PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section: Covers and includes furnishing and installing one (1) hydraulic passenger elevator and one (1) hydraulic service elevator as described herein.

B. Related Work By Others:
1. General Contractor shall provide the following requirements which shall be in accordance with requirements of ASME A17.1 Code plus California Building Code. For specific rules, refer to ASME A17.1, Section 300 for hydraulic elevators. State or local requirements must be used if more stringent.
2. Hoistway:
   a. Clear and plumb hoistway with variations not to exceed one-half (1/2) inch at any point. Minimum one (1) hour of fire resistance rating of hatch walls or CA Building Code
   b. Seventy-five degree (75º) bevel guards on all projections, recesses, or setbacks over two (2) inches except for loading or unloading.
   c. Supports for Rail Brackets at Pit, each Floor, and Roof
      1) Maximum allowable vertical spacing of rail supports, without backing. All rails shall be manufacturer's standard type. Divider beams between hoistway at each floor and roof, for guide rail bracket supports.
      2) Hoisting Beam will be required. Coordinate with Elevator Contractor.
   d. Interface of elevator hoistway with hoistway entrance assembly shall be in strict compliance with Elevator Contractor's requirements. Where openings occur, all walls and sill supports must be plumb.
   e. Where drywall or sheet rock construction is used for front walls, it shall be of sufficient strength to maintain doors in true lateral alignment. Drywall Contractor to coordinate with Elevator Contractor.
   f. Front walls and finish floors are not to be constructed until after entrance frames and sills are in place. Consult Elevator Contractor for rough opening size. When drywall construction is used, General Contractor shall supply drywall framing so that wall fire-resistance rating is maintained.
   g. Entrance frames are to be anchored to walls and properly grouted in place to maintain legal fire rating (masonry construction) by Others as required.
   h. For sill support by Elevator Contractor, hoistway capable of accepting anchor stud-type fasteners must be provided.
   i. When fixtures are mounted in drywall, wall thicknesses may increase. General Contractor must coordinate requirements with Elevator Contractor.
   j. All barricades outside elevator hoistways as required.
3. Pit:
   a. Dry pit reinforced to sustain normal vertical forces from rails, jack units, and buffers.
   b. GFI Convenience outlet and light fixture in pit with switch located adjacent to access door or pit ladder.
   c. Where access to pit is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material to extend forty-eight (48) inches minimum above lowest landing sill. Pit ladder must be sixteen (16) inches wide, twelve

(12) inches on center rungs, and seven (7) inches clear to pit wall or obstruction.

d. If pit has sprinklers, all electrical equipment up to forty-eight (48) inches must be NEMA 4.

e. Pit floor to be approximately level but sufficient slope shall be allowed for drainage. No recess shall be allowed unless covered or guarded.

f. Drains connected to sewers shall not be installed in elevator pits.

g. If required, drains connected to holding tanks can be installed in elevator pits. Pumping equipment, provided to remove accidental water from the pit, must be located outside of the hoistway.

h. Partitions not less than six (6) feet high from pit floor shall be provided between the pits of adjacent hoistways. If openings are provided in partitions, they shall reject a two (2) inch ball.

4. Machine Room:

a. Enclosed and protected machine room.

b. Access to machine room and machinery space as required by governing code or authority.

c. Lighting, convenience outlets, heating, cooling, and ventilation of machine room, and machinery space. Machine room temperature to be maintained between sixty-five degrees (65º) F. and eighty degrees (80º) F., with relative humidity of not greater than ninety-five percent (95%) non-condensing.

d. A fused disconnect switch for each elevator and light switch located per the California Electrical Code (CEC), and where practical, located inside the machine room adjacent to the door.

e. Suitable copper feeder, ground, and branch wiring circuits for signal system and power operated door including main line switch. Feeder and branch wiring circuits for car light and fan, including main line switch.

f. Clear access above ceiling, or metal/concrete raceways in floor, for oil line and wiring duct from machine room, if machine room is remote from elevator hoistway.

g. Convenience outlet and telephone outlet on control panel.

h. Cutout through machine room wall, eight (8) inches x sixteen (15) inches, for oil line and wiring duct. Coordinate with Elevator Contractor at the building site.

i. All conduit and wire runs remote from either the machine room or the hoistways.

j. Heat, smoke, or products of combustion sensing devices connected to elevator machine room terminals when such devices are required.

k. Where sprinklers are provided in elevator machine rooms and hoistways, means shall be provided to automatically disconnect the main line power supply to the affected elevator prior to the application of water. This shall not be a self-resetting type. Shunt trips cannot be installed in machine room.

l. Wherever a sensing device or sprinkler is installed in the hoistway, a hatch will be required for service or repair of the device from outside of the hoistway.

m. Miscellaneous: Recesses, supports, and patching as required to accommodate hall button boxes, signal fixtures, etc.

1.3 SUBMITTALS

A. Shop Drawings: Show plans, elevations, sections, and large-scale details indicating

service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment and signals. Indicate variations from specified requirements, maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.

1. Samples: Provide finish color selection brochures and samples of sheet materials.
2. Schematics: Provide wiring diagrams.
3. Maintenance Manuals: Provide Renewal Parts Catalogs and Maintenance Instructions.
4. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.

1.4 QUALITY ASSURANCE

A. Qualifications: Elevator Contractor is a company specializing in manufacturing and installing elevator equipment with not less than five (5) years successful experience.

B. Codes: Contractor shall abide by all existing laws, codes, rules, and regulations set forth by all governmental units and regulatory authorities having competent jurisdiction over Contractor and/or the designs, clearances, construction, workmanship, and material performed or provided by Contractor, unless specifically accepted. Work shall be performed in accordance with latest edition, including amendments, revisions, and/or changes.

1. ASME A17.1 Safety Code for Elevators and Escalators Code
2. 2013 California Building Code for DSA Requirements
3. CEC-California Electrical Code
4. California Code of Regulations: Title 8, Group 4 including Adopted sections of ANSI A17.1-2004 and CCR Title 24.
5. All codes having legal jurisdiction including requirements or which conflict with ASME code.
6. CBC Section 11B-407 Elevator Accessibility
7. Accessibility Requirements: In addition to local governing regulations, comply with Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG).

C. 2013 California Building Code Title 24 Disable Access, Section 11B-407 Elevators: Elevator equipment being provided shall be designed to conform to 2013 California Building Code (CBC) and applicable ADA accessible regulations. These features shall include, but not be limited to:

1. Call Controls:
   a. CBC 11B-407.2.1.1 Height: Call buttons shall be located within one of the reach ranges specified in CBC Section 11B-308, measured to the centerline of the highest operable part.
   b. CBC 11B-407.2.1.2 Size and Shape: Call buttons shall have square shoulders, be 3/4” minimum in the smallest dimension and shall be raised 1/8” above the surrounding surface. Buttons shall be activated by a mechanical motion that is detectable.
   c. CBC 11B-407.2.1.3 Clear Floor or Ground Space: A clear floor or ground space complying with CBC Section 11B-305 shall be provided at call controls.
   d. CBC 11B-407.2.1.4 Location: Call button that designates the up direction shall be located above the call button that designates the down direction.

e. CBC 11B-407.2.1.5 Signals: Call buttons shall have visible signals that will activate when each call is registered and will be extinguished when each call is answered. Call buttons shall be internally illuminated with a white light over the entire surface of the button.

2. Hall Signals:
   a. CBC 11B-407.2.2 Hall Signals: Hall and in-car traveling lantern. A visible and audible signal shall be provided at each hoistway entrance to indicate which car is answering a call and the car's direction of travel. Where in-car signals are provided, they shall be visible from the floor area adjacent to the hall call buttons.
   b. CBC 11B-407.2.2.2 Hall Visible Signals: Visible signal fixtures shall be centered at seventy-two (72) inches minimum above finish floor or ground. The visible signal elements shall be minimum two and one-half (2-1/2) inches high x two and one-half (2-1/2) inches wide and be visible from the floor area adjacent to the hall call button.

   c. CBC 11B-407.2.2.3 Audible Signals: Audible signals shall sound once for the up direction and twice for the down direction indicating the direction of elevator car travel. Audible signals shall have a frequency of 1500 Hz maximum. The audible signal shall be 10 dBs minimum above ambient but not more than 80 dBs measured at the hall call buttons.
3. Hoistway Signs:
   a. CBC 11B-407.1.2.3.1 Floor Designation: Floor designations complying with CBC Sections 11B-703.2 and 11B-703.4.1 shall be provided on both jambs of elevator hoistway entrances. Floor designations shall be provided in both raised characters and Braille. Raised characters shall be two (2) inches high. A raised star placed to the left of the floor designation shall be provided on both jambs at the main entry level. The outside diameter of the star shall be two (2) inches and all points shall be of equal length. Raised characters including the star shall be white of black background. Braille complying with CBC Section 11B-703.3 shall be placed below the corresponding characters and star.
4. Door Operation:
   a. CBC 11B-407.3.2 Door Operation: Elevator hoistway and car doors shall open and close automatically.
   b. CBC 11B-407.3.3 Reopening Device: Elevator doors shall be provided with a reopening device that will stop and reopen the car and hoistway door automatically if the door becomes obstructed by an object or person.
   c. CBC 11B-407.3.3.1 Reopening Device Height: Device shall be activated by sensing an obstruction passing through the opening at five (5) inches and twenty-nine (29) inches nominal above the finish floor.
   d. CBC 11B-407.3.3.2 Reopening Device Contact: The device shall not require physical contact to be activated although contact is permitted to occur before the door reverses.
   e. CBC 11B-407.3.3.3 Duration: Door reopening devices shall remain effective for 20 seconds minimum.
   f. CBC 11B-407.3.4 Door and Signal Timing: The minimum acceptable time from notification that a car is answering a call shall be a minimum of five (5) seconds.
   g. CBC 11B-407.3.5 Door Delay: Elevator doors shall remain fully open in response to a car call for five (5) seconds minimum.
   h. CBC 11B-407.3.6 Elevator Door Width: The width of the elevator doors shall comply with CBC Table 11B-407.4.1.

