SECTION 14 20 00

ELEVATORS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Related Documents: Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections apply to this Section.

B. Work Included in This Section: Provide electric traction elevators and hydraulic elevators complete as shown and specified.

C. Related Work Interfaced With This Section:

1. Life Safety or Public Address Speakers: Furnished by others; wire from machine room to car, accommodations and installation in car canopy by this Section.

2. Card Readers: Furnished by others; wire from machine room to car, interfacing with elevator controls and installation in elevator car by this Section. Connection in machine room and testing by others.

3. Close Circuit T.V.: Furnished by others; wire from machine room to elevator car by this Section. Connection in machine room and testing by others.

1.02 QUALITY ASSURANCE:

A. Qualifications of Bidders:

1. Manufacturer's Qualifications: The design, engineering and manufacture of major elevator components such as machines, motors, motor drive units, controllers, door operators, safeties, governors, selectors, power units, etc. shall be from manufactures that have been in the business for the last ten years. Equipment proposed must have a history of successful operation under similar conditions for the last two (2) years.

2. Installer and Maintenance Qualifications: Installer must be a licensed Elevator Contractor in the State of California.

a. Show evidence of successful experience in complete installation and maintenance of proposed manufacturer's elevator equipment for at least two (2) years.

b. Directly employ sufficient competent personnel within 50 miles of project to handle construction and maintenance duties.

c. Maintain local stock of parts adequate for replacement on permanent or emergency basis.

d. Respond to trouble calls within one hour. 30 minutes.

e. Offer the County agreement for continuing maintenance after expiration of maintenance period under this contract.

3. Elevator Cars and Entrances: One of the following or accepted equal:

a. Elevator Manufacturer.

b. City-Lift

c. Custom Cab

d. Hauenstein and Burmeister.

e. Sterling

f. Tyler Elevator Products.

4. Mock-Up: If requested by The County's Representative, erect one complete production passenger car at place of manufacture to demonstrate fit, finish and assembly techniques used in final assembly.

B. Requirements of Regulatory Agencies:

1. Codes: In accordance with the latest applicable edition requirements of the following and as specified:

a. A.D.A.: Americans with Disabilities Act.

b. ASME: American Society of Mechanical Engineers - A17.1; Safety Code for Elevators and Escalators.

c. CBC: Title 24; California Building Codes.

d. CCR: Titles 8; California Code of Regulations.

e. NEC: National Electric Code.

f. All local codes, which govern.

2. Permits: Arrange and pay for inspections by governing authorities and obtain all required operating permits.

1.03 SUBMITTALS:

A. Shop Drawings: Submit as required by the County's Representative. The County's Representative reserves the right to require any details of any portion of the equipment.

1. Layouts: Plan and section of hoistways, pits and machinery spaces; include impact and static loads imposed on building structure location of hoistway ventilation and required clearances around equipment.

2. Details: Submit details of cabs, fixtures and entrances.

3. Data: Indicate on layouts or separate data sheets; machine spaces heat release, power requirements, normal annual power consumption, conduit runs outside of hoistways and machine rooms, car and counterweight roller guides and door operators.

B. Samples: Provide samples of materials and finishes exposed to public view and additional, if specifically requested, 6 inch x 6 inch panels, 12 inch lengths or full size if smaller, as applicable.

C. Operating Instructions: Submit manufacturer's literature describing system operations and special operations as specified.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Protect equipment during transportation, erection and construction. Store under cover to prevent damage due to weather conditions. Replace damaged materials.

1.05 SEQUENCING AND SCHEDULING:

A. Schedule and be responsible for coordinating related work with other trades to avoid omissions and delays in job progress.

1.06 WARRANTY:

A. Provide special project warranty, signed by Contractor, Installer and Manufacturer, agreeing to replace/repair/restore defective materials and workmanship of elevator work which may develop within one (1) year from final date of completion and acceptance of the entire installation. "Defective" is hereby defined to include, but not by way of limitation, operation or control system failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration and similar unusual, unexpected and unsatisfactory conditions.

1.07 ALTERNATES:

A. Alternate No. 1; Continuing Full Maintenance Contract:

1. Quote cost and submit manufacturer's proposal for full maintenance contract for a period of five (5) years after expiration of 12-month maintenance provided with this new installation.

2. Provide weekly examinations, lubrication and replacements in accordance with manufacturer's standard practice. Include a minimum of one and one-half hour per traction elevator and one-half hour per hydraulic elevator per visit performing only preventative maintenance. Any work required performing repairs or answering trouble calls shall be in addition to the preventative maintenance hours.

3. Provide 24-hour emergency call back (entrapments) service and trouble callbacks after hours during normal working hours at no cost to County. Trouble callbacks after hours shall be billable for the premium time portion only

B. Alternate No. 2; Destination Entry Group Control System:

1. Quote cost to provide manufacturers Destination Entry Group Control System.

2. Provide touch pads or touch screens at each level for each group of elevators with card reader access provisions.

3. System shall be designed to operate as Destination Entry or as a Conventional Group Control system with up and down registrations and car buttons.

PART 2 - PRODUCTS:

2.01 DESCRIPTION OF SYSTEMS:

A. Elevator No. 1-3; HOJ High Rise Passenger Group

1.	Type:	Gearless Traction
2.	Capacity:	3500 Pounds
3.	Speed:	700 FPM
4.	Stops:	Elev.1: 8 at B, 1, 2, 8 (Transfer Floor) 9, 10, 12, 14 Elev. 2-3: 7 at 1, 2, 8 (Transfer Floor) 9, 10, 12, 14
5.	Openings:	Elev.1: 8 In Line Elev. 2-3: 7 In Line
6.	Travel:	As Shown
7.	Control:	AC/VVVF
8.	Operation:	Group Operation
9.	Machine Location:	Overhead
10.	Compensation:	As Required By Manufacturer
11.	Special Operations:	
	a. Independent Service	
	b. Fire Emergency Service	
	c. Standby Emerg. Power	

d. Anti-Nuisance Service
e. Tenant Security
f. Transfer Floor Operation at Floor 8

12.	Car Enclosure Type:	Passenger (Existing Finishes to be Reused)
	a. Platform Size	Elev. 1: 7'-0" W by 6'-2" D by 10'-0" H
		Elev. 2-3: Size to Accommodate Existing Finishes
	b. Inside Clear	Elev. 1: 6'-8" W by 5'-5" D by 9'-0" H
		Elev. 2-3: Approx 7"-3" W by 5'-3" D by 9'-0" H
13.	Signals and Fixtures	Design as Specified
	a. Car Operating Panels	2 Per Car; Swing Type
	b. Car Position Indicator	Integral with Each Car Panel
	c. Communication Sys.	Integral with Car Panel
	d. Service Cabinet	Integral with Car Panel
	e. Hall Pushbuttons	2 Risers
	f. Hall Lanterns	All Floors
	g. Hall Pos. Indicators	Floors 1 and 2
14.	Passenger Entrance Type	Center Open, Single Speed
	a. Size	Elev. 1: 3'-6" W by 7'-0" H
		Elev. 2-3: 4'-6" W by 7'-0" H to match existing
	b. Frames	
	1) Main Floor	Bronze
	2) Typical Floors	Bronze
	c. Doors	
	1) Main Floor	Bronze
	2) Typical Floors	Bronze
	d. Sills	
	1) Main Floor	Nickel Silver
	2) Typical Floors	Nickel Silver
15.	Miscellaneous Items:	
	a. Disabled Access Requirements	
	b. Key Operated Hoistway Access	
	c. Earthquake Requirements	
	d. Card Reader Provisions	
	e. CCTV Provisions	

B. Elevator No. 4-7; HOJ Low Rise Passenger Group

1.	Type:	Gearless Traction
2.	Capacity:	3500 Pounds
3.	Speed:	500 FPM
4.	Stops:	Elev.4: 9 at B, 1-8
		Elev. 5-7: 8 at 1-8
5.	Openings:	Elev.4: 9 In Line
		Elev. 5-7: 8 In Line
6.	Travel:	As Shown
7.	Control:	AC/VVVF
8.	Operation:	Group Operation
9.	Machine Location:	Overhead
10.	Compensation:	As Required By Manufacturer
11.	Special Operations:	
	a. Independent Service	
	b. Fire Emergency Service	
	c. Standby Emerg. Power	
	d. Anti-Nuisance Service	
	e. Tenant Security	
12.	Car Enclosure Type:	Passenger (Existing Finishes to be Reused)
	Platform Size	Size to Accommodate Existing Finishes
	Inside Clear	Approx 7"-3" W by 5'-3" D by 9'-0" H

