

Gallery Elevator Upgrade Specification

**Vancouver Art Gallery
Vancouver, BC**

**Issued for Tender
June 21, 2019**

Prepared by:

**VERTECH Elevator Services Inc.
Engineering & Consulting
723 – 602 W. Hastings Street
Vancouver, BC V6B 1P2
Ph. (604) 647-4900
Fax (604) 647-4908**

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1. General

1.1. Scope

This specification is intended to cover the upgrading, repair and refurbishment of one (1) existing passenger elevator as described hereinafter, in a first class workman-like manner, by the Elevator Contractor.

The intent of the project is to obtain state of the art equipment to enhance the operation and safety of the equipment with a minimum of disruption to the operation of the building.

1.2. Definitions

Terms used in the specification shall be defined as given in the latest adopted edition of the ASME A17.1-2007/CSA B44-07 - Safety code for elevators and escalators.

Where the term “Owner” or “Owner’s Representative” is used herein, this shall be read as “The City of Vancouver”.

Where the term “Consultant” is used herein, this shall be read as “VERTECH Elevator Services Inc.”.

Where the term “Contractor” or “Elevator Contractor” is used herein, this shall be read as the person(s) or company contracted by the Owner to furnish materials and labour as required by the specification and contract documents.

1.3. Related Work

To complete this installation, the following items must be performed or furnished by trades other than the Elevator Contractor, in accordance with governing codes: Any other work required to complete the installation or satisfy the regulatory authorities and not specifically listed herein shall be the responsibility of the Elevator Contractor. The following items shall be completed as part of the Owner’s Responsibilities:

Miscellaneous Building Work:

- a) Provide and install a type ABC Fire Extinguisher in the elevator machine room if required by the authorities.
- b) Provide and install a new closer and constant lockset on the elevator machine room access door to ensure the door is self-locking and self-closing.
- c) Provide a non-conductive mat over the metal sump cover in the elevator machine room.
- d) Review of electrical power supply sizing to suit the new elevator equipment by an Electrical Engineer if required.

Mechanical:

- a) Provide a suitable machine room environment to maintain the machine room temperature between 5°C and 40°C.

1.4. Sub-Contract Work

To complete this installation, the following items, as a minimum, shall be subcontracted by the Elevator Contractor, to be performed or furnished by trades other than the Elevator Contractor, in accordance with governing codes:

Miscellaneous Building Work:

- a) Patching and fire-stopping of any new or existing holes and penetrations in the elevator machine room and hoistway enclosure.
- b) Cutting and patching of building floors, walls, ceilings, finishes, etc. for new fixtures, conduit, etc.
- c) Concrete removal and restoration in the elevator pit if not done by the Elevator Contractors own forces.

Electrical Work:

- a) Provide new GFCI power outlets in the elevator machine room and elevator pit to replace any and all existing power outlets in the pit and machine room areas if not already in place.
- b) Provide a new 3 phase fused and lockable disconnect switch for the elevator with an auxiliary contact for use by the battery lowering system. Provide new feeder wires and conduit from the disconnect switch to the new elevator controller or transformer location as required. Size of new disconnect switch and fusing to suit the new elevator equipment requirements.
- c) Provide a connection to a proper earth ground for the elevator electrical power supply. Provide a new separate ground/bonding conductor in the 3 phase elevator power supply with feeder wire to the elevator controller to suit the new equipment.
- d) Provide new energy efficient LED strip light fixtures in the elevator pit to replace the existing light fixtures (provide a minimum of 2 fixtures). Fixtures shall be guarded against breakage with a wire guard or polycarbonate lens.
- e) Provide new energy efficient LED strip light fixtures in the elevator machine room to replace the existing light fixtures and to provide 200 lx illumination in all areas measured at floor level. New fixtures shall be wall mounted and located such that they do not encroach on the minimum required headroom in the elevator machine room (2135 mm clear headroom required)

Include the cost of the subcontract work in the base proposal price or optional prices as applicable but indicate the amounts included for each sub-trade in the submission. Subcontractors shall meet the Owners criteria and shall be approved for work on the site prior to commencement of any work by the sub-contractor. All electrical sub-contractor work shall be performed in accordance with the electrical design and specifications (phase 2) included as an attachment to these specifications.

1.5. Cash Allowances

Include in the contract amount, cash allowances as stated herein to cover the net cost to the Elevator Contractor of services, products and the like incurred in performing the work.

The contract price, and not the cash allowance, shall include the Elevator Contractors labour, overhead and profit in connection with such cash allowances. The contract price shall be adjusted by written order to provide for an excess or deficit in the contract value for each cash allowance. Where costs under a cash allowance exceed the amount of the allowance, the Elevator Contractor will be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out elsewhere in the contract documents.