5. Elevator Car Requirements
   a. CBC 11B-407.4.1 Car Dimensions: Inside dimensions of elevator cars and clear width of elevator car door shall comply with CBC Table 11B-407.4.1.
   b. CBC 11B-407.4.2 Floor Surfaces: Floor surfaces in elevator car shall comply with CBC Sections 11B-302 and 11B-303.
   c. CBC 11B-407.4.3 Platform to Hoistway Clearance: Clearance between the car platform sill and the edge of any hoistway landing shall be one and one-quarter (1-1/4) inches maximum.
   d. CBC 11B-407.4.4 Leveling: Each car shall be equipped with a self leveling feature that will automatically bring and maintain the car at floor landings within a tolerance of one-half (½) inch under rated load to zero loading conditions.
   e. CBC 11B-407.4.5 Illumination: The level of illumination at the car controls platform, car threshold, and car landing sill shall be five (5) foot candles minimum.
6. Elevator Car Controls:
   a. CBC 11B-407.4.6.1 Location of Car Controls: Controls shall be located within one of the reach ranges specified in CBC 11B-308
   b. CBC 11B-407.4.6.2.1 Size and Shape of Car Buttons: Buttons shall have square shoulders, be three-quarter (¾) inch minimum in their smallest dimension and be raised one-eighth (1/8) inch above the surrounding surface.
   c. CBC 11B-407.4.6.2.2 Arrangement: Buttons shall be arranged with numbers in ascending order.
   d. CBC 11B-407.4.6.2.3 Illumination: Car control buttons shall be illumination.
   e. CBC 11B-407.4.6.2.4 Operation: Car control buttons shall be activated by a mechanical motion that is detectable.
7. Emergency Controls:
   a. CBC 11B-407.4.6.4 Emergency Controls: Emergency control buttons shall have their centerline thirty-five (35) inches minimum above finish floor.
   b. CBC 11B-407.4.6.4.2 Location: Emergency controls including emergency alarm shall be grouped at the bottom of the panel.
8. Car Control Buttons:
   a. CBC 11B-407.4.7.1.1 Type: Control buttons shall be identified by raised characters or symbols white on black background complying with CBC Section 11B-703.2 and Braille complying CBC Section 11BH-703.3.
   b. CBC 11B-407.4.7.1.2 Location: Raised characters or symbols and Braille designations shall be placed immediately to the left of the control button to which the designations apply.
   c. CBC 11B-407.4.7.1.3 Symbols: The control button for the emergency stop, alarm, door open, door close, main entry floor, and phone shall be identified by raised symbols and Braille as shown in CBC Table 11B-407.4.7.1.3.
   d. CBC 11B-407.4.7.1.4 Visible Indicators: Buttons with floor designations shall be provided with visible indicators to show that a call has been registered. The visible indication shall extinguish when the car arrives at the designated floor.
   e. CBC 11B-407.4.7.1.5 Button Spacing: A minimum clear space of three-eighths (3/8) inch or other suitable means of separation shall be provided between rows of control buttons.
9. Car Position Indicators:
   a. CBC 11B-407.4.8 Car Position Indicators: Audible and visible car position indicators shall be provided in elevator cars.
   b. CBC 11B-407.4.8.1.1 Size: Characters shall be one-half (½) inch high minimum.
   c. CBC 11B-407.4.8.1.2 Location: Indicators shall be located above the car control panel or above the door.

d. CBC 11B-407.4.8.1.3 Floor Arrival: As the car passes a floor and when a car stops at a floor served by the elevator, the corresponding character shall illuminate.
e. CBC 11B-407.4.8 Car Position Indicators: Audible and visible car position indicators shall be provided in elevator cars.

10. Emergency Communications:
    a. CBC 11B-407.4.9 Emergency Communications: Emergency two-way communications systems shall comply with Section 11B-308. Raised symbols or characters while on black background and Braille shall be provided adjacent to the device and shall comply with CBC Sections 11B-703.2 and 11B703.3. Emergency two-way communication systems between the elevator and a point outside the hoistway shall comply with ASME A17.1.
11. Car Hand Rails:
    a. CBC 11B-407.4.10 Support Rail: Support rails shall be provided on at least one wall of the car.
    b. CBC 11B-407.10.1 Location: Clearance between support rails and adjacent surfaces shall be 1-1/2” minimum. Top of support rails shall be 31” minimum to 33” maximum above the floor of the car. The ends of the support rail shall be six (6) inches maximum from adjacent walls.
    c. CBC 11B-407.4.10.2 Surfaces: Support rails shall be smooth and any surface adjacent to them shall be free of sharp or abrasive elements.
    d. CBC 11B-407.4.10.3 Structural Strength: Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of two-hundred fifty (250) pounds is applied at any point on the support rail, fastener, mounting device, or supporting structure.

1.5 WARRANTY

A. Elevator Contractor shall guarantee material and workmanship of equipment installed under these specifications and make good any defects not due to ordinary wear or to improper use which may develop within one (1) year after installation completion or acceptance thereof by beneficial use, whichever is earlier. Defects include, but are not limited to, component failure, poor performance, unusual or excessive component wear, noise, or vibration. At the end of month 10 of the warranty, elevator contractor shall request annual CA DOSH inspection of elevators and any punch lists shall be the responsibility of the elevator contractor.

B. Should Elevator Contractor not remedy such defects within a reasonable time, Owner has the option to contract services of Others to remedy the defect. All costs associated with such remedy will be charged directly to Elevator Contractor. Further, Elevator Contractor will be required to accept such work under the terms of the existing warranty.

1.6 MAINTENANCE

A. Warranty Maintenance Service: Beginning at Substantial Completion, provide twelve (12) months’ full maintenance service by skilled employees of the elevator contractor Include monthly preventative maintenance, repair, or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity. Provide parts and supplies as used in the manufacture and installation of original equipment. At the end of month 10 of the warranty, Elevator Contractor shall request annual CA DOSH inspection of

elevators and any punch lists shall be the responsibility of the elevator contractor. All maintenance shall comply with Part 8 of the ASME A17.1 2004 Code and CA Title 8 Group 4.

1. Perform maintenance during normal working hours. Include emergency callback service 7 days /24 hours at no additional cost. Response Time shall be two (2) hours or less.

B. Continuing Maintenance Service: SDSU will have the option to contract with Elevator Contractor or existing campus elevator service company.

1.7 PROPRIETARY INFORMATION

A. Any proprietary material, information, or data contained in the equipment, or any component or feature thereof, remains the property of the Owner. This includes, but is not limited to, tools, devices, manuals, software, source codes, access codes, object codes, passwords, and remote monitoring feature.

PART 2 – PRODUCTS

2.1 ELEVATOR SYSTEM AND COMPONENTS

A. Passenger Elevator No. 1:

1.	Type:	Direct Plunger
2.	Service:	Passenger
3.	Capacity:	3500 Pounds
4.	Speed:	125 FPM
5.	Stops:	5
6.	Front Openings:	Basement, 1st Floor, 2nd Floor
7.	Rear Openings:	Lower 1st Floor, Lower 2nd Floor
8.	Travel:	32’ 0” +/- As Shown
9.	Control:	Resistance A.C.
10.	Operation:	Simplex Selective / Collective
11.	Machine Location:	Adjacent at Basement
12.	Special Operations:	Independent Service Fire Emergency Service Emergency Battery Lowering Card Access
13.	Car Enclosure Type:	Passenger 6’ 8” W by 5’ 5” D by 8’ 0” H
14.	Signals and Fixtures:	Vandal-Resistant
a.	Car Operating Panels:	Swing Return Type (Front and Rear)
b.	Car Position Indicator:	Integral with Car Panel
c.	Car Position Indicator:	Integral with Car Panel
b.	Communication System:	Integral with Car Panel
c.	Service Cabinet:	Integral with Car Panel
d.	Hall Pushbuttons:	Vandal-Resistant
e.	Hall Position Indicator:	All Floors with Hall Lantern
15.	Passenger Entrance Type:	Side Slide Single Speed
a.	Size:	3’ 6” W by 7’ 0” H
b.	Frames:	No. 4 Stainless Steel
c.	Doors:	No. 4 Stainless Steel
d.	Sills:	Aluminum