13.	Signals and Fixtures	Design as Specified
	a. Car Operating Panels	2 Per Car; Swing Type
	b. Car Position Indicator	Integral with Each Car Panel
	c. Communication Sys.	Integral with Car Panel
	d. Service Cabinet	Integral with Car Panel
	e. Hall Pushbuttons	2 Risers
	f. Hall Lanterns	All Floors
	g. Hall Pos. Indicators	Floors 1 and 2
14.	Passenger Entrance Type	Center Open, Single Speed
	Size	4'-6" W by 7'-0" H to match existing
	a. Frames	
	1) Main Floor	Bronze
	2) Typical Floors	Bronze
	b. Doors	
	1) Main Floor	Bronze
	2) Typical Floors	Bronze
	c. Sills	
	1) Main Floor	Nickel Silver
	2) Typical Floors	Nickel Silver
15.	Miscellaneous Items:	
	a. Disabled Access Requirements	
	b. Key Operated Hoistway Access	
	c. Earthquake Requirements	
	d. Card Reader Provisions	
	e. CCTV Provisions	

C. Elevator No. 8; HOJ Service:

1.	Type:	Geared Traction
2.	Capacity:	4500 Pounds
3.	Speed:	350 FPM
4.	Stops:	14 at B, 1-10, 12, 14, PH
5.	Openings:	14 In Line
6.	Travel:	As Shown
7.	Control:	AC/VVVF
8.	Operation:	Simplex Selective Collective
9.	Machine Location:	Overhead
10.	Compensation:	As Required By Manufacturer
11.	Special Operations:	
	a. Independent Service	
	b. Fire Emergency Service	
	c. Standby Emerg. Power	
	d. Anti-Nuisance Service	
	e. Tenant Security	
12.	Car Enclosure Type:	Service
	a. Platform Size	6'-0" W by 8'-10 D by 10'-0" H
	b. Inside Clear	5'-8" W by 7'-10" D by 10'-0" H
13.	Signals and Fixtures	Design as Specified
	a. Car Operating Panels	1 Per Car; Applied Type
	b. Car Position Indicator	Integral with Each Car Panel
	c. Communication Sys.	Integral with Car Panel
	d. Service Cabinet	Integral with Car Panel
	e. Hall Pushbuttons	1 Riser
	f. Car Lanterns	In Each Jamb
	g. Hall Pos. Indicators	All Floors

14.	Passenger Entrance Type	Side Open, Two Speed
	a. Size	4'-0" W by 7'-0" H
	b. Frames	
	1) Main Floor	Bronze
	2) Typical Floors	Bronze
	c. Doors	
	1) Main Floor	Bronze
	2) Typical Floors	Bronze
	d. Sills	
	1) Main Floor	Nickel Silver
	2) Typical Floors	Nickel Silver
15.	Miscellaneous Items:	
	a. Disabled Access Requirements	
	b. Key Operated Hoistway Access	
	c. Earthquake Requirements	
	d. Card Reader Provisions	
	e. CCTV Provisions	

D. Elevator No. 9; HOJ Service Shuttle:

1.	Type:	Hydraulic Holeless Plunger
2.	Capacity:	4500 Pounds
3.	Speed:	125 FPM
4.	Stops:	2 at 1-2
5.	Openings:	2 In Line
6.	Travel:	As Shown
7.	Control:	SCR Soft Start
8.	Operation:	Two Stop Collective Group Operation
9.	Machine Location:	Remote
10.	Special Operations:	
	a. Independent Service	
	b. Fire Emergency Service	
	c. Tenant Security	
	d. Swing Service	
	e. Emergency Battery Lowering	
11.	Car Enclosure Type:	Service
	a. Platform Size	6'-0" W by 8'-10 D by 10'-0" H
	b. Inside Clear	5'-8" W by 7'-10" D by 10'-0" H
12.	Signals and Fixtures	Design as Specified
	a. Car Operating Panels	1 Per Car; Applied Type
	b. Car Position Indicator	Integral with Each Car Panel
	c. Communication Sys.	Integral with Car Panel
	d. Service Cabinet	Integral with Car Panel
	e. Hall Pushbuttons	1 Riser
	f. In-Car Lanterns	In Strike Jamb
	g. Hall Pos. Indicators	All Floors
13.	Passenger Entrance Type	Side Open, Two Speed
	a. Size	4'-0" W by 8'-0" H
	b. Frames	
	1) Main Floor	Stainless Steel
	2) Typical Floors	Stainless Steel
	c. Doors	
	1) Main Floor	Stainless Steel
	2) Typical Floors	Stainless Steel
	d. Sills	
	1) Main Floor	Nickel Silver
	2) Typical Floors	Nickel Silver

14. Miscellaneous Items:
    a. Disabled Access Requirements
    b. Key Operated Hoistway Access
    c. Earthquake Requirements
    d. Card Reader Provisions
    e. Oil Cooler
    f. CCTV Provisions

E. Elevator No. P1-P2; Parking Passenger

1.	Type:	Gearless Machine Room-less Traction
2.	Capacity:	3500 Pounds
3.	Speed:	350 FPM
4.	Stops:	10 at B5-B1, 1-10
5.	Openings:	10 In Line
6.	Travel:	As Shown
7.	Control:	AC/VVVF
8.	Operation:	Group Operation with P3
9.	Machine Location:	Within Top of Hoistway
10.	Compensation:	As Required By Manufacturer
11.	Special Operations:	
	a. Independent Service	
	b. Fire Emergency Service	
	c. Standby Emerg. Power	
	d. Anti-Nuisance Service	
12.	Car Enclosure Type:	Passenger
	a. Platform Size	7'-0" W by 6'-2" D by 8'-0" H
	b. Inside Clear	6'-8" W by 5'-5" D by 7'-6" H
13.	Signals and Fixtures	Design as Specified
	a. Car Operating Panels	2 Per Car; Swing Type
	b. Car Position Indicator	Integral with Each Car Panel
	c. Communication Sys.	Integral with Car Panel
	d. Service Cabinet	Integral with Car Panel
	e. Hall Pushbuttons	2 Risers
	f. Hall Lanterns	All Floors
	g. Hall Pos. Indicators	Main Floor
14.	Passenger Entrance Type	Center Open, Single Speed
	a. Size	3'-6" W by 7'-0" H
	b. Frames	
	1) Main Floor	Stainless Steel
	2) Typical Floors	Stainless Steel
	c. Doors	
	1) Main Floor	Stainless Steel
	2) Typical Floors	Stainless Steel
	d. Sills	
	1) Main Floor	Nickel Silver
	2) Typical Floors	Nickel Silver
15.	Miscellaneous Items:	
	a. Disabled Access Requirements	
	b. Key Operated Hoistway Access	
	c. Earthquake Requirements	
	d. Card Reader Provisions	
	e. CCTV Provisions	

F. Elevator No. P3; Parking Passenger

1.	Type:	Gearless Machine Room-less Traction
2.	Capacity:	4000 Pounds

3.	Speed:	350 FPM
4.	Stops:	10 at B5-B1, 1-10
5.	Openings:	10 In Line
6.	Travel:	As Shown
7.	Control:	AC/VVVF
8.	Operation:	Group Operation with P1-P2
9.	Machine Location:	Within Top of Hoistway
10.	Compensation:	As Required By Manufacturer
11.	Special Operations:	
a.	Independent Service	
b.	Fire Emergency Service	
c.	Standby Emerg. Power	
d.	Anti-Nuisance Service	
12.	Car Enclosure Type:	Passenger
a.	Platform Size	8'-0" W by 6'-2" D by 8'-0" H
b.	Inside Clear	7'-8" W by 5'-5" D by 7'-6" H
13.	Signals and Fixtures	Design as Specified
a.	Car Operating Panels	2 Per Car; Swing Type
b.	Car Position Indicator	Integral with Each Car Panel
c.	Communication Sys.	Integral with Car Panel
d.	Service Cabinet	Integral with Car Panel
e.	Hall Pushbuttons	2 Risers
f.	Hall Lanterns	All Floors
g.	Hall Pos. Indicators	Main Floor
14.	Passenger Entrance Type	Center Open, Single Speed
a.	Size	4'-0" W by 7'-0" H
b.	Frames	
1)	Main Floor	Stainless Steel
2)	Typical Floors	Stainless Steel
c.	Doors	
1)	Main Floor	Stainless Steel
2)	Typical Floors	Stainless Steel
d.	Sills	
1)	Main Floor	Nickel Silver
2)	Typical Floors	Nickel Silver
15.	Miscellaneous Items:	
a.	Disabled Access Requirements	
b.	Key Operated Hoistway Access	
c.	Earthquake Requirements	
d.	Card Reader Provisions	
e.	CCTV Provisions	

2.02 MATERIALS:

A. Aluminum: Alloy and temper best suited for anodizing finish specified.

B. Bronze: CDA Alloy 280, muntz metal.

C. Glass: Laminated Safety Glass meeting ANSI Z97.1.

D. Nickel Silver: CDA Alloy 796, leaded nickel silver.

E. Plywood: PS-1, A-D exterior Grade Douglas Fir, fire retardant treated.

F. Sheet Steel: ASTM A366, uncoated, pickled, free from defects.

G. Sound Deadener: Fire retardant; spray, roller or adhesive applied; 3/16 inch thick.

H. Stainless Steel: ASTM A167; type 302 or 304.

2.03 FINISHES:

A. Exposed-to-View Surfaces. Provide as follows unless otherwise specified.

1. Aluminum: Clear anodized finish.

2. Bronze: Satin brushed finish. Clear lacquer coat.

3. Nickel Silver: Satin brushed finish.

4. Sheet Steel:

a. Shop Prime: Degrease clean of foreign substances and apply one coat of corrosion inhibiting primer compatible with finish paint selected. Hoistway items visible to public shall be painted one additional coat of black paint.

b. Finish Paint: Factory applied baked enamel or powder coat; color as selected.