The work required by the cash allowance will be competitively bid to qualified sub-contractors familiar with the requirements at the site where possible or it shall be procured from sub-contractors approved by the Owner.

The intent is that the Elevator Contractor shall act as a General Contractor for all sub-trades and shall fulfill the role of the Prime Contractor for the purposes of overseeing workplace safety as required by WorksafeBC.

The following sums shall be included for the fabrication, supply installation, connection, testing and commissioning of the following items;

1. Include a Cash Allowance of \$5,000.00 for Buried Cylinder Cathodic Protection System Anode Replacement work by a Corrosion Services expert as follows:

Gallery Elevator – Cathodic Protection System Anode Replacement Work – Included as Cash Allowance:

- a) Provide a new buried reference anode for the corrosion protection system and locate the anode in the space between the buried cylinder and the cylinder hole casing (if present).
- b) Connect the new anode to the existing cathodic protection system controller and adjust the system to provide a suitable potential between the anode and the cylinder to provide on-going corrosion protection for the existing buried cylinder.

The allowance shall be for the additional cost of the Corrosion Services contractor work indicated above as quoted by the sub-contractors exclusive of markup, overhead and profit.

Preparation work in the pit to remove concrete around the cylinder head to expose the cylinder hole casing, to restore the concrete and to provide access and assistance for the Corrosion Services contractor shall be provided by the Elevator Contractor as part of the base bid for the work and not as part of this cash allowance.

1.6. Alternative Products

Alternative products to those specified may be accepted provided they are pre-approved in writing by the Owner prior to submission of bid.

Elevator Contractors wishing to obtain pre-approval of alternative products shall make such requests in writing for consideration by the Owner and the Consultant. Requests for alternatives shall include a full description of each product including full-disclosure of the proprietary nature of the equipment including diagnostics, tools, components and spare parts. Requests shall also include a list of sites where the product has been used locally, references and details on the training available for the products including training for third party elevator contractors or the Owner's personnel.

Acceptance of alternative products shall not imply acceptance of any deviation or variances from the specified requirements unless such deviations or variances are clearly stated and agreed to in writing prior to the submission deadline.

1.7. Codes and Regulations

All new equipment shall be furnished and installed in accordance with the CSA/CAN-B44-07 Safety Code for Elevators, including any applicable supplements, the BC Safety Standards Act and the BC Elevating Devices Safety Regulation and any other local requirements that may be in force.

The new equipment and installation shall comply with the Canadian Electrical Code, the Vancouver Building ByLaw and Fire Code for the jurisdiction of the work as well as any and all applicable local codes.

1.8. Certificates

The Elevator Contractor shall furnish all licenses and permits and shall arrange for and make all inspections and tests required thereby. The cost of certificates, licenses, permits, etc. for any sub-contract work shall also be included in the basic submission price.

1.9. Material and Workmanship

Provide only new material and equipment designed for elevator use.

Install all equipment in a neat and professional manner. Label all components clearly and secure all wiring in a neat and orderly fashion.

1.10. Warranty

The Elevator Contractor shall guarantee the materials and workmanship of the apparatus furnished under these specifications and will make good any defects not due to ordinary wear and tear or improper use or carelessness which may develop within two (2) years from date of substantial completion of the project. Substantial completion shall be the point at which all of the new equipment has been installed and all of the elevators are operating as a group with all required features operational. The Consultant shall verify the date of substantial completion of the work.

1.11. Hoarding

Provide hoarding for the protection of the public and worker's at the site.

Where the work requires that the hoistway is open provide a substantial hoarding with a locked access door to protect the opening. The Elevator Contractor shall provide the hoarding lock code or key to on-site security for emergency condition access.

Provide barriers at all working floors to protect the public from the area of the work.

The design and construction of any hoarding or barriers used on the public / gallery side of the elevator shall be subject to review and approval by the Owner and it should be suitable for the location within the gallery space.

1.12. Conduct

The building is occupied and therefore conduct at the site must be appropriate so as not to interfere with the normal functioning of the building.

Materials, tools and other equipment shall be stored and protected in areas designated by the Owner, if available.

Any noisy or smelly work shall be performed at times suitable to the Owner. Access and use of the elevators will be permitted for moving in new equipment and materials and for removal of equipment. Arrange to do such work at times designated by the Owner. The Elevator Contractor shall include an allowance in the contract price to conduct such work in overtime as may be required.

The Elevator Contractor shall be responsible for any damage or soiling of building finishes resulting from performance of the work and the Owner shall reserve the right to deduct the cost of any remedial work required in the event that the Elevator Contractor fails to correct any such damage or soiling.

1.13. Site Access

The Elevator Contractor shall examine the site with respect to the constraints and limitations of accessing the areas of the work.

The Elevator Contractor personnel shall sign in and out at the buildings security desk on a daily basis and as required when coming and going from the work site.