16.	Miscellaneous Items:	Disabled Access Requirements Key-Operated Hoistway Access Earthquake Requirements

B. Service Elevator 2

1.	Type:	Direct Plunger
2.	Service:	Service with Class C3 Loading
3.	Capacity:	4500 Pounds
4.	Speed:	150 FPM
5.	Stops:	4
6.	Front Openings:	Basement, 1st Floor, 2nd Floor, 3rd Floor
7.	Travel:	51’ 0” +/- As Shown
8.	Control:	Resistance A.C.
9.	Operation:	Simplex Selective / Collective
10.	Machine Location:	Adjacent at Basement
11.	Special Operations:	Independent Service Firefighter’s Emergency Service Emergency Battery Lowering Operation Card Access Door Hold Button
12.	Car Enclosure Type:	Passenger/Service
	a. Inside Clear:	5'-8" W by 7'-11” D by 9’-0" H
13.	Signals and Fixtures:	Vandal-Resistant
	a. Car Operating Panels:	Swing Return
	b. Car Position Indicator:	Integral with Car Panel
	c. Communication System:	Integral with Car Panel
	d. Service Cabinet:	Integral with Car Panel
	e. Hall Pushbuttons:	Vandal-Resistant
	f. Hall Position Indicator:	All Floors with Hall Lantern
14.	Passenger Entrance Type:	Side Opening Two Speed
	a. Size:	4'-0" W by 8'-0" H
	b. Frames:	No. 4 Stainless Steel
	c. Doors :	No. 4 Stainless Steel
	d. Sills:	Nickel Silver
15.	Miscellaneous Items:	Disabled Access Requirements Key-Operated Hoistway Access Earthquake Requirements

2.2 APPROVED MANUFACTURERS

A. Approved Manufacturers:
1. Mitsubishi Elevator
2. Otis Elevator
3. ThyssenKrupp Elevator
4. KONE Elevator
5. Specialized Elevator

B. Control Systems:
1. Motion Control Engineering 2000

C. Hydraulic Pumping Units:
1. V-Belt – Dry Type Pump Unit and Oil Cooler

D. Hydraulic Valves:
   1. EECO
   2. Maxton

E. Door Operator Equipment:
   1. ECI 1000 (CL)
   2. GAL MOVFR (CL)

F. Door Re-Opening Device:
   1. Janus PanaChrome

G. Signal Equipment Vandal Resistant:
   1. Innovation
   2. ERM

H. Passenger Elevator Cab and Cab Enclosures:
   1. Sterling Corporation
   2. City Lift

2.3 APPROVED FINISH MATERIALS

A. Provide the following materials and finishes for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated:
   1. Satin Stainless Steel: ASTM A 666, Type 304 with No. 4 Directional

2.4 ELEVATOR PERFORMANCE REQUIREMENTS

A. Elevator Riding Qualities: Elevator Contractor shall make any necessary adjustments to maintain a pleasing and comfortable elevator ride, as determined by Owner.
   1. Elevator operation, while traveling at full speed, shall be smooth and easy, without vibration.
   2. Elevator operation, when transitioning from starting, acceleration, deceleration, leveling or stopping, shall be smooth and easy, without abruptness.
   3. Operation of elevator's emergency stop switch shall quickly stop the elevator's motion, however, shall not be violent.
   4. Noise levels inside car shall not exceed the following:
      a. Car at rest with doors closed and fan off – 40 dBa.
      b. Car at rest with doors closed, fan running – 55 dBa.
      c. Car running at high speed, fan off – 50 dBa.
      d. Door in operation – 60 dBa.
   5. Side-to-side, front-to-back, and vertical accelerations, measured in either direction, shall not exceed fifteen (15) milli-g based on ISO/A95 readings taken by the PMT accelerometer, or approved equal.

      Amplitude of acceleration and deceleration shall not exceed four (4) feet per second for geared elevators. A sustained jerk shall not be more than twice the acceleration.

B. Elevator Car Performance:
   1. Rated Contract Speed: Regardless of load or direction, variance from rated contract speed shall not exceed fifteen (15) percent in either direction.
   2. One-Floor Run Time (Start-to-Stop): Elevator shall not exceed 9 (nine) seconds from the time it takes to start; travel one floor; level; and stop at that floor.

3. Leveling: Elevator shall level within one-quarter (1/4) inch, regardless of load or direction of travel.

C. Elevator Door Performance:
1. Passenger Elevator Door Performance Times:
   a. Door Open: Doors shall go from fully CLOSED position to fully OPEN position in 2.0 seconds.
   b. Door Close: Doors shall go from fully OPEN position to fully CLOSED position in 3.0 seconds.
   c. Door Dwell Times: Car Call and Hall Calls shall be as required by ADA code. Times shall be field adjustable and separately adjustable for a Car Call or Hall Call Stop.
2. Service Elevator Door Performance Times:
   a. Door Open: Doors shall go from fully CLOSED position to fully OPEN position in 3.0 seconds.
   b. Door Close: Doors shall go from fully OPEN position to fully CLOSED position in 4.0 seconds.
   c. Door Dwell Times: Car Call and Hall Calls shall be as required by ADA code. Times shall be field adjustable and separately adjustable for a Car Call or Hall Call Stop.
3. Door Closing Pressure (or Kinetic Energy): Shall not exceed thirty (30) pounds of pressure per code.
4. Door Protection Timer: Shall be provided for both the open and close directions. Shall cease attempting to open door after a predetermined adjustable time in the event that door is prevented from reaching open position. Will reopen doors for a short time in the event that door-close attempt fails to close door locks after a predetermined time.
5. Nudging Action: In the event of an obstructed door protection device for a predetermined time interval (25.0 to 30.0 seconds), buzzer shall sound and doors shall attempt to close at the maximum kinetic energy allowed by Code.

2.5 OPERATING SYSTEMS

A. General: Features specified are minimum requirements. Inclusion of the listed operations will provide a minimum amount of system flexibility to reduce response time and intervals.
1. Bid features specified are minimum requirements and shall be non-proprietary. The features specified are minimum requirements. It shall be the responsibility of the Elevator Contractor to provide descriptive information of their system describing the various enhancements and their operation.

B. Simplex Selective Collective Operation
1. Arrange for Simplex Selective Collective Automatic Operation. Operate elevators from a single riser of landing buttons and from operating device in car.
2. Momentary pressure on one or more car or hall button, other than those for landing at which car is standing, starts car and causes car to stop at first landing for which a car or landing call is registered corresponding to direction of travel. Stops made in order in which landings are reached irrespective of sequence in which calls are registered.

3. Double door operation not permitted. If an Up traveling car is passenger occupied for an intermediate floor and a Down call is registered at that floor, with no calls above car, car travels to floor, opens doors to let passenger out, lights down direction arrow in hall lantern, and accepts waiting passenger without closing and reopening doors.
4. System shall have the capability of printer connection for printout. All diagnostic equipment shall be built into the control cabinets or provided separately as part of the base system. No required diagnostic equipment shall be removed from equipment room.
5. Diagnostics and Monitoring
   a. System shall be provided with capabilities for monitoring command and diagnostic computer and printer.
   b. Provide laptop computer or other approved diagnostic tools and software. Software shall be M View.

2.6 AUXILIARY OPERATIONS

A. Independent Service:
1. Key-operated switch shall be provided for selecting independent service operation. When switch is turned to the “on” position, all previously registered car calls for that car shall be canceled and an attendant shall be required to operate the car.
2. The car shall park with its doors open. The closing of the doors and starting the car shall be subject to constant pressure on a floor button in the car operating panel until the car starts in motion. If the floor button is released before the doors are fully closed, doors shall reopen.
3. After car is in motion, floor button may be released and car shall automatically proceed to and stop at floor for which the car call was registered.
4. A car operating on independent service shall automatically bypass registered Hall Calls. Registered Hall Calls shall not be canceled, but shall remain registered and answered by a car in normal automatic operation.
5. When independent service switch is turned to the “off” position, car shall be restored to normal operation.

B. Key-Operated Hoistway Access:
1. Key-operated switches shall be furnished in the hoistway entrance jamb at top and bottom floor for hoistway access. A key-operated switch shall be furnished in service cabinet to place car on access control.
2. Operation of hoistway access switches, after initiation by car operating switches, shall operate car with hoistway doors open at the respective floor being operated and allow access to top or bottom of hoistway.
3. Rail-mounted switches shall be provided to limit car travel to comply with Code.

C. Card Reader Provisions:
1. For access to restricted landings. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. Provide cutout and Plexiglas lens for card reader.
   a. Car readers and other security access system equipment provided and installed by Others.

D. Firefighters Emergency Service Phase I and II:
1. <u>Phase I Operation</u>:

a. Description to be according to Standard Fighter's Emergency Service Operation Code. It is the Elevator Contractor's responsibility to provide Firefighter's Service to meet specific job location requirements.