5. Stainless Steel:

a. Plain: Satin, directional polish, No. 4 finish unless otherwise specified.

b. Patterned: Rigidized Metal's No. 5 WL, RIMEX Metals No. 5-SM or equal.

6. Touch-Up:

a. Prime Surfaces: Use same paint as factory for field touch-up.

b. Finish Painted Surfaces: Refinish whole panel with shop prime and finish paint as specified above.

B. Non-Exposed-to-View Surfaces: Degrease and shop paint manufacturer's standard corrosion inhibiting primer.

2.04 AUTOMATIC OPERATION:

A. General Operation of Individual Elevators:

1. Provide a non-proprietary microprocessor-controlled dispatching system designed to monitor all types of traffic and sufficiently flexible so that it can be modified to accommodate changes in traffic patterns. Include hardware necessary to protect hoist motors, motor drives and door operators. Software shall control group and simplex program operations.

2. The system shall continuously monitor the demand based on real time calculations to assign and reassign the elevators to handle the traffic in the most efficient manner.

3. Provide "anti-nuisance service" whereby all car calls will be cancelled if the load-weighing device detects that an abnormal number of calls are registered given the number of passengers in the car. System using false call answering to accomplish this is not acceptable.

4. Serial Link Communications: Provide a distributed processing network consisting of localized processors located in machine rooms, car stations, hall stations and top of car to allow system to make fast decisions based on data shared by the processor involved in the different operations of the elevators. For group dispatch operations, all elevators in the group shall be capable of acting as a group common dispatcher as the need arises.

5. Fault Diagnostic System: Provide County with all hardware such as on-board LED. Diagnostics, hand held device or laptop computer, as standard with manufacturer, and supporting software documentation. Diagnostic system shall be capable of determining faults most difficult to find.

B. Group Automatic Operation; For Two or More Cars:

1. Provide an "on-demand" hall call response system that will continuously scan the hall calls and assign the closest elevator in time to respond to that call. The system shall be capable of reassigning the elevator if demand changes the real time calculation.

2. A car with no car calls registered arriving at a floor where both "up" and "down" hall calls are registered shall respond to the hall call in the direction of travel and illuminate the appropriate lantern. If no car call is registered for that direction, the lantern shall be extinguished, the lantern for the other direction shall light and the car shall respond to the call in that direction. The doors shall not close and reopen.

3. The system shall be capable of monitoring hall and car calls to monitor coincidental calls. The cars will continuously scan the whole system to determine the closest elevator in time taking into account the coincidental car and hall call.

4. Other Required Features:

a. Should a car be delayed from leaving a floor for any reason, other cars shall respond to the hall calls at that floor and shall be dispatched in a normal manner.

b. Provide each car with an adjustable load-weighing device, which will immediately dispatch cars and bypass hall calls when car is loaded to predetermined load.

5. General Program Adjustments:

a. After each group of elevators have been placed in regular service and the building substantially occupied, the elevators shall be regularly observed under normal operating conditions and minor adjustments shall be made as found necessary to ensure that the elevators operate at maximum efficiency.

b. If zones are employed, arrangements shall be made in the control circuits of the elevators for the division between each zone to be raised or lowered if found necessary due to uneven distribution of traffic between the zones and/or staffing requirements.

6. Artificial Intelligence (Fuzzy Logic):

a. The group supervisory control system shall employ techniques of artificial intelligence/fuzzy logic to allow the elevator system's microprocessors to anticipate varying conditions of traffic patterns and to respond accordingly while considering physical and statistical parameters.

b. The software utilized shall continuously learn the patterns of traffic within the building based on gathering and analyzing historical statistics. The traffic statistics shall provide the necessary input to the software so future demands can be anticipated and considered during the allotting process along with the physical parameters.

c. The system shall continuously gather and store historical data such as hall calls, car calls, and landing car stops. The statistical data shall exponentially decay in a manner that places added weighting to recurring traffic patterns. System shall consider the following parameters provided by the historical traffic data:

d. System shall consider the passengers probable destination before passengers actually enter the car.

e. Based on hall call arrival rates, the system shall be capable of predicting when and where service is expected to be required and to determine which landings should receive parked cars.

f. The system shall give more consideration to the historical traffic data statistics, which reflect repetitive patterns.

g. The system shall assign parked cars to the landings with the highest arrival rates for each interval. Should the actual building traffic change, the system shall recognize the change and reassign the parking floors.

C. Simplex Selective Collective Operation:

1. Provide a microprocessor-based control system to perform functions of elevator motion, car operation dispatching and door control.

2. Arrange for Simplex Selective Collective automatic operation. Operate elevators from a single riser of landing buttons and from operating device in car.

3. Momentary pressure of one or more car or landing buttons, 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 in which car is traveling. Stops made in order in which landings are reached, irrespective of sequence in which calls are registered.

4. Double door operation not permitted. If an up traveling car has a passenger for an intermediate floor and a down call is registered at that floor, with no calls above car, it travels to floor, opens door to let passenger out, then lights down direction arrow in hall lantern and accepts waiting passenger without closing and reopening doors.

D. Two-Stop Collective Operation:

1. Provide a microprocessor-based control system to perform functions of elevator motion, car operation dispatching and door control.

2. Operate elevator from single button landing stations and operating buttons in car.

3. Landing or car button causes car to start and proceed to that floor. Doors open automatically when car arrives. When car is traveling away from a registered landing call, call remains registered and car responds on next trip.

2.05 SPECIAL OPERATIONS:

A. Inspection Operation: Provide key-operated hoistway access device and car top operating device. Key switches shall be mounted in doorframes with only ferrule exposed at terminal landings. Incorporate access switches in hall button stations for freight elevators.

B. Independent Service: Independent service operation shall be provided so that, by means of a switch located in the car service cabinet, the car can be removed from automatic operation and be operated by an attendant. The attendant shall have full control of the starting, stopping and direction of car travel. The car shall respond to car buttons only. The hall signals for the car on independent service shall not operate.

C. Operation Under Fire or Other Emergency Conditions: Provide special emergency service to comply with ASME A17.1, CCR Title 8 and local codes having jurisdiction. Provide Phase 1 recall switch at Main Floor Elevator Lobby and Fire Control Life Safety Room. Interlock recall switches to prevent simultaneous activation. Key switches at main floor shall be integrated in hall button station with engraved instructions.

D. Operation Under Earthquake Conditions: Provide seismic operation in accordance with ASME A17.1. Provide a dual ring and string, continuously monitoring type counterweight displacement device for each counterweight with rings mounted on diagonal corners of frame. Provide a seismic switch device measuring both horizontal and vertical accelerations for each group of elevators located per manufacturer's recommendations.

E. Operation Under Emergency Power System:

1. General: The standby power system is sized to operate one elevator in each group simultaneously. Elevators shall be grouped as follows:

Group 1 = Elevators No. 1-3
Group 2 = Elevators No. 4-7
Group 3 = Elevators No. 8
Group 4 = Elevators No. P1-P3

a. When normal power fails and standby power becomes available, a signal will be given to the controllers, all elevators will shut down, and all car lights, etc., will be extinguished.

b. When emergency power comes onto the line, power for lighting car fan and alarm bell shall be automatically transferred and all cars on automatic operation shall be sequentially returned one at a time from each group, to the main floor.

c. After all cars are parked at main floor, one car of each group shall resume normal operation.

d. Provide interlocking illuminated strip switches to permit manual selection of desired elevator to operate on emergency power.

e. When normal power fails and emergency power is used, or when normal power is restored, the Elevator Manufacturer shall provide all circuitry necessary, including time delay or auxiliary relays required to accomplish safe, continuous elevator operation. The cars will start in sequence, not simultaneously; allow 10 seconds between starts.

f. Fire service and derailment devices shall be operable when system is on emergency power operation.

F. Transfer Floor Operation: Restrict access to and from crossover floor as follows:

1. The car button of the higher group of elevators for the crossover floor shall not activate in the up direction. Access to crossover floor shall be in the down direction only.

2. The landing signals for the higher group of elevators at the crossover floors shall be of the terminal type with up designations only. Access to elevators from crossover floor shall be in the up direction only.

G. Tenant Security: Provide CRT and keyboard in Guard Control Station to enable and disable car call buttons as follows:

1. Function, which locks out all cars in a group so that all car buttons are inoperative, except the main floor.

2. Function which locks out any selected car button for all elevators in a group serving that floor.

3. Tenant security operations can be overridden by cars on independent, any special emergency service or by card reader access.

2.06 DOOR OPERATION:

A. Passenger Type Horizontal Sliding:

1. Door Operator: Provide heavy-duty master type operators with direct current motor. Provide closed-loop door operators, equal to Otis HPLIM or I-Motion, ThyssenKrupp HD98, Mitsubishi LV4K, GAL-MOVFR or MAC DPSS.

a. Provide door times available as specified under "Design Criteria".

b. Car and hoistway doors shall open and close simultaneously, quietly and smoothly; door movement shall be cushioned at both limits of travel. Door operation shall not cause cars to move appreciably.

c. Door hold open times shall be readily and independently adjustable when car stops for a car or hall call. Main floor door hold times shall be adjustable independent of other floors.