Elevator Contractors shall allow for the existing site conditions in preparing estimates for moving in and installing new equipment, tools and materials as well as equipment removal.

The Elevator Contractor shall protect the building floor levels, stairwells, etc. when using common areas for hoisting, storage and the like. The Elevator Contractor shall be responsible for any damage or soiling of building finishes resulting from performance of the work and the Owner shall reserve the right to deduct the cost of any remedial work required in the event that the Elevator Contractor fails to correct any such damage or soiling.

Where work takes place in proximity to stored art work or other gallery exhibits or materials the Elevator Contractor must take extra care to prevent any damage or soiling of the crates, materials, etc.

1.14. Storage

Storage for the Elevator Contractors tools, equipment and for the new elevator equipment may be limited on site and the Elevator Contractor shall ascertain and allow for existing site conditions in this regard.

1.15. Personnel

Personnel assigned to the site shall wear suitable, clean uniforms and attire and shall act in a courteous and professional manner while conducting their work on the premises. The personnel shall observe and obey the policies and procedures for the place of work regarding; security, safety, access and routine sign-in requirements and shall obtain and wear identification, if required by and approved by the Owner, at all times when working at the site.

1.16. Site Safety

The site personnel shall be provided with appropriate personal and workplace safety equipment and shall adhere to recognized safe working procedures.

The Elevator Contractor shall adhere to the Worksafe BC Occupational Health and Safety Regulation regarding workplace safety requirements and guidelines for work in confined spaces, fall protection and working with hazardous materials as well as any other applicable conditions or requirements.

1.17. Trademarks, Patents, Copyrights

The equipment provided shall not display any trademarks or other visible company logos.

1.18. Date Compliance

Provide equipment and control systems fully compliant for rollover and operation through the year 2017 and beyond. Provide a letter of assurance certifying that the equipment provided is fully date compliant with respect to time and date storage and time and date information exchange.

1.19. Inspection and Commissioning

Upon completion of the work and prior to turning elevators over for use by the public arrange for acceptance tests and inspections with the regulatory authority. Advise the Owner at least 48 hours in advance of the testing and inspection so that a representative may be on site. The Elevator Contractor shall submit copies of any such inspection reports to the Owner and the Consultant within 48 hours of receipt. Include for any repeat inspections that may be required to satisfy the requirements of the inspecting authority.

Inspection and testing shall also be conducted by the Consultant. Provide qualified manpower, tools, test weights and instruments to complete these tests and any repeat tests that may be required as a result of incomplete or deficient work. Allow for a minimum of one half (1/2) man day per elevator for testing and inspection and additional time for repeat inspections if required.

1.20. Description of Existing Equipment

Elevator/Description	Gallery Passenger Elevator #1		
BCSA Elevator ID #	8847		
Manufacturer - Machine #	Montgomery		
Date of Installation	~1981		
Type of Elevator	In-Ground Holed Hydraulic		
Capacity and Class of Loading	4,000 lb.		
Rated Speed	~ 100 fpm (TBC) – the intent is that the existing speed shall remain unchanged		
Number of Stops	4 Stops & Openings (all front)		
Floors Served	G, 2, 3, 4 (note floor markings to be changed to 1,2,3,4)		
Operation	Simplex, Collective		
Controller Type	Montgomery Relay Logic		
Power Unit	Dry Mount Pump and Motor		
Valve Information	UC4-B44		
Door Type	Two Speed Side Opening		
Door Size	4'-0" w x 7'-0" h		
Door Operator	MAC PMSSC		
Door Reopening Device	Panaforty Infrared Detector		
Car Operating Panel	One (1) per car		
Car Position Indicator	One (1) per car – Multilight Display in Cab Door Header/Transom		
In-Car Riding Lanterns	Two (2) per car in Car Door Jambs		
Hall Buttons	One (1) Riser at Accessible Height		
Hall Direction Lanterns	None		
Hall Position Indicator	None		
Firefighters Elevator:	No	Standby Power:	No

1.21. Cutting and Patching

Any cutting, patching, painting or other restorative work required to accommodate the installation of the new equipment and operating and signal fixtures, and not specifically listed herein as being by others, shall be the responsibility of the Elevator Contractor.

Prior to proceeding with any such work the Elevator Contractor shall review the details of the work with the Owner and obtain approval to proceed.

All effected finishes shall be suitably restored to the Owner's satisfaction.

Portions of this work may be sub-contracted with the permission and approval of the Owner.

Note that environmental testing may be required by the City of Vancouver prior to any concrete cutting of walls, floors or ceilings. The Elevator Contractor shall refer to the environmental report provided by the Owner and attached as part of the tender documents.

1.22. Remote Conduit and Wiring

Any remote conduit and wiring required to interconnect the elevator control system with lobby panel, panel for emergency personnel, monitoring and control equipment or any other equipment provided under this specifications, and not specifically listed herein as being by others, shall be the responsibility of the Elevator Contractor.