2. Phase I and II Switches:
   a. Shall operate by the same key.
   b. Manufacturer's standard key shall be used.
   c. Key shall not operate any other device and no other key shall operate.
   d. Appropriate Firefighter's Service key switch, jewel, fire and call cancel buttons, door open, door close buttons, and instructions shall be grouped together at the top of the main car operating panel behind a locked panel. Panel shall have hairline joints and concealed hinges. All buttons and switches shall be readily available, located not more than seventy two (72) inches above the floor.
      1) Provide a three-position (Reset, Off, On) key-operated switch at the designated level. Switch shall be provided with an illuminated visual signal to indicate when Phase I Emergency Recall Operation is in effect. The key shall be removable in the On and Off position. With the key in the Off position, normal elevator service shall be provided and the smoke/combustion detectors shall be functional.

      2) Smoke detectors shall be provided in the elevator lobby, at each floor, and in the associated elevator machine room and hoistways, if sprinklered. Smoke detector operation at the main or designated level as approved by governing authority. Smoke detector activated operation shall only be reset manually. The key switch at the designated level in the Reset position shall delete the Fire Service command and restore the elevators back to normal operation only if the fire alarm initiating device has been cleared. If the fire initiating device is still active (On), Phase I Emergency Recall Operation will continue in effect.
      3) Phase I Operation shall be initiated by the activations of the smoke/combustion detectors or by placing the designated level key switch in the On position, the following operation shall occur:
         a) All cars controlled by this activation shall return non-stop to the designated level; doors shall open, and remain open.
         b) A car traveling away from the designated level shall reverse at the next available floor, without opening its doors, and cause it to proceed to the designated floor non-stop.
         c) Door reopening devices on power-operated doors affected by smoke or heat shall be rendered inoperative. Mechanically-operated devices shall remain operative.
         d) Cars standing at any floor other than the designated floor shall close their doors and proceed to the designated floor without stopping for Car or Hall Calls.
         e) Cause car and hall buttons to become inoperative and extinguish call register lights and hall lanterns. Position indicators shall remain operative.
         f) Cause the emergency stop switch to become inoperative once the car has started in motion. All other emergency devices shall remain operative.

g) All cars shall be provided with a visual and audible signal system which shall be activated until the car has returned to the designated level.

h) A car standing at a landing shall have the door open button rendered inoperative as soon as the door is closed and the car starts to the designated level. It shall remain inoperative until the car has returned to the designated or alternate level.

3. Phase II Operation:

a. A three-position (Off, Hold, On) key-operated switch shall be provided in the car operating panel in each car. Firefighter's Service key switch, jewel, fire and call cancel buttons, door open, door close buttons, and instructions shall be grouped together at the top of the main car operating panel behind a locked panel. Panel shall have hairline joints and concealed hinges. All buttons and switches shall be readily available, located not more than seventy two (72) inches above the floor.

b. The switch shall become effective only with Phase I Operation is in effect and the car has returned to the designated or alternate floor. The key shall be removable in only the Off and Hold position. Operation on the switch shall not change operation until the car is at a floor with the doors fully open.

c. When the switch is in the Off position, Phase I Operation shall be in effect, if activated.

d. The switch in the Hold position shall cause the car to remain at the first floor with its doors open and the door close button shall be inoperative after the car has been placed into Phase II Operation at the designated or alternate level.

e. Operation of the key switch to the On position shall place the elevator on Phase II Operation. The operation shall be as follows:

1) Elevator shall be operated only by a person in the car registering Car Calls.

2) All hall lanterns and corridor buttons shall remain inoperative.

3) Doors shall be opened by constant pressure of the door open button and, if pressure on this button is released prior to the time the doors reach their full open position, doors shall immediately reclose. Once the doors are fully open, they shall remain open until the closing procedure is initiated as described herein.

4) After registration of a Car Call, doors shall be closed by constant pressure on the door close button.

5) Car Calls registered in error may be cancelable by momentary operation of the cancel button.

6) Upon completion of the door close operation and the registering of a Car Call, car shall travel to the Car Call floor and stop with the doors closed.

7) Car shall operate only by registration of a Car Call in the car and does not respond to Hall Calls.

8) Door reopen devices rendered inoperative in Phase I Operation shall remain inoperative.

9) Turning Key-operated switch in the hall to the Off position, Hold position, or resetting the smoke/combustion sensors shall not override car switch.

10) Appropriate Firefighter's Service key switch, jewel, fire, and call cancel buttons, door open, door close buttons, and instructions shall be grouped together at seventy-two inches (72") in the top of the main car operating panel behind a locked panel. Panel shall have hairline joints and concealed hinges.

E. Battery Powered Lowering Device:
1. Shall have recharging capabilities.
2. Shall have an ON/OFF switch and a test switch.
3. Shall function as follows:
In the event of a loss of normal electrical service, shall automatically activate.
a. Upon activation, elevator shall safely descend to the lowest landing.
b. Doors shall remain closed until proper landing is reached at which time the doors shall automatically open.
c. Elevator shall safely shut down until normal power is restored.
d. When normal power is restored, device shall reset and be functional for future events.

F. Car Top Inspection:
1. An inspection station shall be provided on top of the car for operation of car at low speed by authorized personnel. Station shall contain an inspection toggle switch, UP and DOWN buttons, and a Run/Stop toggle switch. A safety button shall be provided. When car top inspection switch is turned to Inspection position, car shall be put on inspection operation.
2. Car shall be run either UP or DOWN by constant pressure on the UP or DOWN button and the safety button providing doors are closed and the safety circuit is made. Releasing the button shall cause car to stop immediately. Turning the Run/Stop switch to the Stop position shall render the car inoperative.
3. Turning the inspection switch to the Run position shall restore car to automatic operation.
4. Car top light and power outlet shall be provided. It may be an integral part of car top inspection station or a separate unit.
5. Car top shall have code compliant railings and kick plates.

2.7 HYDRAULIC MACHINE ROOM EQUIPMENT

A. General: Arrange equipment to fit in machine room space and meet all clearance code requirements. Provide identifying numbers on pumping unit, oil cooler, controller, and disconnect switch. Comply with N.E.C. Article 110-16a Working Clearances.

B. Pump Unit:
1. Provide positive-displacement type with a maximum ten percent (10%) variation between no load and full load and with minimum pulsations.
2. Pump unit must be self-contained and sound-isolated. Frame to have structural channels having a section depth equal to or greater than 1/10th the maximum frame dimension. Provide cross members as required to support the unit.
3. Pump shall be V-belt (dry type).
4. Motor shall be rated and capable of providing a minimum of 120 starts per hour.
5. Valve shall be integral type.
6. Oil coolers with temperature control, ½ HP motor.

7. For pump units located on occupied floors: Furnish four (4) stable steel springs with integral seismic restraints, having a minimum static deflection of one (1) inch. Locate springs at the four corners of the unit and attach to the auxiliary frame or unit with height-saving brackets. Provide a minimum clearance of one (1) inch between the bottom of the frame or unit and the slab below. Vibration isolators shall be Mason Industries Type SLR or approved equal.

C. Oil Reservoir: Provide oil reservoir (tank) with capacity equal to plunger displacement plus an additional twenty-five (25) percent. Tank heaters, oil level gauge, and strainers shall be provided.

D. Hydraulic Oil: Hydraulic oil type to be ISO VG 32 turbine oil with a viscosity of 150 ssu @ 100o F (38o C). A minus pour point is recommended. A bio-degradable (vegetable) oil that does not contain a high acidic property is acceptable if it meets the same specifications.

E. Hydraulic Silencer: Provide hydraulic silencer containing pulsation-absorbing material in a blowout-proof housing between pump unit and cylinder.

F. Controller:
1. Non-Proprietary MCE 2000 Microprocessor-based control devices shall be housed in an enclosed, free-standing, NEMA I cabinet and be capable of wall or floor mounting.
2. Printed circuit boards shall be of the highest quality and shall be fitted into permanently aligned sockets.
3. Supervisory unit shall be programmable to allow for on-site modifications.
4. Individual car controller shall be designed to control the starting, acceleration, deceleration, and stopping of the elevator. Controller shall automatically cut the power supply and stop the car in response to the operation of a safety device. Electro-mechanical contactors shall be used to provide code-required safety circuit protection. All switches and contactors shall be mounted for easy access. All switches and contractors shall be approved and rated for the duty required.
5. Controller wiring shall be flame-resistant and neatly formed and tied. The terminals shall have suitable means of permanent identification.
6. No mechanical timers shall be used. Timers shall be of electronic components. All timers shall be field programmable without requiring system shutdown. Arrange circuits for prevention of accidental grounding defeating the safety circuits.
7. Program controller to identify a low oil condition or inability of elevator to reach the top landing within a pre-programmed time.
8. Provide Nordic Soft Start rated at a minimum fifty-seven (57) percent of motor horsepower rating.
9. Provide battery-powered lowering device which may be an integral part of controller or separate unit.

G. Piping:
1. All piping shall be a minimum of Schedule 40 with a 500-pound working pressure.
2. All piping to be above ground and accessible and not crossing any expansion joints.
3. Flexible hoses will not be acceptable in any part of feedline.
4. Sound couplings shall be installed in feedlines between the pumping unit and the jack assembly.
5. Where piping is suspended, utilize neoprene vibration isolation hangers. The vibration isolators shall be Mason Industries Type HD with a minimum static deflection of 0.2 inches.