2. Hangers and Tracks: Sheave type with two-point suspension. Steel sheaves with flanged groove and resilient sound-absorbing tires. Minimum 2-1/2 inch diameter for hoistway, 3 inch for car. Manufacturer's heavy-duty tracks and ball or roller bearing with adjustable up thrusts.

B. Door Protection; Passenger Type:

1. Electronic Scanning Type:

a. Provide a door protective system, which does not rely on physical contact with a person or object to inhibit door movement or initiate door reversal. Provide system equal to the Otis "Lambda II", Adams "I.C.U." or Janus "Panaforty".

b. The system shall be able to detect a 2-inch diameter rod introduced at any position within the door movement and between the height of 2 inches and 63 inches above sill level.

c. Detection of intrusion into the protected area shall cause the doors, if fully open, to be held in the open position and, if closing, to reverse to fully open position.

d. If doors are prevented from closing for an adjustable period of 15 to 45 seconds or upon activation of Fire Emergency Service, they shall proceed to close at reduced speed and a loud buzzer shall sound. Door closing force shall not exceed 2-1/2 ft.-lbs. when door re-opening device is not in operation.

e. For side-opening doors, the detector for the strike jamb side shall be recessed, flush with strike jamb.

2. Door Hold Button; Service Elevators: Provide an illuminated door hold button, operation of which will hold the doors open for a predetermined and adjustable period of 20 to 90 seconds. Sound warning buzzer 5 seconds prior to expiration of time. Normal operation shall be resumed upon:

a. Expiration of door hold time.

b. Operation of door close button in car.

c. Operation of any floor button in car.

2.07 SIGNALS AND OPERATING FIXTURES:

A. General: Provide signals and fixtures as shown and specified. Location and arrangement of fixtures shall comply with handicap requirements.

1. Passenger Elevator Buttons: Provide minimum 1-inch diameter mechanical, white illuminated buttons raised 1/8 inch from surrounding surface with square shoulders and with engraved identifications. Operation of car or hall button shall cause button to illuminate. Response of car to car or hall call shall cause corresponding button to extinguish.

2. Service and Parking Elevator Buttons: Provide vandal-resistant stainless steel minimum 1 inch diameter mechanical buttons, raised 1/8 inch from surrounding surface with square shoulders and integral illumination equal to Adams/EPCO, Elevator Research and Manufacturing or GAL fixtures. Operation of car or hall button shall cause button to illuminate. Response of car to car or hall call shall cause corresponding button to extinguish.

3. Switches: Toggle type typically or key operated where noted.

4. Faceplates: Provide of material and finish as indicated and specified; 1/8 inch minimum thickness with sharp edges relieved. Unless otherwise specified provide faceplates matching material and finish of entrance doors and frames.

5. Fastenings: Provide with concealed fasteners for passenger elevators and with flush tamper-proof screws of material and finish matching faceplates for service and parking elevators.

6. Cabinets: Provide with pulls, concealed hinges and doors mounted flush with hairline joints to adjacent surface.

7. Arrangement: Arrangement of fixtures shall generally conform to that specified, but components may be rearranged, if desired, subject to The County's Representative's approval.

8. Engraving: Of size indicated; color backfill with epoxy paint in contrasting color as selected.

9. Lamps: Miniature LED type.

10. Audible Chimes: Electronic adjustable audible chimes; bell type gong not acceptable.

11. Provide floor passing signal of the adjustable electronic audible chime type.

12. Tactile Markings: Provide raised Braille and alpha characters, numerals or symbols to the left of operating buttons and devices used by the public. Indications may be engraved directly on faceplates or separate plates flush mounted with hairline joints and concealed mechanical fasteners. Plates shall be of same size and shape as buttons.

B. Car Operating Panels:

1. General: Provide buttons numbered to conform to floors served and the following:
   a. Locate top operating button at 48 inches above floor; maximum 54 inches when required.

   b. Locate emergency stop and illuminated alarm button in bottom row at 35 inches above floor. Wire emergency stop to ring alarm bell.

   c. Provide "Door Open", "Door Hold", and "Door Close" buttons located above emergency stop and alarm of same design as car button.

   d. Engrave main panel with capacity, number of passengers and elevator number in 1/4-inch letters. Engrave auxiliary panel with NO SMOKING in 1-inch letters. All other signage required by local codes shall be engraved as directed by The County's Representative.

   e. Provide fire emergency panel above floor buttons containing phase II fire key switch, call cancel button stop switch, door open, door close buttons, audible/visual signals and instructions.

   f. Make provisions for card readers.

2. Swing Type: Integrate cabinets, buttons and engraving into swing front return panels without applied faceplate. Entire front return shall swing on concealed hinges with concealed locking means for servicing.

3. Applied Type: Integrate cabinets, buttons and engraving into hinge single piece faceplate mounted to front return panel or sidewall adjacent to strike jamb.

C. Car Position Indicators:

1. Provide car position indicators with indications corresponding to floor designations with matching direction arrows and floor passing chimes or verbal annunciator which announces the floor at which the car is about to stop. Provide "X" or "E" indications for elevators with express zones. Provide digital type direct readout indicator with minimum one-inch high indications mounted integral with each car-operating panel.

D. Hall Position Indicators: Digital type with 2-inch high indications. Combine with hall lanterns.

E. Service Cabinet: Provide cabinet door with a lock and concealed hinge as an integral part of car operating panel mounted with flush hairline joints. Cabinet door shall be provided with a flush glazed window of required size to hold elevator-operating permit. Service cabinet shall contain the following:

1. Independent service switch.

2. Two-speed ventilation switch.

3. Light switch or dimmer as applicable.

4. Inspection switch, key operated.

5. Duplex convenience outlet.

6. Buzzers as required.

7. Constant pressure test switch for emergency car lighting.

8. Card reader over-ride switch.

F. Passenger Emergency Communication Speaker Phone: Provide a complete communication system in compliance with A.D.A. regulations consisting of a combination speaker/microphone, amplifier, automatic dialer with 4 number rollover capability and matching car station push button with telephone symbol to activate system and call-acknowledgement lights. Mount behind a pattern of holes as selected as an integral part of car operating panel. Wire to machine room and program automatic dialer as directed by County.

G. Building Emergency Personnel Communication System (for Travels over 60'): Provide a two-way voice communication system in accordance with ASME A17.1. The two-way voice communication system outside of the car shall be located within the Guard Station.

H. Hall Button Fixtures: Each fixture shall contain buttons, which light to indicate hall call registration and extinguish when call is answered. Engrave fire-exiting instructions on faceplates.

I. Hall Lanterns: Provide with single chime for up and double chime for down direction. Lantern illuminates white for up and red for down. As car approaches floor, lantern shall illuminate and chime approximately 4 seconds prior to doors opening to indicate next direction of travel. Provide manufacturer's standard hall lanterns with triangular lenses.

J. Car Lanterns: Manufacturer's standard car riding lantern mounted at a maximum height above floor. Lens shall be flush with faceplate or face of jamb. Lantern illuminates and chimes as doors open. Provide single chime for up direction and double chime for down direction.

K. Remote Control Stations: Provide indicator and control panels with wiring from elevator hoistways to and between remote stations as specified. Engrave operating instructions for controls, indicators, elevator numbers and floors served by each elevator or group of elevators. Coordinate quantity and size of conduit runs as specified under "Related Work Included In Other Sections". Provide manufacturer's system utilizing CRT device and keyboard incorporating all features specified. Panel shall be sized to suit space available and design as approved.

1. Guard's Lobby Control Stations: Locate as directed. Include the following devices for each elevator or group of elevators as applicable.

a. Display showing status, position and direction of each elevator.

b. Function to call and shut down each car at lobby with doors closed.

c. Function to place cars on independent service operation and call car to lobby and park with doors open.

d. Function for tenant security operation as specified under Special Operations.

e. Building Emergency Personnel Communication System with instructions.

2. Life Safety Control Station: Locate in Fire Control Room as indicated; size panel to suit space available, design as approved. Include the following for each elevator or group of elevators as applicable.

a. Display showing status position and direction of each elevator.

b. Three-position fire key switch with visual indication. Interlock with lobby key switch to prevent simultaneous activation.

c. Display reading EMERGENCY POWER to illuminate as soon as main power fails. Manual selection switches for each car and display indicating which car are operating on standby (emergency) power.

d. A compartment containing properly identified keys to operate all fire service switches. Provide tags with legible instructions on each key. Lock on compartment shall be subject to house master key or fire department key as approved.

2.08 WIRING:

A. General: Provide all necessary wiring with 15% or a minimum of four spares between cars and controllers and to all remote control stations. Furnish shielded wires in cables for all communication systems card readers and speakers. Include two additional pairs of shielded spares for each car.