Any wires brought "to the hoistway" by other trades shall be routed to the elevator machine room in the hoistway by the Elevator Contractor.

Prior to proceeding with any such work the Elevator Contractor shall review the details of the work with the Owner and obtain approval to proceed. Portions of this work may be sub-contracted with the permission and approval of the Owner

2. Product – Elevators

2.1. Retained Equipment

The following equipment may be retained provided the requirements of the specification can be met with respect to performance, operation, reliability, safety and other miscellaneous requirements:

Refurbish all retained equipment. Clean, lubricate, paint and adjust all components to appear and operate as new, replace any parts or components that are worn or otherwise damaged. Make allowance for existing wear and other conditions and restore retained equipment to provide smooth, quiet, comfortable and reliable operation of the equipment. Replace or repair any parts that are worn. This shall include but not be limited to seals, valves, pumps, motors, isolation, rollers, contacts, or switches.

Equipment that may be Retained

- a) Car Sling, Platform, Cab Structure, Finishes (optional) and Car Door Panels
- b) Hall Door Equipment (Refurbish)
- c) Hoistway Entrances and Door Panels
- d) Buried Hydraulic Cylinder & Plunger
- e) Hydraulic Oil Line Piping, Muffler, Isolation Couplings
- f) Pit Scavenger Pump
- g) Car Roller Guides
- h) Rails
- i) Buffers

2.2. New Equipment

The following equipment shall be replaced with new equipment as detailed elsewhere in the specifications:

New Equipment to be Provided

- a) Individual Elevator Controller with electronic soft start.
- b) Machine Room, Hoistway and Cab Wiring, including Travelling Cables.
- c) Provisions for Fire and Life Safety Emergency Operational Features.
- d) Seismic Pipe Rupture Valve
- e) Submersible Hydraulic Power Unit (Tank, Pump, motor and control valve assembly).
- f) New Hydraulic Piping in the Machine Room to new Power Unit
- g) New Piping Gate Valves in Pit and Machine Room
- h) Car Operating and Signal Fixtures, including Car Operating Panel, Car Position Indicator, Car Direction Lanterns, and Handsfree Telephone Device.
- i) Hall Call Button Fixtures at all floors.
- j) Top of Car Inspection Controls, Emergency Cab Light & Bell and Cab Ventilation Fan.
- k) New Hall Tactile Markings and Miscellaneous Signage.
- l) Car Top Guard Rail and Extended Cab Apron Guard.
- m) Miscellaneous Components, Pit Stop Switches, Hoistway Access Devices, etc.
- n) Closed Loop Door Operator, Car Door Gate Switch, Linkage, Clutch, Door Interlocks, Car Door Restrictor and Related Hardware.

- o) Hoistway Unlocking Devices, Door Closers and Landing Door Safety Retainers at all floors.
- p) Automatic Battery Lowering Device.
- q) Infrared Light Beam Door Detector.
- r) Refurbish Car Roller Guides.
- s) Remote Elevator Panel Modifications
- t) Optional - Cab Interior finishes, Car Door and Front Finishes, Wall Panels, Handrails, Flooring, Ceiling, and Lighting.
- u) Optional – Extended Warranty Maintenance Period (additional 12 months)
- v) Optional – Hydraulic Cylinder Replacement and Corrosion Protection System.

Remove all replaced equipment from the site and take possession of such equipment. The Owner reserves the right to retain ownership of any equipment removed and shall advise the Elevator Contractor of their intent to retain any such components prior to their removal.

Dispose of any replaced equipment in a suitable manner.

2.3. Architectural Finishes

The new equipment provided shall have the following finishes:

Fixture or Component	Material or Finish
Car and Hall Operating & Signal Fixtures	Stainless Steel #4 Brushed Finish
Optional Cab Interior Components:	
Cab Front Return, Car Door Header, Car Door Jambs and Car Door Panels	New Stainless Steel #4 Brushed Finish cladding
Cab Rear & Side Walls as applicable	New, Vertical, Raised, Removable Panels finished with Plastic Laminate as selected by the Owner. Stainless Steel Brushed Finish panel reveals and kickplate/base.
Cab Ceiling	Re-paint Cab Shell Canopy (White or Black as selected by the Owner) and make suitable for application of suspended ceiling.
Cab Suspended Ceiling	Sectional Stainless Steel Suspended Ceiling Frame with Recessed Pot Lights
Cab Lighting	New energy efficient LED pot lights as approved by the Owner
Cab Handrails	1.5” or 2” diameter Stainless Steel Cylindrical Handrails with ends returned to the wall finishes on all non-access walls
Cab Flooring	New Sheet Vinyl Flooring consisting of 2.5 mm thick solid colour Forbo Walton linoleum or Johnsonite Tarkett Lenza, or equivalent. Final selection to be approved by the Owner

2.4. Car Operating Panel

A new applied car operating panel shall be supplied. Provide one panel per elevator to replace the existing car operating panel.