6. Where piping is floor mounted, utilize Unistrut saddle supports with neoprene vibration isolation hangers. The vibration isolators shall be Mason Industries Type ND with a minimum static deflection of 0.2 inches.
7. Provide vibration-isolated couplings between the pump unit and oil lines.
8. Provide an oversized opening through the slab or wall for the oil line penetration. Utilize a sleeve having a diameter equal to two inches greater than the oil line. Center the oil line in the sleeve. Pack the opening with an approved resilient material which maintains the required fire separation.

2.8 WIRING AND TRAVELING CABLES

A. Wiring:
1. General:
   a. Wiring shall be installed for the proper operation of equipment.
   b. Wiring shall be in strict compliance with applicable codes.
   c. Wiring shall be completely and adequately enclosed in raceway, conduit, or gutters. Raceway, conduit, and/or gutters must meet applicable codes. Flexible metal conduit may be used for short runs (maximum thirty-six [36] inches). Raceways, conduits, and/or gutters shall be configured so as to not damage wire being installed within or pulled-through.
   d. Wiring shall be properly identified with marking tags to correspond with field wiring diagrams.
   e. Wiring shall be copper; solid wire not acceptable.
   f. Wiring shall contain Underwriters Laboratories labels.
2. Machine Room Wiring: Shall be sized for appropriate type of current loads.
3. Communication Cable: Shielded communication cable shall be furnished for interconnections of controllers.
4. Power Wiring: Wiring of proper size and type to provide for proper electrical protection of furnished equipment.
5. Hoistway Wiring: Wiring of proper size and type to provide for proper electrical protection of furnished equipment.
6. Wiring between Hoistway and Machine Room: Wiring of proper size and type to provide for proper electrical protection of furnished equipment.
7. Hoistway Door Interlocks Wiring: Shall be type “SF” high-temperature resistant wiring. Splicing of “SF” high-temperature wire in gutter, raceway, or conduit is not allowed; all runs to run back to controller.

B. Traveling Cables:
1. Shall be furnished with an adequate number of conductors. All traveling cables shall not contain over seventy-five (75) conductors per cable. Ten (10) percent spares shall be provided in all traveling cables. Cables shall contain No. 14-gauge wires for lighting supply. Provide eight (8) #20 AWG shielded twisted pairs for card readers and one (1) RG 6 coaxial cable.
2. Shall be suspended so as to minimize strain on individual copper conductors. Shall be supported per Code.
3. Traveling cable supports shall be located so as to minimize the possibility of damage due to cables coming in contact with hoistway construction or equipment in the hoistway. Where necessary, suitable guards shall be provided.
4. Shall have an outer covering that is flame-retardant and moisture-resistant, and satisfies the Underwriters Laboratories Standard Test.
5. All wiring shall be properly identified to provide for easy connections.

2.9 SIGNAL EQUIPMENT-PASSENGER ELEVATORS

A. Car Control Stations:

1. A swing car return panel shall be provided manufactured from 1/8" stainless steel material with No. 4 finish. Panel shall contain vandal-resistant floor call buttons corresponding to the number of floors served plus the standard devices of door open, door close, alarm, emergency stop buttons and certificate frame.
2. Passenger elevator car controls shall have a minimum dimension of ¾ inch and shall be raised 1/8 inch above the surrounding surface. Control buttons shall be vandal resistant LED illuminated shall have square shoulders and shall be activated by a mechanical motion that is detectable. All control buttons shall be designated by 5/8 inch minimum raised characters and standard raised symbols immediately to the left of the control button. Contracted (Grade 2) Braille shall be located immediately below the character or symbol. A minimum clear space of 3/8 inch or other suitable means of separation shall be provided between rows of control buttons. The raised characters and symbols shall be white on a black background.
3. Standard required cluster of devices shall be located at a centerline height of 35 inches from cab floor to comply with handicap requirements. All standard required devices and floor call buttons shall have handicap indications adjacent to them.
4. Engrave car operating panel as indicated below. Engraving shall be filled with epoxy of contrasting color.
   a. Capacity of elevator shall be in ¾" numerals/lettering.
   b. Number of passengers shall be in ¾" numerals/lettering.
   c. Elevator number shall be in ¾"' numerals/lettering.
   d. Phase II Fire Emergency Instructions shall be sized per Code.
5. Provide a hands-free telephone meeting all ADA regulations. Mount behind a pattern of holes in the swing return. It shall be identified by a raised telephone symbol and corresponding Braille lettering and located adjacent to the device. Provide all wiring to make function as required. Program automatic dialer as directed. ADA Communication device shall be Talk-A-Phone Model EPT 400.
6. Firefighter's Service key switch, jewel, fire and call cancel button, door open button, door close button, and instructions shall be grouped together at the top of the main car operating panel behind a locked panel. Firefighter's service key switches to be ERM "KS" type. Panel shall have hairline joints and concealed hinges. All buttons and switches must be readily available and not more than seventy two (72) inches above floor.
7. Provide cut-out and Plexiglas cover for card/proximity reader. Card reader by Others.
8. For service cabinet, provide as a minimum, independent service key switch, fan and dimmer light switches, duplex convenience outlet, keyed stop switch, inspection switch, nudging buzzer, means to test emergency light. These switches shall be clearly identified as to their function. Service cabinet shall be integrated into car operating panel. Cabinet door shall be lockable with concealed hinges and hairline joints. All key operated switches shall be Sargent "SDS" 700-800 Series switches. Key switch for Sargent cylinder to be flush mounted type HBF-CC-KA self-centering key switch. (www.sdcsecurity.com)
9. Service Elevator Only: Provide door hold button to hold doors open for loading and unloading. Door hold open time to be adjustable from one (1) minute to ten (10)

minutes. Pushing door hold button while door is open shall cancel the remaining time, close doors, and allow the elevator to return to service.

B. Rear Car Control Station - Elevator 1 Only

1. An auxiliary swing car return panel shall be provided manufactured from 1/8" stainless steel material with No. 4 finish. Auxiliary car operating panel shall be furnished to be installed on the opposite side of the car door entrance from the main operating panel. The auxiliary panel shall include the standard operating devices essential for passenger operation.
3. This panel shall be located at the same height as the main car operating panel and shall contain a cover plate of the same design as the main car operating panel.
3. Only normal passenger operated devices shall be located in this panel.
4. Other devices such as telephone, intercom, or special requirements may be included if space for these devices is not adequate in main panel.
5. All devices that are duplicates of main operating panel devices shall be of the same design as the main panel devices and be access compliant.

C. Car Position Indicator:

1. An electronic readout type position indicator shall be provided to give a visual indication of car position.
2. As car travels through the hoistway, numeral corresponding to floor at which car has stopped or is passing shall be displayed on the position indicator. The numeral shall be formed on a 7-segment LED or "dot matrix" display, from information received from the controller. Change from one numeral to another shall be instantaneous and complete.
3 Readout size letters shall be minimum two (2) inches in height.
4. Readout shall be located in the swing return panels. Front and rear on elevator 1.
5. As the car passes or stops at a floor served by the elevators, the corresponding numerals shall illuminate, and an audible signal shall sound. Numerals shall be a minimum of one-half (½) inch high. The audible signal shall be no less than twenty (20) decibels with a frequency no higher than 1,500 Hz. An automatic verbal announcement of the floor number at which a car stops or which a car passes may be substituted for the audible signal.

D. Hall Pushbutton Stations:

1. Provide one (1) riser of corridor vandal-resistant call buttons. Button assembly shall consist of a single LED illuminated button for each terminal landing. Button assembly shall consist of two LED illuminated buttons for intermediate landing. Locate hall pushbutton stations to allow view of car directional lanterns.
2. Button or other indication shall be illuminated when it is pressed for the desired direction and the action registered in the group control. Buttons shall be identical to
floor call buttons in car operating panel unless specifically detailed to be of other designs. The centerline of the hall call buttons shall be forty-two (42) inches above the floor. Buttons shall be a minimum of three-quarter (¾) inch in size and shall be raised one-eighth (1/8) inch above the surrounding surface. Button designating the up direction shall be on top
4. A Fireman's Service switch assembly shall be provided at the Fire Recall Floor(s) as required by Code. Fireman's Service switch may be located in Fire

Recall Floor pushbutton riser. Firefighters service key switches to be ERM "KS" type.

5. Engrave fire exiting pictograph and instructions on faceplates. Engraving shall be filled with epoxy of color per Code.

E. Hall Lantern and Position Indicator, All Floors

1. A hall direction lantern fixture with UP lanterns and electronic readout type position indicator shall be provided to give a visual indication of the car position.
   a. When car first receives an indication to run, the lantern corresponding to the up direction of travel illuminates. When car stops in response to a call and the doors start to open, if a lantern is illuminated indicating that the car has a direction for further travel, the gong sounds. The gong sounds once when the UP lantern is illuminated. Illumination to LED type.
   b. A visual and audible signal shall be provided at hoistway entrance indicating to the prospective passenger the car answering the call and its direction of travel. The visual signal for each direction shall be a minimum of two and one-half (2½) inches high by two and one-half (2½) inches wide and visible from the proximity of the hall call button. The audible signal shall sound once for the "up" direction and or shall have verbal annunciators that say "up." The centerline of the fixture shall be located a minimum of six (6) feet in height from the lobby floor.