B. Traveling Cables: Use minimum number of traveling cables with flame retarding and moisture resisting covers. Include shielded wires and spares as noted above. Cord thoroughly and protect cables from rubbing against hoistways or car items. Provide with steel cable core and properly anchored to relieve strain on individual conductors.

C. Work Light and Convenience Outlet: Provide on top of car with wire lamp guard.

D. Stop Switch: Provide in each pit and on top of car.

E. Alarm Gong: Six-inch size, 110 volt. Provide on top of each car to be actuated by corresponding alarm button or emergency stop switch.

F. Auxiliary Disconnect Switches: Provide as required in remote controller rooms or at remote equipment not in view of mainline switches; include all wiring and conduit.

G. Coaxial Circuit: Provide for closed circuit television camera in elevators. Run from elevator car to machine room.

2.09 CAR ENCLOSURES:

A. General: Fabricate finish work smooth and free from warps, buckles, squeaks and rattles; joints lightproof. Car shall be sound isolated from car frame. Apply outside of car with 3/16-inch thick sound deadener. No visible fastenings, except as indicated.

B. Passenger Cars; Elevator No. 1-7:

1. Steel Shell: Fabricate walls of 14-gauge sheet steel from floor to canopy. Canopy 12 gauge reinforced. Paint shell in color as selected by The County's Representative.

2. Emergency Exit: Top of car per code.

3. Ventilation: Two-speed squirrel cage exhaust blower, Morrison model AA or equal, with sound isolation mounting on canopy. Provide concealed vents above base and ceiling as required.

4. Car Doors: Fabricate from 16-gauge sheet steel on front and back of each panel sufficiently reinforced with steel to insure rigidity. Provide two guides per panel located one inch from each end. Provide full-length neoprene astragals. Finish car side with stainless steel and return finish 1/2 inch around edge of doors.

5. Protective Pads: Provide one set of heavy quilted protection pads for each group of elevators. Pads shall cover all walls with cutout sections for car operating panels. Provide pads with rubber-coated 'J' type hooks sewn into top of pad for mounting on top of removable panels.

6. Front Return Panels: Provide full integral swing type front return panels fabricated from 14 gauge stainless steel.

7. Interior Panels, Ceiling and Lighting: Interior panels and ceiling of the existing elevators 2-7 have been removed and stored and are to be treated to meet ASME A17.1 requirements for flame spread and smoke density. Interior panels shall be refinished, restored and installed in new elevators 2-7. Elevator 1 shall be provided with new interior finishes that match existing , contemporary compatible.

8. Handrail: Provide handrails on rear wall. Fabricate from 1-1/2 inch diameter stainless steel with matching brackets. Securely attached to car shell with concealed fasteners.

9. Sills: Provide extruded nickel silver threshold plate. Mount with concealed mechanical fasteners. Allow for installation of finish flooring.

10. Finish Flooring: Stone flooring as selected by County's Representative

C. Service/Passenger Cars; Elevator No. 8 & 9:

1. Steel Shell: Fabricate walls of 14 gauge patterned stainless steel. Extend from floor to canopy and heavily reinforce to withstand severe service.

2. Canopy and Lighting: 12 gauge reinforced stainless steel with recessed fluorescent light fixtures with protective lens. Protect light housing from damage.

3. Emergency Exit: Top of car per code.

4. Car Doors: Fabricate from 16-gauge sheet steel on front and back of each panel sufficiently reinforced with steel to insure rigidity and sound deadened. Provide two guides per panel located one inch from each end. Provide full-length neoprene astragals. Mount doors on structural header, not on car enclosure. Finish car side with stainless steel and return finish 1/2 inch around edge of doors.

5. Entrance Columns and Front Return: Provide front return panels fabricated from 14 gauge stainless steel.

6. Ventilation: two-speed squirrel cage exhaust blower, Morrison model AA or equal, with sound isolation mounting on canopy. Provide vent slots in base.

7. Bumper Rails: Provide 1/2 inch by 6-inch stainless steel No. 4 finish bar located at 12 inches above floor on all walls without entrances. Mount flat with countersunk mechanical fasteners securely attached to car shell.

8. Handrail: Provide a 1-1/2 inch diameter stainless steel rail on all walls without entrances mounted with matching brackets securely attached to car shell.

9. Sills: Provide extruded nickel silver threshold plate. Mount with concealed mechanical fasteners. Allow for installation of finish flooring.

10. Finish Flooring: Tile as selected by the County's Representative.

D. Passenger Cars; Elevator No. P1-P3:

1. Steel Shell: Fabricate walls of 14-gauge sheet steel from floor to canopy. Canopy 12 gauge reinforced. Paint shell in color as selected by The County's Representative.

2. Emergency Exit: Top of car per code.

3. Car Doors: Fabricate from 16-gauge sheet steel on front and back of each panel sufficiently reinforced with steel to insure rigidity and sound deadened. Provide two guides per panel located one inch from each end. Provide full-length neoprene astragals. Finish car side with stainless steel and return finish 1/2 inch around edge of doors.

4. Front Return Panels: Provide full integral swing type front return panels fabricated from 14 gauge stainless steel.

5. Interior Panels: Provide removable panels of 1/2 inch in particleboard with balance sheet faced and edged with patterned stainless steel.

6. Ceiling and Lighting: Provide a suspended ceiling fabricated from stainless steel. Provide equally spaced low voltage down lights in ceiling as with dimmer switch controls located in service cabinet.

7. Handrail: Provide a 1-1/2 inch diameter stainless steel rail on rear wall mounted with matching brackets securely attached to car shell.

8. Sills: Provide extruded nickel silver threshold plate. Mount with concealed mechanical fasteners. Allow for installation of finish flooring.

9. Finish Flooring: Tile as selected by the County's Representative.

E. Emergency Lighting; All Elevators: Provide an emergency car lighting unit mounted on top of car, battery driven and self-rechargeable. Upon outage of normal power the unit shall, within 5 seconds, light two lamps as part of normal car lighting or separate lights mounted above drop ceiling. The unit shall have sufficient capacity to keep the lights in continuous operation for four hours and also the alarm bell for one hour. Provide a readily accessible means for testing the unit in service cabinet. Light fixtures mounted in car front returns or operating panels are not acceptable.

2.10 HOISTWAY ENTRANCES; PASSENGER TYPE:

A. General: Fabricate finish work smooth with flush surfaces and free from warps and buckles. Entrance assemblies shall bear 1-1/2 hour U.L. rating. Provide entrances of size and type as scheduled.

B. Struts and Closer Angles: As required for entrance installation and door closer mechanism. Use full-length struts. Hanger headers, minimum 3/16 inch material extending from strut to strut.

C. Dust and Hanger Covers: Provide as required of minimum 16-gauge sheet steel. Provide hanger cover plates extending full length of door track. Paint black.

D. Fascia, Toe and Head Guards: Minimum 16 gauge sheet steel; reinforce fascia. Paint black. Provide blind fascia in express zones or for reverse openings as required.

E. Sills: Extruded sills with non-slip surfaces and grooves suitable for guides. Extend strut to strut and mount without exposed screws. Provide all support angles and levelers for a complete installation. Sill material as scheduled.

F. Frames: Fabricate from 14-gauge material with side jambs in one continuous piece from sill to head section. Head and jamb flush bolted with hairline joint to provide unit frames with neat appearance from corridor side. Standard bolted frame for Elevator No.9, P1-P3 will be acceptable. Material and finish of frames as scheduled.

G. Doors: Fabricate from 16-gauge material sufficiently reinforced with steel to insure rigidity and sound deadened. Provide two guides per panel, which will remain engaged in sill if guiding member is destroyed. Provide full-length neoprene astragals on leading edge and non-vision wings of material and finish to match doors. There shall be no keyholes in the door unless required by governing authority. Corridor side of door panel material and finish as scheduled. Return finish a minimum of 1/2 inch around edges of door.

H. Tactile Markings: Provide raised Braille and alpha characters, numerals or symbols similar to those for car stations of size required by governing authority. Locate on each entrance jamb at 60 inches above floor indicating floor designation. Material and finish of plates shall have contrasting background and mounting means similar to those on car panels.

2.11 TRACTION ELEVATOR EQUIPMENT:

A. Design Criteria:

1. Performance:

a. Contract Speed: Maximum five percent (5%) speed variation under any loading condition in either direction.

b. Motion Time: Brake release to brake set as measured in both directions for a typical one floor run under any loading condition. After make-up of hoistway door interlock, initiate movement of car within 0.2 second for gearless elevators and 0.7 second for geared elevators.

1) 350 FPM: 5.6 seconds.

2) 500 FPM or Greater: 4.5 seconds

c. Door Open Times:

1) 3'-6" Center Open: 1.8 seconds.

2) 4'-0" Center Open: 2.0 seconds

3) 4'-0" Side Open: 2.5 seconds.

d. Door Close Times: Minimum, without exceeding kinetic energy and closing force, allowed by code.

e. Door Dwell Times: Comply with A.D.A. formula and provide separate adjustable timers with initial settings as follows:

1) Main Lobby Hall Call: 5.0 seconds.

2) Upper Lobby Hall Call: 5.0 seconds.