The panel shall contain a bank of illuminating car call buttons marked to correspond to the landings served, an emergency call button, door open and door close buttons. The emergency call button shall be connected to a bell that serves as an emergency signal.

The car shall be provided with the following switches located in a lockable cabinet:

- a) light toggle switch,
- b) fan toggle switch,
- c) inspection/hoistway access enable keyed switch,
- d) emergency light test switch or button,
- e) 110 V duplex power outlet,

The car shall be provided with the following components flush mounted in the panel faceplate:

- a) Blank Jewel for Emergency Recall Illuminating Indicator, (Provisions for FEO)
- b) Independent Service keyed switch
- c) Stop/Run Keyed Switch,
- d) Integral Emergency Cab Lighting Lens,
- e) Hands Free Emergency Voice Communication Device,
- f) Emergency Telephone Activation Button,
- g) Flush mounted lens and mounting studs for card reader,

The Car Operating Panel shall be equipped with provisions for the future addition of a separate service panel dedicated for the fire fighter operation. Provide a locked panel for the future addition of the Fire Emergency Operation Components. The Panel cover shall NOT be labelled at this time. Behind the locked cover shall be provided space for the following:

- a) In-Car Firefighter's Operation Switch and written instructions,
- b) Call Cancel Button,
- c) Fire Recall Illuminating Indicator,
- d) Emergency Stop Switch or Button,
- e) Additional Door Open and Close Buttons for Front and Rear Doors, as applicable,

All operating devices and components for the public shall be provided with tactile markings mounted flush in the panel faceplate and secured firmly in place with studs and flanges.

All illuminating devices shall be provided with long life LED illumination which is clearly visible in the ambient lighting level of the cab.

The panel faceplate shall be professionally engraved to identify each component, the position of switches, the elevator capacity, the Owner's identification number as well as any jurisdictional identification numbers applicable to the installation.

Shop drawings shall be submitted with details for review and approval prior to manufacturing.

The following manufacturers and button fixture products are approved for use on this project:

- Dupar Controls – US91 Target Style Vandal Resistant
- MAD Elevator Fixtures – BS, BP Vandal Resistant

The existing 120 V duplex power outlet located in the base of the cab wall can be eliminated as long as a new power outlet is provided in the cab service cabinet.

2.5. Keying

Elevator Contractors shall provide a common key for each group of devices per the following:

Key Grouping	Restrictions	Function
1	None	Service Cabinet, Independent Service
2	Restricted – Elevator Maintenance & Inspection Personnel Only	Inspection, Hoistway Access & Enabling, Run/Stop

2.6. Car Position Indicators

Provide a new car position indicator display above or as part of the new car operating panel at a minimum height of 6'-6" from the cab finished floor level. The position of the car in the hoistway shall be shown by the illumination of the indication corresponding to the range of landing at which the car is stopped or passing.

Display shall consist of LED 16 segment displays with characters no less than 2" in height.

Display shall be sufficiently illuminated such that they are clearly visible in the ambient lighting level of the cab.

If the existing indicator fixture location is not concealed by the optional new cab finishes then locate the new indicator fixture in the car door header or allow for recladding of the entire header to conceal the old fixture location.

2.7. Hall Push-Button Fixtures

Provide new hall button fixtures at each landing to replace the existing fixtures. The new fixtures shall be designed to be flush mounted using the existing back boxes and to eliminate the need for cutting and patching. Buttons can be mounted at the current height and location.

At each terminal landing, a fixture containing a single button shall be provided and at each intermediate landing, a fixture containing "UP" and "DOWN" buttons shall be provided.

When a call is registered by pressing a hall button, that button shall become illuminated and shall remain illuminated until the call is answered.

Provide LED illuminating elements with a minimum usage rating of 100,000 hours. The illumination shall be of sufficient intensity that it is clearly visible in the ambient lighting levels of corridors.

All cutting and patching necessary for the installation of the fixture shall be the responsibility of the Elevator Contractor.

The fixture at the Main level landing which contains the added features may be surface mounted if necessary subject to acceptance of the design by the Owner and the Elevator Consultant. Surface mount fixtures shall have rounded or chamfered edges and should not protrude more than 1" from the finished wall surface

Provide an Elevator voice communication system failure indicator light, audible signal and a means to silence the communication failure audible signal in the fixture at the Main floor level.

The following manufacturers and button fixture products are approved for use on this project:

- Dupar Controls – US91 Target Style Vandal Resistant
- MAD Elevator Fixtures – BS, BP Vandal Resistant

2.8. In-Car Lanterns

Provide new in-car lantern fixtures to replace the existing fixtures. The fixture shall be flush mounted in the car door jambs to replace the existing fixtures.