2.10 DOOR OPERATING EQUIPMENT

A. Door Operator:

1. A passenger-type master door operator shall be furnished to open and close car and hoistway doors simultaneously. Door movement shall be electrically controlled throughout entire travel of doors.
2. Door Control – Compatible with Control Logic: Operator shall be controlled with a controller compatible to control logic provided. Operation of the doors shall be controlled by open and close commands from the microprocessor signal logic. Operation shall be provided with a motor of adequate horsepower for opening size. Operation shall be fully controlled for smooth consistent operation. Opening speed shall be a minimum of two (2) FPS and closing speed shall be adjustable to meet the force and torque requirements of applicable codes.
3. Door Control – Solid State Closed Loop: Control of the operator shall be solid-state closed loop type. Speed of the operator shall be controlled by a calculated computerized curve with separate acceleration, deceleration, and full speed adjustments. Door movement at high speed shall be the same for all doors of an elevator regardless of hoistway door panel weights. Door position shall be digitized to provide accurate position information at all times as part of the feedback loop. Reversals shall require a minimum of travel prior to direction change so as to reduce physical contact. Control shall be designed to provide a range of speeds to be selected by control system for various door speeds according to traffic demand.
4. Door Coupler: A mechanical coupler to connect car and hoistway door shall be provided. Operation of coupler shall provide driving motion of hoistway doors for full open and full close direction. Drive rollers shall remain engaged to prevent separation of hoistway doors from car doors.
5. Car Door Contacts: Each elevator car door shall be equipped with an approved electric contact which shall prevent the operation of the elevator driving machine by the normal operating device unless car door is in closed position except when the car is in the landing zone and is either stopped or being stopped. Car door contacts shall be so located that they are not readily accessible from inside of car.

6. Car Door Hangers and Tracks: Car door hangers and tracks shall be provided for each car door. Hangers and rollers shall be designed for high-speed power operation and have provisions for horizontal and vertical adjustments. Hangers shall be designed for two-point suspension of each door panel. Hanger sheaves shall have a resilient surface and pre-lubricated sealed bearings. Hangers shall be provided with upthrust adjustments to prevent sheaves from being removed from track unless upthrusts are loosened. Tracks shall be a shaped finished surface to fit the sheave profile and of adequate strength to properly support doors and periphery equipment without deflection of track.
7. Door Restrictors: Restricted opening of hoistway doors and/or car doors shall be provided in accordance with ASME A17.1 Rule 111.12.

B. Car Door Protection Device:
1. Provide infrared curtain using beams of invisible infrared light to protect passengers against closing of elevator doors. This reopening device shall also be capable of sensing an object or person in the path of a closing door without requiring contact for activation at a nominal five (5) inches and twenty-nine (29) inches. Door-reopening devices shall remain effective for a period of not less than twenty (20) seconds. After such an interval, doors may close in accordance with the requirements of ASME A17.1.
   a. Curtain to have a minimum of one hundred fifty-four (154) infrared beams
   b. Detectors shall illuminate green as doors are opening, flash red as doors start to close, and stay red as doors move together.
2. Car doors shall have an electronic obstruction nudging reopening device.
   a. Device shall automatically reinstate operation after blockage is cleared.
3. Doors shall be held open for a normal cycle of five (5) seconds and shall be reopened by beam interruption.
   a. Time shall be adjustable within control panel.

2.11 HOISTWAY ENTRANCES

A. Hoistway Entrances:
1. Passenger elevator hoistway entrances shall be 3’6” x 7’0”.
2. Service elevator hoistway entrances shall be 4’0” x 8’0”.
3. Entrance assemblies shall bear 1-½ hour U.L. rating.
4. Entrances shall include hoistway door unlocking devices and service keys per code.
5. Sills, struts, hanger supports, hanger covers, and unit frames shall be set in proper relation to the elevator car guides.
6. Sills shall be aluminum on passenger elevator and nickel silver on service elevator.
7. Finish to No. 4 satin stainless steel.
8. Frames shall have a protective covering for finished surfaces. The frames shall be formed of not lighter than 14-gauge steel with head and jamb sections bolted together.

9. Elevator landing jambs on all elevator floors shall have the number of the floor on which the jamb is located designated by raised characters that are a minimum of two (2) inches in height on center above the floor on the jamb panels on both sides. On the main entry level, a raised five-pointed star shall be placed to the left of the raised character. The outside diameter of the star shall be two (2) inches and all points shall be of equal length. Raised characters, including the star, shall be white on a black background. Contracted (Grade 2) Braille shall be placed below the corresponding raised characters and the star. The Braille translation for the star shall be "MAIN." Permanently applied plates are acceptable if they are permanently

B. Hoistway Doors:
   1. Passenger elevator doors shall be center opening, 3'6" x 7'0".
   2. Service elevator doors shall be two- speed side opening, 4'0" x 8'0".
   3. Door panels shall bear one and one-half (1-½) hour U.L. rating.
   4. Doors shall be formed of not lighter than 16-gauge steel and all joints shall be bolted.
   5. Bottom of the doors shall be provided with removable laminated phenolic guides, minimum two (2) per door, which run in the sill slots.
   6. Door shall be reinforced for separate hangers or built to include integral hangers.
   7. Finish to No. 4 satin stainless steel.

C. Hoistway Door Hangers and Tracks: Door hangers and tracks shall be provided for each hoistway door. Hangers and rollers shall be designed for high speed power operation and have provision for horizontal and vertical adjustments. Hangers shall be designed for two-point suspension of each door panel. Hanger sheaves shall have a resilient surface and pre-lubricated sealed bearings. Hangers shall be provided with upthrust adjustment to prevent sheaves from being removed from track unless upthrusts are loosened. Tracks shall be a shaped finished surface to fit the sheave profile and of adequate strength to properly support the doors and periphery equipment without deflection of track.

D. Hoistway Door Interlocks:
   1. An electro-mechanical interlock shall be provided for each hoistway entrance. Interlock system shall be a tested and approved system to comply with applicable codes. Interlocks shall prevent operation of the car away from landing unless doors are in closed and locked position as defined by applicable codes. Provide type "SF" high temperature wiring for hoistway interlock circuits. Inline or butt splicing will not be allowed in hoistway raceway, conduit, or gutter.
   2. Unlocking Devices: Emergency devices and keys for opening hoistway doors from the landing shall be provided per Code.

E. Door Closers: Each door shall be provided with a "reel" type spring closer. Device shall be capable of closing the door from any position of the opening and maintain when they are not connected to car door coupler. Broken arm "jack-knife" type door closers are acceptable if required by door design. Sash weight type door closers shall not be allowed.

F. Sills: Sills shall be aluminum on passenger elevator and shall be nickel silver on service elevator. Grooves for door guides shall have a minimum clearance for the guides. Sill shall be supported on steel brackets securely fastened to structural supports.

G. Fascia Plates: Shall be made of steel reinforced to insure a flat even surface throughout and shall be securely fastened to hanger housings and sill above.

H. Toe Guards: Entrance side of platform shall be provided with a smooth metal guard plate of not less than 0.0598-inch thick steel or equivalent strength and stiffness. It shall be adequately reinforced and braced to car platform. It shall extend not less than the full width of widest hoistway door opening. It shall have a straight vertical face extending below the floor surface of the platform of not less than the depth of the leveling landing or truck zone plus three (3) inches, but not less than twenty-one (21) inches. Lower portion of the guard shall be bent back at an angle of not less than sixty (60) degrees nor more than seventy-five (75) degrees from the horizontal.

I. Headers: Shall be constructed of sufficient size and thickness to provide support for the frame and hangers and shall be securely bolted to the strut angles or closer support angles.

J. Struts and Closer Steel Angles: Shall be furnished of sufficient size to accommodate the door closers. Angles shall be continuous and securely bolted to the sills and building beams above or bracketed from a point above the header to the guide rails.

K. Hanger Covers: Shall be made of steel and shall be of the removable type. Shall be arranged to insure hanger accessibility from within car.

2.12 HYDRAULIC HOISTWAY EQUIPMENT

A. Hydraulic Cylinder Assembly

1. Well Hole: Elevator Contractor shall become familiar with the project and all existing conditions. Elevator Contractor shall be responsible drilling well hole.
2. Well Hole Casing: Elevator Contractor shall provide a 10-gauge steel well hole casing. Casing shall be twelve (12) inches larger in diameter than the hydraulic cylinder to be installed. Well casing shall have welded watertight joints and closed, watertight bottom.
3. PVC Casing: A 3/8” PVC casing shall be provided. PVC casing shall have watertight sealed couplings and watertight bottom end caps. PVC casing shall be six (6) inches larger inside diameter than the outside diameter of the hydraulic cylinder to be installed. PVC is to extend a minimum of eight (8) inches above pit floor or to bottom of pit channels.
4. Hydraulic Cylinder
   a. To be made from electric-resistance welded ASTM-A53 Grade B pipe and must meet requirements of ANSI A17.1 Elevator Code.
   b. Bottom of cylinder shall be equipped with a safety bulkhead welded in place with an orifice to meet code requirements and closed with a forged seamless cap, butt welded to end of cylinder.
   c. Shall be free from rust and scale. Shall be equipped with a heavy coat of epoxy or mastic and be wrapped with 20 mil Tapecoat, Glasswrap, Trantex, or approved equal.
5. Cylinder Head: Shall be made from carbon (60,000 PSI tensile) steel. Shall be designed for 500 PSI oil service at sixty-five (65) degrees centigrade.
6. Packing: Shall be “U” type packing. An oil line return feature shall be incorporated into the packing stack, with cylinder heads drilled and tapped for piping to tank.