3) Car Call: 5.0 seconds.

4) Interruption of Door Protective Device: Reduce dwell to 1.0 second after all ADA requirements have been met.

f. Leveling: Within 1/4 inch under any loading condition. Level into floor at all times, do not overrun floor and level back.

g. Releveling: Provide smooth and accurate releveling required due to cable stretch.

2. Operating Qualities: The County's Representative will judge riding qualities of cars and enforce the following requirements. Make all necessary adjustments.

   a. Acceleration and Deceleration: Starting and stopping shall be smooth and comfortable, without obvious steps of acceleration. Slowdown, stopping and leveling shall be without jars or bumps. Stopping upon operation of emergency stop switch shall be rapid but not violent.

      1) Vertical Acceleration: Maximum 4 ft. per second squared. Maximum jerk 8 ft. per second cubed.

      2) Horizontal Acceleration: Maximum 15 mg peak-to-peak measured at full speed for full travel in both directions.

   b. Full Speed Riding: Free from vibration and sway.

3. Motor Control:

   a. Equipment: Capable of operating at plus or minus ten percent of normal feeder voltage and plus or minus three percent of feeder frequency without damage or interruption of elevator service.

   b. Control System: Closed loop feedback control incorporating positional and velocity selector system that is capable of operating continuously at contract speed and load for one hour without exceeding 50 degrees Centigrade from ambient machine room temperature. Design system to not adversely affect stability of voltage and frequency controls of emergency generator set or loads connected to emergency power bus during standby power operation.

   c. Car Load Sensing:

      1) The control system shall sense the actual load condition of the elevator prior to any movement of the elevators. The start/acceleration pattern shall be adjusted to reflect the carload to achieve a smooth start/acceleration under all load conditions and location in the hoistway.

      2) Provide load-sensing devices that utilize crosshead deflection or hoist rope pressure. System shall be accurate within 100 pounds and stable over extended periods.

      3) Systems using pre-torquing of the D.C. motor armature are acceptable; variable voltage control of the brake energization is not acceptable.

4. Sound Control:

   a. Vibration: Sound isolate machines and motor drives from beams and building structure to prevent objectionable noise and vibration transmission to occupied building spaces.

   b. Airborne Noise: Maximum acoustical output level of:

      1) 75 dba measured in machine room.

      2) 60 dba measured in elevator cars during all sequences of operation.

      3) 50 dba measured in elevator lobbies.

B. Guide Rails:

1. Size: Standard steel tees with backs machined for splice plates. Extend rails full depth of pits and mounted to continuous pit channels with adjustment bolts to allow for building settlement. Minimum weight in pounds per foot shall be 15 pounds for car and 15 pounds for counterweight.

2. Installation: Drawings indicate basic hoistway framing and special supports for rail brackets. Guide rails shall be sized or reinforced to span a distance of 14'-0". The Elevator Contractor shall provide all additional supports and/or rail backing required. Install plumb within 1/16 inch. File joints smooth.

C. Guide Shoes: Roller type with rubber composition tires, minimum 3/4 inch wide and fully adjustable spring loaded to provide continuous contact with rail surfaces. Balance car to insure equal guide shoe pressure on all wheels and not exceed manufacturer's recommendations.

D. Hoist and Governor Ropes: Size and number to insure proper wearing qualities; minimum eight strands wound around hemp core. Pre-formed cables will be permitted. Minimum size: Hoist ropes, 1/2 inch for hoist ropes and 3/8 inch for governor ropes.

E. Hoist and Governor Ropes: Size and number to insure proper wearing qualities and compatible with driving and deflecting sheaves. Use only code approved hoisting ropes. All ropes shall be tensioned and pressure equalized between individual hoist ropes after final testing has been accepted by local governing authority.

F. Buffers: Mount on continuous pit channels with required blocking and supports. For deep walk-in pits, provide platforms with access ladders for servicing car buffers as acceptable to Elevator Code authorities. Provide oil buffers, spring return type with switches. Pistons shall be fully protected by bluing or canvas covers.

G. Counterweights: Sectional metallic weights securely fastened in structural frame. Frame to be designed to maintain structural integrity without bending upon activation of a seismic force of .5 g. Weight shall occupy a minimum of two-thirds the height of the frame.

H. Safeties: Flexible guide clamp type mounted on underside of car frame.

I. Governor: Centrifugal speed type to be located at top of hoistway in machine room or in pit with protective covering over sheave, jaws and exposed gears. Pit tail sheave frame shall be ratchet or tension type held under 200 pounds tension. Governor can be self re-setting type if code approved prior to installation. Provide controller with positive displacement jumper in the event of re-setting governor from elevator controller equipment room. Positive displacement jumper shall only be attached to controller in the event of governor re-setting by qualified personnel.

J. Car Frame and Platform:

1. Passenger Elevators: Steel frame with steel or double wood floor; isolate platform from car frame by rubber pads and provided with jacking bolts for pad replacement.

2. Service/Passenger Elevators: Freight type construction with heavy channels front and rear, metal stringers with steel or double layered wood floor. Design for Class A freight loading

K. Traction Machines: Provide machines with heavy structural steel bedplates and motors rated for 30 minute with maximum 50 degree Centigrade rise or better. Provide manufacturer's standard double wrap or single wrap traction machines as approved with 1:1 or 2:1 roping.

L. Controller: As standard with approved manufacturer; overload relays in three legs of power circuit and in loop circuit; cabinets with NEMA-1 enclosures and doors arranged with locks or mechanical latches. Provide permanently marked symbols or letters identical to those on wiring diagrams adjacent to each component.

1. The controller wiring shall be carried out in a neat and workmanlike manner in accordance with relevant requirements of National Electric Code.

2. All external connections to the equipment on each controller shall be made by means of approved cable thimbles and/or solderless cable lugs, depending on the current to be carried.

3. Condenser activated or dashpot timers, motors or incandescent globes for dampening acceleration and deceleration steps are unacceptable.

4. Main contactors or starter switches shall be horsepower rated and are not to be mounted directly to the steel cabinets, to ensure quiet operation of controllers.

5. The controllers must be properly shielded from line feeder pollution.

M. Power Conversion and Regulation Unit:

1. All circuitry shall be as approved by the enforcing code. Operation shall be quiet and the performance standards herein specified shall be provided.

2. Design system to control starting and stopping and to prevent damage to motor from overload or excess current and to automatically disconnects power supply. Apply brake and bring car to rest in event of power failure or safety device operation.

3. Controllers shall not have failure modes which results in full power being applied to drive machine operation in event of phase reversal, phase failure or low voltage, which might result in elevator malfunction.

4. Provide system to convert 3 phase, 60 Hz, A.C. building power supply to a fixed D.C. voltage and then invert from D.C. voltage to a variable voltage, variable frequency, distortion-free, smooth A.C. current output to the A.C. hoist motor.

5. Varying the frequency input to the motor shall control motor speed; varying the voltage to the motor shall control torque.

6. System shall be provided with necessary devices to insure quiet operation not exceeding noise level specified in "Design Criteria" and to protect building system power line against line voltage transients.

N. Machine Beams and Sheaves: Provide all structural steel machine and sheave beams with dead end hitch plates, bearing plates, anchors and blocking as required to support equipment. Secondary, overhead and deflecting sheaves with roller bearings and means for lubricating bearings from machine rooms as required where secondary levels are not provided. For machine room-less type applications provide permanently sealed motors, and deflector sheaves requiring no lubrication.

O. Selector:

1. The system shall utilize a device to establish incremental car position to an accuracy of .1875 inches or better using quadrature signal for the entire length of the hoistway. Absolute floor number encoding with parity shall be provided at each floor in order to establish exact floor position to the computer. The system shall not require movement to a terminal landing for the purpose of finding the correct car position.

2. The system shall utilize an automatic two-way leveling device to control the leveling of the car to within 1/4 inch above or below the landing sill. Over travel, under travel, or rope stretch must be compensated and the car brought level to the landing sill.

3. The individual car controller shall be capable of learning the position of each floor in the building to an accuracy of .1875 inches.

4. The individual car controller shall have the software program that uses mathematical methods to create an idealized optimum velocity profile of the car travel from any floor to any other floor providing a smooth and stepless elevator ride. All the system motion parameters (such as jerk, acceleration, deceleration rates etc.) shall be field programmable with parametric limitations for the system dynamics, and be stored on EPROM as non-volatile memory.

5. The drive control system shall utilize the optimized velocity profile in a dual-loop feedback system based on car position and speed. A velocity feedback device shall permit continuous comparison of car speed with the calculated velocity profile to provide accurate control of the acceleration and deceleration, right to the final stop without discomfort, regardless of direction of travel or load in the car.

6. The individual car controller shall have an independent safety processor that monitors the speed of the car and creates a phantom speed contour near the terminal landing, so that the car would not be capable of traveling faster than the phantom speed contour. This processor should work independently of any other logic or motion control processors in the system.

7. The controller shall utilize a solid-state drive unit using solid-state power devices to control the motor field and machine brake.

8. The controller shall provide the required electrical operation of the elevator control system including the automatic application of the brake, which shall bring the car to rest upon failure of power.