All cutting and patching necessary for the installation of the fixture shall be the responsibility of the Elevator Contractor.

The lantern shall illuminate, and a chime shall also be furnished on the car which will sound once for "UP" and twice for "DOWN" as the doors are opening to announce the direction of travel.

Provide illuminating elements with LED replaceable lamps with a minimum usage rating of 100,000 hours. Illuminating elements shall be of sufficient intensity to be clearly visible in the ambient lighting level of the corridor.

2.9. Hoistway Access Devices

Provide new hoistway access keyed switch fixtures at the bottom and top landings for access to the elevator car top and pit regardless of the rated speed of the elevator. Keying shall be the same as the inspection/hoistway access enable keyed switch located in the car operating panel.

The new fixtures shall be installed in the landing door jamb, or in the landing door sight guard for each respective elevator. Do not mount the devices in the hall button fixture.

The Elevator Contractor shall be responsible for any cutting and patching necessary to provide suitable cutouts for the new fixtures, to restore the elevator entrance finishes and infill construction to proper conditions on completion.

2.10. Cab Interior Finishes - Optional

Indicate in the submission the separate, optional extra cost to provide new cab interior finishes as follows:

Portions of this work may be subcontracted and the names of all proposed subcontractors shall be provided in the proposal. The Owner shall approve the use of any subcontractor prior to award of any subcontract work. Subcontractors shall provide references where similar work has been performed within the last 24 months.

Completely remove the old finishes including wall panels, reveals, cab suspended ceiling, cab lighting fixtures, etc. Strip the cab walls and car door panels of old finishes and prepare for new finishes. Remove the existing cab flooring as well as any sub floor or old flooring that may still be in place and prepare for new flooring.

The car door panels, door posts, car door header and front return panel shall all be clad in new stainless steel finishes with overlapping or tight fitting joints. Cladding on the car door shall fully wrap the leading edge of the door panel and all fasteners shall be concealed.

Provide removable wall panels on the rear and side walls of plastic laminate as described elsewhere herein. Panels to be 5/8" thick composition board core with laminated back. Provide stainless steel reveal strips around each panel and in the cab corners and a stainless steel base/kickplate.

The existing cab notice board mounted in the cab shall be removed and reinstalled in a position acceptable to the Owner on completion of the cab work.

Provide a new suspended ceiling with stainless steel finish and with a removable section for car top escape hatch. Provide a minimum of six (6) new LED pot lights recessed into the cab suspended ceiling or more lighting to provide a suitable lighting level in the cab.

Provide new stainless steel handrails on the cab side and rear walls as specified elsewhere herein.

Provide new satin finish stainless steel protective pad hooks on all walls including front return panel and provide one complete set of new fire retardant protective pads of quilted canvas for the cab walls and front return panels. Include cutouts for the car operating panel(s) as necessary.

The materials provided shall comply with the latest revision of the governing code with respect to flame spread and smoke development classification and other requirements for elevator cab interior finishes.

Weight addition to the cab shall be limited to a maximum of 5% of the combined original sum of the weight of the cab, enclosure and its capacity. Should the weight addition exceed this 5% then the weight addition shall be reviewed and approved by a registered professional engineer in accordance with clause 8.7.2.15.2 of the B44-07 Elevator Safety Code regarding an increase in the deadweight of the car.

The responsibility for the overall installation lies with the Elevator Contractor and the Owner does not intend to deal directly with the subcontractors.

2.11. Cab Flooring

Provide new cab flooring consisting of new heavy duty sheet vinyl flooring as selected by the Owner and as specified elsewhere herein. Include removal and disposal of old flooring and preparation for new flooring including new subfloor as required.

Any new materials provided shall comply with the latest revision of the governing code with respect to flame spread and smoke development classification and other requirements for elevator cab interior finishes.

The responsibility for the overall installation lies with the Elevator Contractor and the Owner does not intend to deal directly with the subcontractors.

2.12. Car Guides

The existing roller guides shall be retained and refurbished. Clean and adjust the guides replacing worn bushings, springs, rubber bumpers and rollers to provide a smooth quiet ride.

2.13. Cab Lighting

Provide new cab lighting as specified elsewhere herein.

Provide a circuit which shall automatically shut off the cab lighting after the elevator has been idle for a predetermined time period (adjustable). Ensure that this feature is disabled when the elevator is out of service due to malfunction.

2.14. Cab Ventilation

Provide ventilation openings in the cab that are concealed by the finishes and protected as required by the elevator safety code.

Provide a new quiet cab ventilation fan mounted on the car top. Fans shall be of a rugged, quiet design with a maximum noise level of 55 DbA.