7. Plunger: To be manufactured from steel pipe (A53, Grade B) or equivalent mechanical tubing. Shall be straight within 1/16 inch and ground to 24-32 or better micro-inch finish. If a multiple-piece plunger is required for the project, the coupling ends shall be machine-bored, faced, and internally threaded to receive the coupling.
8. Installation
   a. Set PVC casing within steel well hole casing.
   b. Backfill between PVC casing and steel well hole casing with clean dry neutral well tamped silica sand.
   c. Set hydraulic cylinder within PVC casing.
   d. Hydraulic cylinder and plunger shall be plumb within 1/16 inch.
   e. The annulus between the cylinder and the top of the protective plastic casing shall be sealed and provided with means of inspection for the presence of oil.
9. Support cylinder on grade-mounted slab by use of neoprene pads with a minimum static deflection of 0.1”. The isolators shall be Mason Industries Super W Pad or approved equal. Ensure a one (1) inch gap is maintained all around and beneath cylinder below grade so that cylinder does not contact anything other than neoprene pads specified above.

B. Pit Valves:
   1. A code-compliant gate valve shall be installed between hydraulic cylinder and hydraulic pumping unit.
   2. Overspeed Shut-Off Valve: Provide an regulated Overspeed Shut-Off valve designed to provide protection against supply line failure or overspeed in the down direction. Overspeed Valve shall comply with ASME A17.1-1993 Rule 2410.6 requiring seismic safety valves.

C. Pit Stop Switch: A stop switch shall be provided in the elevator pit. Switch shall be designed to cut off power to elevator pump motor and bring car to rest independent of regular operating devices. Switch shall be accessible from pit access door or pit ladder.

D. Scavenger Pump: Provide electrically-operated scavenger pump with storage reservoir and float-activated or other automatic means to return oil to system. Provide one-half (1/2) inch copper tubing for oil return line.

E. Limit Switches:
   1. Normal and final terminal stopping devices shall be provided for the elevator at each terminal. Terminal stopping devices shall have rollers with rubber or other approved composition tread to provide silent operation when actuated.
   2. Normal terminal stopping devices shall be provided and arranged to stop the car automatically from any speed obtained under normal operation within top and bottom over travels, independent of operating devices, final terminal stopping device, and buffers.
   3. Final terminal stopping devices shall be provided and arranged to stop car automatically from the speed specified within top clearance and bottom over travel independent of the operation of normal terminal stopping device, but with buffers operative. When the final terminal stopping devices operate, normal operation in either direction shall be prevented.

F. Buffers – Spring: Provide suitable spring buffers with necessary blocking and supports under elevator car. Buffers shall be of proper stroke and capacity per Code.

G. Car Sling: A car frame to support the elevator platform and enclosure shall be provided.
   1. Frame members shall be made of steel and of adequate strength to support finished cab, capacity, and platform, along with all associated equipment.
   2. Design shall support buffer impact. Mounting plate for guide shoes, buffer strike plates, and platform supports shall be provided.
   3. Balance frame shall be provided to allow for proper balancing of car assembly after all equipment is mounted. Assembly shall be such that it can be mounted and contain adequate weights to keep pressure on roller guides to fewer than fifty (50) pounds of force on roller after balancing.

H. Platform: Shall be provided for specified capacity and Class C3 loading for service elevator, consist of a steel frame with suitable LEED Certified sub-flooring and a finished floor. The underside of platform shall be properly fireproofed. Platform connection to the frame assembly shall be isolated. Support frame shall carry isolation pads on which the platform shall rest without any metal connection to the steel frame. Isolation pads shall effectively isolate the cab from the frame assembly. All auxiliary apparatus shall be substantially supported.
   1. A proper length toe guard shall be provided and securely mounted to the entrance sill for all car openings.
   2. Platform shall be provided with one metal sill with fluted tread and suitable grove for car door guides. No fastenings or holes shall be exposed in the entrance are of the top-side of the sill.
   3. Sill must extend the full width of the platform. Sill to be recessed for stone flooring.

I. Car Guide Rails:
   1. Shall be T-Type of proper size to comply with specified loads and per codes.
   2. Guide rails shall be accurately machined standard section guide rails with tongue and grooved joints for the car weighing not less than specified per Code.
   3. Machine splice plates shall be used to form the rail joints. Each splice plate shall be so located so as not to interfere with the brackets and clips.
   4. All guide rails shall be erected parallel to a maximum deviation of one-eighth (1/8) inch, +/- one-sixteenth (1/16) inch.
   5. Except for guide shoe surfaces, rails shall be painted.

J. Rail Backing: Provide rail backing where the distance between support framing is greater than required by Code.

K. Rail Brackets:
   1. Shall be securely mounted and designed to allow for proper rail alignment.
   2. Shall be of sufficient strength for the rail forces based upon calculation per codes.
   3. Inserts for bracket mounting shall be used when concrete beams, walls, or concrete block walls over eight (8) inches thick, are used to support guide rail brackets.
   4. Paint brackets after final installation.

L. Roller Guides:
   1. Roller guide shoes shall be furnished, securely bolted to car frame at top and bottom. Each roller guide shall consist of, as a minimum, a set of three (3) sound-reducing wheels in precision type call bearings and held in

contact with rail surfaces by means of adjustable spring-loaded devices. Roller guides shall run on dry un-lubricated guide rails.

2. Roller guides shall be properly aligned in respect to rail surface.

2.13 CAR ENCLOSURE – PASSENGER ELEVATOR

A. General: Provide metal cab as specified below and architectural interior finish drawings.

B. Enclosure: ADA-compliant shell. 6'-8" Wide clear inside from finish side of removable panels on side walls. 5'-5" Deep clear inside. Enclosure shall include a flush design car door, car lighting fixture, ventilation, car top railing as required by code, and inspection certificate frame. It shall be manufactured from 14-gauge sheet steel and be eight (8) feet tall. Canopy shall be manufactured from 12-gauge steel and be sufficiently reinforced. When complete, cab must be free from squeaks, rattles, and light leaks. Cab shall be sufficiently isolated from car frame. Cab walls are to be insolated with sufficient sound deadening material. Cab shell to be baked enamel.

C. Cab interior allowance for wall finishes, ceiling, lighting and flooring - $40,000.

D. Car Doors: Door panels shall be formed of not lighter than 16-gauge steel and all joints shall be welded. Bottom of doors shall be provided with removable laminated phenolic guides, minimum two (2), which run in the sill slots. Door shall be reinforced for separate hangers or built to include integral hangers and shall contain suitable material for sound deadening. Provide full length neoprene astragals. Finish car side with No. 4 satin stainless steel and return finish one-half (½) inch around edge of doors.

E. Sill: Sill shall be aluminum. Grooves for door guides shall have a minimum clearance for guides. Sill shall be supported on steel brackets securely fastened to structural supports.

F. Front Return Panels/Jambs: Provide swing returns, fabricated from 14-gauge No. 4 satin stainless steel. Transom shall be full width of cab.

G. Interior Wall Panels Finish Allowance: In Cab Interior Allowance.

H. Handrail: Provide handrail on rear wall of cab. Handrail shall be manufactured from one and one-half (1-1/2) inch diameter satin stainless steel with matching brackets. Handrail shall be mounted at handicap and ADA-prescribed height. Handrail fastenings shall hold as a minimum a two hundred fifty (250) pound person without separating from wall. Handrail included in interior allowance.

I. Base: Included in Cab Interior Allowance.

J. Ceiling and Lighting: Included in Cab Interior Allowance.

K. Emergency Lighting: Furnish a self-rechargeable, battery driven, emergency car lighting device mounted on the top of car. Emergency light to be in ceiling. Emergency light shall function in accordance with and meet all current code requirements. Provide a means to test emergency light device in service cabinet. Provide energy-efficient fixtures sufficient to provide five (5) fc at car threshold and uniform illumination at handrail height, with doors closed. Not less than two (2) lamps shall be provided.

L. Ventilation: Furnish two-speed, Morrison heavy-duty squirrel exhaust fan. Fan is to be installed on car top. Fan shall be sufficiently isolated from canopy. Provide concealed vents above base and ceiling as required.

M. Emergency Exit: An emergency exit meeting current code requirements shall be located in the canopy.

N. Finish Flooring: Included in Cab Interior Allowance.

O. Pads and Hooks: Provide one (1) set of protective pads and hooks for each cab.

2.14 CAR ENCLOSURE – SERVICE ELEVATOR

A. General: Provide metal cab as specified below and architectural interior finish drawings.

B. Enclosure: ADA-compliant shell. 6'-8" Wide clear inside from finish side of removable panels on side walls. 7'-11" Deep clear inside. Enclosure shall include a flush design car door, car lighting fixture, ventilation, car top railing as required by code, and inspection certificate frame. It shall be manufactured from 14-gauge sheet steel and be nine (9) feet tall. Canopy shall be manufactured from 12-gauge steel and be sufficiently reinforced. When complete, cab must be free from squeaks, rattles, and light leaks. Cab shall be sufficiently isolated from car frame. Cab walls are to be insolated with sufficient sound deadening material. Cab shell to be baked enamel.

