agreed to by the Owner and Contractor.
2. A minimum of five (5) days advance written notice shall be given to the Owner and Elevator Consultant by the Contractor detailing the reasons for the simultaneous removal of the elevators from service along with the estimated out-of-service time.
3. The request shall be subject to review by the Elevator Consultant and approved by the Owner prior to the commencement of the work.
4. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

C. Transfer of Hall Button Risers

1. Transfer of the hall button riser(s) to the new signal control systems shall be performed on a not-to-interfere basis and shall not interrupt building operations or inconvenience building occupants.
2. Costs for this work in addition to associated expenses shall be included as part of the base bid pricing.

3.3 FIELD QUALITY CONTROL

A. Inspection and Testing

1. Upon completion of each work phase or individual elevator specified herein, the Contractor shall, at its own expense, arrange and assist with inspection and testing as may be required by the A.H.J. in order to secure a Certificate of Operation.

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B. Substantial Completion

1. The work shall be deemed "Substantially Complete" for an individual unit or group of units when, in the opinion of the Consultant, the unit is complete, such that there are no material and substantial variations from the Contract Documents, and the unit is fit for its intended purpose.
2. Governing authority testing shall be completed and approved in conjunction with inspection for operation of the unit; a certificate of operation or other required documentation issued; and remaining items mandated for final acceptance completion are limited to minor punch list work not incorporating any life safety deficiencies.
3. The issuance of a substantial completion notification shall not relieve the Contractor from its obligations hereunder to complete the work.
4. Final completion cannot be achieved until all deliverables, including but not limited to training, spare parts, manuals, and other documentation requirements, have been completed.

C. Contractor's Superintendent

1. The Contractor shall assign a competent project superintendent during the work progress and any necessary assistant, all satisfactory to the Owner. The superintendent shall represent the Contractor and all instructions given to him shall be as binding as if given to the Contractor.

3.4 PROTECTION / CLEANING

A. Protection and Cleaning

1. Adequately protect surfaces against accumulation of paint, mortar, mastic and disfiguration or discoloration and damage during shipment and installation.
2. Upon completion, remove protection from finished surfaces and thoroughly clean and polish surfaces with due regard to the type of material. Work shall be free from discoloration, scratches, dents and other surface defects.
3. The finished installation shall be free of defects.
4. Before final completion and acceptance, repair and/or replace defective work, to the satisfaction of the Owner, at no additional cost.
5. Remove tools, equipment and surplus materials from the site.

B. Barricades and Hoistway Screening

1. The Contractor shall provide barricades where necessary in order to maintain adequate protection of areas in which work specified by the Contract Documents is being performed, including open hoistway entrances. Fabrication and erection as all barricades shall be in compliance with applicable OSHA regulations.
2. As required, the Contractor shall provide temporary wire mesh screening in the hoistway and of any elevator undergoing work specified in the Contract Documents. This screening shall be installed in such a manner as to completely

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segregate the hoistway from that of adjacent elevators. Screening shall be constructed from .041" diameter wire in a pattern that rejects passage of a 1" diameter ball.

3.5 DEMONSTRATION

A. Performance and Operating Requirements

1. Passenger elevators shall be adjusted to meet the following performance requirements:

- a. Speed: within 3% of rated speed under any loading condition.
- b. Leveling: within 1/4" under any loading condition.
- c. Typical Floor-to-Floor Time: (Recorded from the doors start to close on one floor until they are 3/4 open at the next floor.)

Passenger Elevators 9.0-9.5 seconds.

Service Elevators 12.0-12.5 seconds.

- d. Door Operating Times

Door Type	Opening	Closing
42" center opening	1.5-2.0 sec.	2.5-3.0 sec.
48" side opening	2.5-3.0 sec.	4.5-5.0 sec.

- e. Door dwell time for hall calls: 4.0 sec with Advance lantern signals
- f. Door dwell time for hall calls: 5.0 sec without Advance lantern signals
- g. Door dwell time for car calls: 3.0 seconds
- h. Reduced non-interference dwell time: 1.0 seconds.

2. Maintain the following ride quality requirements for the passenger elevators:

- a. For speeds up to 1400 fpm, the speed of the car roller guides shall not exceed 500 rpm.
- b. Where pit permits, extend bottom roller guides by not less than one half the distance from the centerline of the upper roller guides to the platform.
- c. Noise levels inside the car shall not exceed the following:
 - 1) Car at rest with doors closed and fan off - 40 dba.
 - 2) Car at rest with doors closed, fan running - 55 dba.
 - 3) Car running at high speed, fan off - 50 dba.
 - 4) Door in operation - 60 dba.

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- d. Vertical acceleration shall not exceed 14 milli-g and horizontal accelerations shall not exceed 20 milli-g.
 - 1) The accelerometer used for this testing shall be capable of measuring and recording acceleration to nearest 0.01 m/s² (1 milli-g) in the range of 0-2 m/s² over a frequency range from 0-80 Hz with ISO 8041 filter weights applied. Accelerometer should provide contact with the floor similar to foot pressure, 60 kPA (8.7psi).
- e. Amplitude of acceleration and deceleration shall not exceed 4.0 ft/sec².
- f. A sustained jerk shall not be more than twice the acceleration.
- g. The rate of change in the acceleration/deceleration rate shall not be greater than 8.0 ft/sec³.

B. Acceptance Testing

- 1. Comply with the requirements of Division 01.
- 2. The Contractor shall provide at least five (5) days prior written notice to the Owner and Consultant regarding the exact date on which work specified in the Contract Documents will reach completion on any single unit of vertical transportation equipment.
- 3. In addition to conducting whatever testing procedures may be required by local inspecting authorities in order to gain approval of the completed work, and before seeking approval of said work by the Owner, the Contractor shall perform certain other tests in the presence of the Consultant.
- 4. The Contractor shall provide test instruments, test weights, and qualified field labor as required to safely operate the unit under load conditions that vary from empty to full rated load and, in so doing, to successfully demonstrate compliance with applicable performance standards set forth in the project specifications with regard to:
 - a. Operation of safety devices.
 - b. Sustained high-speed velocity of the elevator in either direction of travel.
 - c. Brake-to-brake running time and floor-to-floor time between adjacent floors.
 - d. Floor leveling accuracy.
 - e. Door opening/closing and dwell times.
 - f. Ride quality inside the elevator car.
 - g. Communication system.
 - h. Load settings at which anti-nuisance, load dispatch, and load non-stop features are activated.
- 5. Upon completion of work specified in the Contract Documents on the last car in any group of elevators, and in conjunction with the aforementioned testing procedures, the Contractor shall carry out additional testing of group dispatch/supervisory control features in the presence of the Consultant.
- 6. The Contractor shall provide test instruments and qualified field labor as required to successfully demonstrate:

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- a. Independent service operations
 - b. Restricted access security features and card reader controls
 - c. Zoning operations and floor parking assignments
 - d. Up/down peak operation
7. After hour tests of systems such as emergency generators, fire service, and security systems shall be conducted at no extra cost to the Owner.

END OF SPECIFICATION