The fan shall be mounted to the elevator car top and the existing fan opening may be retained.

Provide a circuit which shall automatically shut off the cab ventilation fan after the elevator has been idle for a predetermined time period (adjustable). Ensure that this feature is disabled when the elevator is out of service due to malfunction. Fan to start automatically when activated by car or hall call.

2.15. Requirements for Passengers with Disabilities

Provide equipment in compliance with the latest revision of the Local Building Code and Appendix E of the CSA B44-07 - Safety code for elevators and escalators.

Raised markings shall be furnished adjacent to the car buttons, controls and voice communication device.

Hall Buttons shall be installed at the prescribed height.

Visual signals shall be provided to acknowledge registration of a car or hall call. Audible signals shall be provided to acknowledge registration of a car call. Visual and audible signals shall be provided to indicate the car position and direction of travel.

Raised markings shall be furnished on each hall door entrance jamb at the prescribed height.

2.16. Hall Tactile Markings

Provide new tactile and Braille markings on each hall door frame at the correct, prescribed height to replace the existing markings. Take care not to damage the existing finishes when removing the old markings.

Provide quality embossed metal jamb plate markings.

Provide EJ4 markings with a satin stainless steel finish character on a black background available from Stencil Cutting and Supply (SCS/AIM) Company, Ph. 1-800-783-4633 www.scsselevatorproducts.com or pre-approved equivalent product.

2.17. Emergency Voice Communication Device

A hands free emergency voice communication system shall be furnished in the cab mounted as an integral part of the car operating panel. Necessary wires shall be included in the car travelling cable and shall consist of a minimum of one shielded pair of 20AWG conductors. Arrange to monitor outgoing phone calls and respond to calls received at no extra charge as part of the elevator maintenance agreement if requested to do so by the Owner.

Provide any necessary power supply required by the telephone equipment. The phone equipment shall have a built in back up power supply in the event of the loss of normal AC Power.

The telephone shall be equipped with an auto-dialer and illuminating indicator which shall illuminate when a call has been placed and flash when the call has been answered.

A separate activation button shall be provided on the car operating panel faceplate to activate the emergency voice communication device and initiate a call. The device shall be capable of transmitting a pre-recorded location message with an adjustable call time that can be extended by the monitoring station. The device shall be able to dial a primary emergency number, and be able to automatically dial a backup number in the event there is no answer at the primary number.

The voice communication system shall include means to automatically verify the communication system operability either continuously or on a periodic (minimum daily) basis. If the verification means indicates that the voice communication system is not functional then a signal shall activate the visual and audible signal at the main floor elevator emergency fixture. A means to silence the audible signal shall be provided and it shall be accessible to authorized personnel only.

Provide a telephone system for communications off site or to a 24 hour monitored location via any of the following: auto dialer, arrange for off-hook type operation through the site PBX system, or arrange the phone to work with existing ringdown equipment.

The phone shall be able to receive incoming calls from other locations and shall be capable of acknowledging incoming calls and establishing hands free two way communication automatically.

Provide a Webb Electronics MWP-150 modular panel mount phone in the cab.

The existing telephone line shall be reused. The Elevator Contractor shall locate the wiring and make the appropriate wiring connections to the new equipment to connect the elevator telephone. Provide all necessary equipment to permit the elevator telephones to be fully functional using a single communication line.

The Owner shall provide 24 hour monitoring of phone calls made from the elevator telephones

2.18. Hoistway Operating Devices

Normal terminal stopping devices shall be provided to slow down and stop the car automatically at the terminal landings and to automatically cut off the power and apply the brake, should the car travel beyond the terminal landings.

2.19. Buffers

The existing buffers may be retained and reused as a means for stopping the car at the bottom limits of travel.

2.20. Car Top Guard Rail

Provide a substantial metal guard rail on the rear and sides of the car top regardless of the distance measured horizontally from the edge of the car top to the hoistway wall.

The guard rails must be designed and installed to comply with the requirements of B44-07 Section 2.10.2.

2.21. Apron Guards

Provide new apron guards for the elevator to protect the space below the elevator cab.

Where space permits provide guards which extend no less than 4'-0" below the level of the car sill or to the maximum depth as pit depth allows.

2.22. Car Door Restrictor

Provide a mechanical car door restrictor which shall prevent opening the car doors from within the cab when the elevator is out of the door zone. Provide a device for the front car doors only. The rear car doors shall be bolted or clamped in the closed position so that they cannot be opened.

The following manufacturers and door restrictor products are approved for use on this project:

- Unitec (Otis) – Folding Door Restrictor
- GAL – LWZ-2 Clutch Assembly with Restrictor Clutch

2.23. Door Operator

Provide a new heavy duty, solid state, variable speed, closed loop door operator capable of high speed door operation for the front and rear car door openings.