C. Cab Interior: Cab interior allowance for wall finishes, ceiling, lighting and flooring - $45,000.

D. Car Doors: Door panels shall be formed of not lighter than 16-gauge steel and all joints shall be welded. Bottom of doors shall be provided with removable laminated phenolic guides, minimum two (2), which run in the sill slots. Door shall be reinforced for separate hangers or built to include integral hangers and shall contain suitable material for sound deadening. Provide full length neoprene astragals. Finish car side with No.4 stainless steel and return finish one-half (½) inch around edge of doors.

E. Sill: Shall be nickel silver. Grooves for door guides shall have a minimum clearance for guides. Shall be supported on steel brackets securely fastened to structural supports.

F. Front Return Panels/Jambs: Provide swing returns, fabricated from 14-gauge No. 4 satin stainless steel. Transoms shall be full width of cab.

G. Interior Wall Panels: Included in Cab Interior Allowance.

H. Handrail: Provide handrail on side and rear walls of cab. Handrail shall be manufactured from one and one-half (1/2) inch diameter satin stainless steel with matching brackets. Handrail shall be mounted at handicap and ADA prescribed height. Handrail fastenings shall hold as a minimum a two-hundred fifty (250) pound person without separating from wall.

I. Guardrails: Provide guardrail of 8” x 3/8” solid stainless steel flat stock mounted on side and rear walls. Locate the bottom of the guardrail at four (4) inches above the finish floor.

J. Base: Provide three (3) inch high base below removable panels fabricated from No. 4 stainless steel with code required vent slots.

K. Ceiling and Lighting: Included in Cab Interior Allowance

L. Emergency Lighting: Furnish a self-rechargeable, battery driven, emergency car lighting device mounted in canopy of car. Emergency light shall function in accordance with and meet all current code requirements. Provide a means to test emergency light device in service cabinet. Provide energy-efficient fixtures sufficient to provide five (5) fc at car threshold and uniform illumination at handrail height, with doors closed. Not less than two (2) lamps shall be provided.

M. Ventilation: Furnish two-speed, Morrison heavy-duty squirrel exhaust fan. Fan is to be installed on car top. Fan shall be sufficiently isolated from canopy. Provide concealed vents above base and ceiling as required.

N. Emergency Exit: An emergency exit meeting current code requirements shall be located in the canopy.

O. Finish Flooring: Included in Cab Interior Allowance.

P. Pads and Hooks: Provide one (1) set of protective pads and hooks.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examination of Site: Prior to commencing elevator installation, inspect hoistways, hoistway openings, pits and machine rooms as constructed. Verify that hoistway, pit, machine room and openings are of correct size and within tolerance and are ready for work of this section. Notify General Contractor in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of elevator work. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer. Arrange for temporary electrical power to be available for installation work and testing of elevator components.

B. Examination of Specifications: Contractors shall thoroughly examine specification requirements. Should any discrepancies arise between Contractor documents and the work to be performed or equipment to be provided, Contractor shall notify Owner, in writing, of such discrepancies at least seven (7) days prior to bid date. If no discrepancies are presented to Owner at least seven (7) days prior to the bid date, then any changes required to plans or specifications become the responsibility of the Contractor and shall be performed by the Contractor at no additional cost to Owner.

3.2 INSTALLATION

A. Manufacturer’s Instructions: Comply with all manufacturers’ written instructions.

B. Codes and Regulations: Comply with all applicable codes and regulations.

C. Equipment Installation: Install all equipment to allow for ease of access for maintenance and repair; to promote a safe operating condition; and to enhance equipment operation.

D. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustments, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.

E. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts designed to minimize transmission of vibrations to structure and thereby minimize structure-borne noise from elevator system.

F. Lubrication: Lubricate operating parts of systems as recommended by manufacturers.

G. Alignment: Installation of hoistway entrances shall be such that the alignment of the cars is accurate with the entrances. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimensions at each landing.

H. Sills: Set sills flush with finished floor surface at landing. Fill space under sill solidly with non-shrink, non-metallic grout.

I. Contract Speed: Speed variation under any loading condition in either direction shall be no more than five (5) percent.

J. Leveling Tolerance: Leveling tolerance shall be one-eighth (1/8) inch, up or down, regardless of load and direction of travel.

K. Manufacturer's Name: Manufacturer's nameplates, trademarks, or logos not permitted on surfaces that are visible to the public.

L. Final Clean Up: At completion of installation, finishing touching shall include the following:
   1. Clean machine room floor of dirt, oil, grease, and brush-paint floor with one (1) coat of oil-resistant paint. Color to be determined by Owner.
   2. Apply one (1) coat of field-applied machinery enamel to machine room equipment, hoistway equipment and all exposed equipment installed as part of this specification. Exclude items that have an architectural finish. Prior to applying the coat of enamel, remove all dirt, dust, oil, grease, grim, and scale.
   3. Any damage received to painted surfaces prior to final acceptance shall be repainted. Additionally, all existing and new equipment that have only a primer coat shall receive one (1) final coat of gloss, oil-resistant or enamel paint, in Contractor's customary colors.

3.3 FIELD QUALITY CONTROL

A. Permits: Elevator Contractor shall obtain and pay for all necessary municipal and state permits.

B. Testing: Elevator Contractor shall advise Owner, Architect, and authorities having

jurisdiction, a minimum of five (5) business days in advance of the dates and time of performing tests. Elevator Contractor shall submit a complete report describing the results of the tests.

1. Acceptance Testing: Upon completion of elevator installation and prior to permitting use of elevators, at the Elevator Contractor's expense, Elevator Contractor shall provide instruments, weights, and personnel to conduct test recommended by ASME A17.1 and governing regulations and agencies.
2. Operating Tests: Load elevators to rated capacity and operate continuously for thirty (30) minutes over full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of elevator machine during thirty (30)-minute test period. Record failure of elevators to perform as required. Perform operating test on one elevator of each type, capacity, speed, and travel distance.

C. Test Requirements: In the event that operation does not meet test requirements, Elevator Contractor shall promptly adjust, repair, or replace deficiency or defective equipment to fully satisfy the requirements of the tests.

D. Elevator Consultant Evaluations - Job Progress Evaluations: Periodically, throughout the installation, an elevator consultant will evaluate the job progress and workmanship of the Elevator Contractor with respect Contract Documents compliance. Should any discrepancies or conflicts with the Contract Documents be noted during the evaluation, a punch list of the discrepancies will be presented to the Elevator Contractor. Elevator Contractor shall immediately rectify the discrepancies listed in the punch list at no additional cost to Owner. This process applies to a final progress evaluation prior to Final Acceptance of the installation.

E. Final Acceptance: Final acceptance of the modernization work will not be granted until all discrepancies of the Contract Documents are satisfied, all required testing has been performed and satisfied, all Project Completion Submittals provided to the Owner, permits and certificates received by the Owner, and Owner is satisfied that the installation is complete in all respects. When the Final Acceptance requirements are met, final payment will be made to the Elevator Contractor.

3.4 DEMONSTRATION

A. Instruct Owner's personnel in proper use, operation, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of operational failure, and other building emergencies. Train Owner's personnel in procedures to follow in identifying sources of operational failures or malfunctions.

B. Make a final check of each elevator operation with Owner's personnel present and before date of Final Acceptance. Determine that operation systems and devices are functioning properly.

C. Should the Elevator Contractor be contracted by the Owner to provide continuing full maintenance service on the elevator equipment, Elevator Contractor shall fully explain the maintenance program and procedures to Owner.

3.5 PROJECT COMPLETION SUBMITTALS

A. After completion of work and prior to final acceptance, submit the following documents. Final payment will not be made until received.
   1. Maintenance Manual: Three (3) bound manuals with complete instructions on the maintenance of the system, schedule of required maintenance, and information on lubrication points and grade of lubricants.
   2. Operating Manual: Three (3) bound manuals instructing on the proper use, function. and operation of the equipment.
   3. As Built Wiring and Straight Line Diagrams: "As built" wiring and straight line diagrams, specific to this project, showing electrical connections, directions, and sequence of operation of devices connected with the elevators. Any circuit changes, upgrades, or modifications to the system shall be updated on the wiring diagrams.
   4. Parts Catalogs: List of all parts with part numbers.
   5. Maintenance/Diagnostic Tool: One (1) elevator maintenance/diagnostic tool, if utilized. The maintenance/diagnostic tool shall not be such that the useful life of the equipment, nor the normal and daily operation and function of the equipment, are compromised in any way.
   6. Inspection and Acceptance Certifications and Operating Permits: All required inspection certifications and operating permits as required per Code.
   7. Elevator Keys: Three (3) sets of elevator keys, tagged with identification.

END OF SECTION