9. In addition, the power control shall be arranged to continuously monitor the actual elevator speed signal from the velocity transducer and to compare it with intended speed signal to verify proper and safe operation of the elevator.

10. During operation of the elevator with overhauling load (empty car up or loaded car down), precision speed control shall be obtained by the regulation system utilized in the power control. The automatic leveling zone shall not extend more than 12 inches above or below the landing level nor shall the doors begin to open until the car is within 12 inches of the landing. In addition, the inner leveling zone shall extend not more than 3 inches above or below the landing. The car shall not move if it stops outside the inner leveling zone unless the doors are fully closed.

11. An electro-mechanical switch shall open all power feed lines to the brake. A single ground, short circuit, or solid-state control failure shall not prevent the application of the brake in the intended manner. Systems that do not apply the brake when the car stops at a landing are not acceptable.

12. A motor field current sensing means shall be provided which shall cause electric power to be removed from the armature and brake unless the direct current flowing in the shunt field of the motor is sufficient to prevent over speeding of the motor.

P. Compensation:

1. Chain Type: Encapsulated chain equal to Quiet Link, Whisperflex or equal with pit guide rollers to maintain loop, limit horizontal movement and prevent rubbing of chain on elevator equipment or hoistway items.

2. Cable Type: Use cables similar to hoist cables. Provide guards over top of sheaves to prevent materials from falling into sheave grooves. Provide manufacturer's standard tension sheave with or without frame - mounted in elevator pit and restrained from tipping.

2.12 HYDRAULIC ELEVATOR EQUIPMENT:

A. Design Criteria:

1. Performance:

a. Contract Speed: Maximum twenty percent (20%) speed variation under any loading condition in either direction.

b. Motion Time: From start to stop of elevators motion as measured in both directions for a typical one floor run under any loading condition. Initiate movement of car within 1.5 second after make-up of hoistway door interlock.

1) 125 FPM: 9.1 seconds.

c. Door Open Times:

1) 4'-0" Side Open: 2.5 seconds.

d. Door Close Times: Minimum, without exceeding kinetic energy and closing force, allowed by code.

e. Door Dwell Times: Comply with A.D.A. formula and provide separate adjustable timers with initial settings as follows:

1) Main Lobby Hall Call: 5.0 seconds.

2) Upper Lobby Hall Call: 5.0 seconds.

3) Car Call: 5.0 seconds.

4) Interruption of Door Protective Device: Reduce dwell to 1 second after all ADA requirements have been met.

f. Leveling: Within 3/8 inch under any loading condition. Level into floor at all times, do not overrun floor and level back.

g. Hydraulic Pressure: Hydraulic components shall be factory tested for 600 PSI. Maximum operating pressure shall be 425 PSI.

2. Operating Qualities: The County's Representative will judge riding qualities of cars and enforce the following requirements. Make all necessary adjustments.

a. Starting and stopping shall be smooth and comfortable. Slowdown, stopping and leveling shall be without jars or bumps.

1) Vertical Acceleration: Maximum 4 ft. per second squared. Maximum jerk 8 ft. per second cubed.

2) Horizontal Acceleration: Maximum 10 mg peak-to-peak measured at full speed for full travel in both directions.

b. Full Speed Riding: Free from vibration and sway.

3. Sound Control:

a. Vibration: Sound isolate the power units from building structure to prevent objectionable noise and vibration transmission to occupied building spaces.

b. Airborne Noise: Maximum acoustical output level of:

1) 85 dba measured in machine room.

2) 60 dba measured in elevator cars during all sequences of operation.

3) 50 dba measured in elevator lobbies.

B. Guide Rails:

1. Size: Standard steel tees with backs machined for splice plates. Extend rails full depth of pits. Do not bottom on pit floor. Minimum weight shall be 15 pounds per foot.

2. Installation: Drawings indicate basic hoistway framing and special supports for rail brackets. Guide rails shall be sized or reinforced to span a distance of 14'-0". The Elevator Contractor shall provide all additional supports and/or rail backing required. Install plumb within 1/16 inch. File joints smooth.

C. Guide Shoes:

1. Roller Guides: Roller type with rubber composition tires, minimum 3/4 inch wide and adjustable spring loaded to provide continuous contact with rail surfaces. Nominal roller diameters shall be 6 inches.

2. Slide Guides: Provide heavy duty solid or swivel type sliding guides with non-metallic gibs requiring minimal lubrication; minimum 8 inches long.

D. Buffers: Spring type mounted on cylinder support channels with required blocking and supports. For deep walk-in pits provide platforms with access ladders for servicing plunger assembly.

E. Car Frame and Platform: Freight type construction with heavy channels front and rear, metal stringers with steel or double layered wood floor. Design for Class A freight loading

F. Platen Isolation: Provide minimum 3/4-inch thick steel plates between top of plunger and car frame with one inch rubber or neoprene isolation material between.

G. Holeless Installation: Provide twin-post holeless type hydraulic elevators utilizing conventional single stage cylinder/plunger units on each side of elevator car adjacent to guide rails. Inverted cylinder/plunger units will not be accepted.

H. Cylinder: Steel pipe, factory tested for 600-pounds/square inch working pressure. Sandblast or wire brush outside of cylinder to remove rust and scale. Paint with heavy coat of epoxy or mastic. Wrap with 20-mil wrapping of Trantex, Tapecoat, Glasswrap or approved equal. Work shall be done in shop and repaired in field if coating is damaged.

I. Plunger: Use seamless steel pipe or tubing, minimum Schedule 80. Plunger shall be no more than 0.010 inch out of round and straight within 1/16 inch. Protect during shipping and installation to avoid damage. If plunger is gouged, scarred or shows visible tool marks, it shall be replaced. Finish shall be 20 micro inches or finer. Plunger top shall be isolated from car frame. Plungers with follower guides are not acceptable.

J. Packing: Provide packing, which inhibits leaking of oil with drip ring.

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

L. Oil: Provide Hydro Safe biodegradable hydraulic vegetable oil or approved equal specifically designed and formulated for hydraulic elevator use.

M. Piping: Minimum Schedule 80 steel pipe suitable for 600 pounds pressure. No hoses shall be used in any part of piping. Provide sound isolating couplings in oil line between jack and pumping plant. Support piping using vibration isolating mounts or hangers with integral felt or neoprene at least 1/4 inch thick. Use threaded or welded joints throughout except at the connections to power unit and cylinder unit. Use no more than two victaulic type connections in the machine room and two in the pit area.

1. Overhead and Exposed Piping: Provide drip deflectors at pipe joints where pipes run above ceiling areas to prevent damage to these areas in case of joint leakage.

2. Underground Piping: Protect with extruded high density polyethylene coating having a thickness of 25 to 60 mills applied with a minimum 8 mill thickness of modified rubber adhesive material all as manufactured by Plexco or equal. Install piping on three-inch bed of clean, dry sand and backfill with additional three inches of sand.

3. Testing: Before enclosing pipe system, close ends, fill with fluid, establish 600 PSI pressure and allow to stand for 24 hours. Make corrective repairs to leaks or pressure drop.

N. Pit Valves:

1. Provide in each elevator pit a gate valve to shut off oil between cylinder and pumping plant.

2. Provide a pressure type line rupture safety valve to shut off oil between cylinder head and pit valve. Activation of safety valve shall not void operation of lowering valve.

O. Pumping Plant:

1. General: Self-contained unit with sound reducing cabinet and sound isolated base.

2. Pump: IMO, Roper or accepted equal for 150 SSU oil, belt driven or submersible. Maximum speed 3600 RPM. Maximum pressure 425 pounds per square inch.

3. Tank: Capacity equal to plunger displacement plus 25%. Provide strainers, oil level sight gauge and device to maintain uniform oil temperature.

4. Valves: Integral type by Elevator Equipment Company, Maxton Company or by elevator manufacturer. Provide conveniently located manual lowering valve accessible without removing pumping plant enclosure panels.

5. Motor: General Electric, Imperial, Westinghouse or accepted equal; maximum speed 1800 RPM for belt driven and 3600 RPM for submersible. Provide minimum 120 start heavy-duty motor, continuous rated, 50 degrees C. temperature rise, Class A insulation or 70 degrees C. rise for Class B insulation.

6. Controller: Integral, floor or wall mounted as applicable to space conditions. Include door-operating relays combined with controller. Provide SCR solid-state soft start starting. Provide three (3) manual reset overload relays, one in each line and reverse phase relay. Provide externally mounted permanently identified junction boxes on controller cabinets for termination of communication circuits.

7. Muffler: Blowout proof type between pumping plant and cylinder.

P. Oil Cooling System: Provide an oil cooling system utilizing heat pipe technology similar to HyTec Oil Coolers as manufactured by Noren Products, Inc. of Menlo Park, California or equal.

Q. Hydraulic Elevator Protective Circuit: In the event the car should stall due to low oil in the system or, if for other cause the car fails to reach the top landing within a predetermined time while traveling "up", a special circuit shall be provided which shall automatically return the car to the bottom landing and open the doors for 10 seconds after which the elevator will close doors and completely shut down. Recycling the mainline switch shall restore Service.

R. Hydraulic Elevator Battery Emergency Lowering Operation: Provide a battery driven unit which will initiate operation of the Protective Circuit and lower elevator to bottom landing in the event of a power failure. Service shall be restored automatically upon restoration of normal power supply. Arrange with an exposed method of testing. Arrange circuitry so that, if the mainline switch is open when the power transfer takes place, the elevator will not respond to the operation of the protective circuit. Provide a double pole-isolating switch on the battery unit to disconnect the battery output.

PART 3 - EXECUTION

3.01 GENERAL:

A. Bidding Documents: Bidders shall examine architectural, structural, electrical and mechanical plans and specifications. Any discrepancies which affect the elevator work or conditions adverse to the bidder's equipment shall be brought to The County's Representative's attention at least seven (7) days prior to the bid date.

3.02 PREPARATION:

A. Field Measurements: Field-verify dimensions before proceeding with the work. Coordinate related work by other trades. Verify the following to be acceptable for installation of elevators.

1. Hoistway has been correctly sized and otherwise properly prepared.

2. Equipment supports are satisfactory.

3. Electrical rough-ins are correct.

4. Do not begin installation until unsatisfactory conditions have been corrected.

3.03 INSTALLATION:

A. General: Install per manufacturer's requirements, those of regulatory agencies and as specified.

B. Welded Construction: Provide welded connections for installation of 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.

C. Sound Isolation: Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure and thereby, eliminate sources of structure-borne noise from elevator system.

D. Lubricate operating parts of systems, including ropes, as recommended by manufacturer.

E. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails, for accurate alignment of entrances with cars. 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.

F. Erect guide rails plumb and parallel with maximum deviation of 1/16 inch. Anchorage of guide rails shall not compromise waterproofing. Do not bottom rails on pit floor.

G. Grout sills with non-staining, non-shrink grout. Set units accurately aligned with finished floor at landings.

H. Graphics: Provide graphics visible to public as selected by The County's Representative.

I. Manufacturer's Nameplates: Manufacturer's nameplates, trademarks or logos not permitted on surfaces visible to public.

3.04 TEMPORARY ELEVATOR USE DURING CONSTRUCTION:

A. General: Should the General Contractor require the use of any elevator during construction, Contractor shall make arrangements directly with the Elevator Contractor, coordinate temporary facilities and pay all costs associated with the protection, operation and use of elevators.

B. Maintenance: Elevators shall be maintained on a regular basis during the temporary construction use. A minimum of two hours per week per elevator shall be spent on examination, lubrication, adjusting and cleaning the elevator equipment.

C. Damage: The County is entitled to receive new elevator equipment upon final acceptance of the entire project. The County's Representative will thoroughly examine all elevator equipment upon completion of temporary use and provide a punch-list outlining items that must be repaired or replaced to ensure the equipment is in new condition. Final acceptance and payment will not be made until all items have been satisfactorily completed.

D. Schedule: Sufficient time must be allowed to prepare and adjust temporary elevators so that the entire elevator installation is ready for final acceptance.

3.05 FIELD QUALITY CONTROL:

A. Regulatory Agencies Inspection: Upon completion of elevators, Contractor shall provide instruments, weights and personnel to conduct test required by regulatory agencies. The Contractor shall submit a complete report describing the results of the tests.

B. Examination and Testing: When installation is ready for final acceptance, notify and assist The County's Representative in making a walk-through review of entire installation to assure workmanship and equipment complies with contract documents. Provide equipment to perform the following tests:

1. One-hour heat and run test with full load in car. Perform for one car of each duty.

a. Stop car at each floor in each direction.

b. Provide well-shielded thermometers for motor and verify that temperatures do not exceed 50 degrees Centigrade above ambient. Laser Temperature pointers acceptable.

c. Performance and leveling tests shall be made before and after heat and run test.

2. Check and verify operation of all safety features and special operations.

3. Demonstrate and verify to the The County's Representative the following:

a. Measure horizontal acceleration for a full speed, full rise up and down run.

b. Measure acoustical output levels in machine room, lobbies and cars for a full speed, full rise up and down run.

c. Measure voltage transients and harmonics feedback into building electrical system for a full speed, full rise up and down run.

C. Correction: Make corrections to defects or discrepancies at no cost to County. Should discrepancies be such that re-examination and retesting is required, the Contractor shall pay for all costs including those of The County's Representative fees.

D. Final Acceptance: Final acceptance of the installation will be made only after all corrections are complete, final submittals and certificates received and the County is satisfied and the installation is complete in all respects. Final payment will not be made until the above is completed.

E. INSTRUCTIONS: Instruct County's' personnel in proper use of each system during a minimum of one hour training session on the proper use of each system. This training session will be conducted onsite at the County's' convenience.

3.06 MAINTENANCE:

A. General: Provide complete continuing maintenance on entire elevator equipment during regular working hours on regular working days for a period of 12 months after filing Notice of Completion.

B. Examination: Include systematic examination, adjustment, and lubrication of elevator equipment whenever required and replacement of defective parts with parts of same manufacture as required for proper operation. Contractor not responsible for repairs to car enclosures, door panels, frames, sills or platform flooring resulting from normal usage or misuse, accidents and negligence for which Contractor is not responsible. Examinations shall be performed weekly expending a minimum of one and one-half hour per unit per visit performing preventative maintenance service.

C. Performance Standards:

1. Maintain the performance standard set forth in this Specification and maintain correct operation of the dispatching system.

2. Maintain smooth starting and stopping, smooth riding qualities and accurate leveling at all times.

D. Callbacks: In event of failures, provide 24-hour callback service at no additional cost to the County.

E. Elevator Shutdowns:

1. Should any elevator become inoperative, repair within 24 hours of notification of such failure. Breakdown of major components shall be completed and service restored within 72 hours.

2. Failure to comply with above, the County may order the work done by other contractors at the Contractor's expense.

3. Devices repaired or replaced by others shall, nevertheless, be provided with maintenance by the Contractor who shall become completely responsible for correct operation of such devices for lifetime of this contract.

F. Follow-Up Tests: Test all safety devices and emergency operations at six (6) month intervals or oftener and submit written report on each test. Make tests at times which do not interfere with building operation.

G. Maintenance Materials:

1. Expendable Parts: The Contractor shall provide a metal cabinet in at least one machine room on project premises containing the following expendable parts required for prompt replacement. Parts used for routine maintenance shall be replenished and stored in machine room to ensure an adequate supply is available. Parts and cabinet shall become County's property and not removed upon expiration of maintenance period.

a. One set starter contacts and coils.

b. Two field replaceable resistors of each type installed.

c. One set hanger sheaves for car and hoistway doors.

d. Two relays and relay bases of each type installed.

e. Twenty-four lamps of each type installed.

f. Car and hall buttons with identical graphics installed; six for manufacturer's standard buttons, one of each type for special buttons.

g. Twelve fuses of each type installed.

h. Any other parts required for prompt replacement.

i. Lubricants and cleaners of all types used for maintenance.

2. Replacement Parts: Keep the following parts in a warehouse within 50 miles of the project premises.

a. One door operator motor of each type used.

b. Transformers of each type installed.

c. Two complete door interlocks.

d. Parts for motor drive units.

e. One encoder of each type installed.

f. Parts for door protective devices.

g. One set of packing for each size cylinder.

h. Such other parts as are needed to insure prompt replacement in event of elevator shutdown such as spare control boards for computer-operated systems.

H. Maintenance Data: After completion and prior to final acceptance, submit three sets of complete and accurate maintenance data specific for each elevator. Final payment will not be made until received.

1. Maintenance Manuals: Describe proper use and maintenance of equipment, lubrication points, types of lubricants used and frequency of lubricant application, manufacturer's literature describing system maintenance and troubleshooting as specified.

2. Countys Manuals: Describe operation of each feature, i.e. Independent Service, Security Operation, Guard Station Equipment, etc…that is specifically used by the County or end user. Include details of what to do and what not to do with the elevator equipment In Case of Emergency, E.Q Fire, Evacuation etc….,

3. Parts Catalogs: Complete listing of all parts of equipment and components used in the installation.

4. Wiring Diagrams: One set mounted in machine room, one blue line set and one electronic version on CD delivered to the County. Wiring diagrams shall be as built, specific for this installation, and reference identification on drawings shall match points identified on terminals of controllers.

5. Maintenance Tool and Software Manuals: Provide maintenance tools and supporting software documentation required for the complete maintenance of the entire system including diagnostics ad adjusting. Maintenance tool may be hand held or built into control system and shall be of the type not requiring recharging or reprogramming nor of the automatic destruct type. The tool and supporting software may be programmed to operate only with this project's identification serial numbering. If control system is of the type that the software is field up loadable, both a copy of the control software and the parameters shall be clearly marked and submitted to the County on CD.

I. Final Service and Inspection: Two weeks before expiration of the year's maintenance, the equipment shall be lubricated, fully serviced, adjusted to the standards designated and emergency service operation devices shall be checked. A representative of the County will make a complete inspection.

J. Quotation: Base bid shall include cost of maintenance and materials as described above.

END OF SECTION