Provide closed loop controls consisting of a variable speed motor and encoder assembly and solid state programmable controls. The encoder shall feedback information on the actual position and speed of the doors to the operator logic controls and compare this information to a pre-programmed motion pattern. The operator shall automatically adjust the closing characteristics so that the doors will operate consistently in accordance with the pre-programmed pattern under changing conditions such as wind conditions. The controls shall be equipped with a keypad and display for programming, adjustment and troubleshooting.

Provide a new retractable car door clutch. Provide new linkages, pivots, car gate switch and open and close limit switches.

Refurbish the car door hangers, tracks, gibs and other related components replacing any parts that are worn or damaged.

Provide all new car door rollers with a non-metal running surface to replace the existing car door rollers.

Provide an operator which is easily field adjustable for both opening and closing cycles. Adjust the door operation for smooth quiet operation at the times indicated elsewhere in the specifications and acceptable to the Owner and the Consultant.

The following manufacturers and door operator products are approved for use on this project:

- ECI – VFE 2500
- GAL – MOVFR
- Otis Elevator – AT400
- AMD-2

2.24. Door Re-opening Device

Provide a new infrared based light-ray type car door protective devices having a multi-beam array with the following operation:

When in their full open position, the doors shall be unable to initiate closing if a person or object interrupts one or more of the beams. If one or more of the beams are interrupted while the doors are closing, the doors shall stop, then reverse to reopen. The doors shall reclose after a brief time.

After a stop is made, the door shall remain open for a time to permit passenger transfer, after which they shall close automatically. This time interval shall be less for a car call than for a hall call or a coincident car/hall call.

The device provided shall be immune from and operate normally when exposed to direct sunlight.

The following manufacturers and door detector products are approved for use on this project:

- Otis Canada Inc. – “Optiguard”
- Adams Elevator – “Gatekeeper”
- CEDES – IMS 100
- Janus – “Pana 40 Plus”
- Formula Systems – “Safescreen FCU47”

2.25. Hall Door Equipment – New and Refurbished

Refurbish the hall door equipment including, sight guards, hangers, tracks, gibbs, relating devices and other related components replacing any parts that are worn or damaged.

Provide new hall door interlocks and pick up assemblies at each landing. Provide all new hall door rollers with a non-metal running surface to replace the existing hall door rollers.

Remove the existing door closers from the landing door panels and provide new closers consisting of counterweights running in a fixed vertical track or reel-type (spirator) door closers mounted on the landing door panel at all floors. Ensure means are in place to close the slow speed door should the relating means fail.

Provide new standard drop key type hoistway door unlocking devices at all landings for the elevator.

Replace any broken or damaged sight guards on the landing door panels.

Provide new top and bottom safety retainers to retain the door panels in position should the primary guiding or supporting mechanisms fail. Retainers shall be distinctly marked and readily identified and shall be design to meet the requirements of section 2.11.11.8 of the B44-07 Elevator Safety Code.

2.26. Wiring

Provide complete new machine room, hoistway and cab wiring in accordance with the Canadian Electrical Code.

All wiring connections shall be made on terminal blocks which are clearly and permanently labeled.

The space between wiring conduit or trough and wall or floor openings shall be filled with a fire resistant material and resilient caulking. Include for filling and fire-stopping of existing penetrations at pipe and electrical trough between the hoistway, machine room and pit areas. Hinged trough covers shall be altered or modified so that the trough can still be opened once the openings that are penetrated are sealed and filled with suitable fire-stopping materials.

2.27. Pit Stop Switches

Provide new pit stop switches in the elevator pit to replace the existing switch(es).

Switches shall be guarded against accidental operation and shall be located such that they are easily accessible from the pit floor level and also from the pit access level. Where the depth of the pit or point of access is such that one switch would not be accessible from both locations then provide one or more auxiliary switches in each location.

2.28. Travelling Cables

Provide new travelling cables with cables designed specifically for elevator use.

Suspend travelling cables under the cab and in the hoistway using the steel core, wire mesh grips or as otherwise recommended by the manufacturer.

Travelling cables shall be installed to prevent twisting and kinking of the cables and the supports shall be horizontally spaced to match the inherent loop diameter of the cable.

Travelling cables should be supported so as not to come into contact with any equipment or the walls of the hoistway. Where contact is unavoidable provide protective pads of quilted canvas or other suitable material to prevent damage to the travelling cables.

Provide additional wiring sufficient to connect the all buttons, indicators and switches in the car operating panel for connection to future fire service operation.

Provide spare wiring consisting of the greater of a minimum of 10% or ten (10) individual conductors, two (2) 14 AWG conductors, One (1) RG6 Coaxial cable and provide a minimum of eight (8) twisted shielded pairs of 20 AWG communication conductors for voice communication, audio, video, security or other equipment which may be provided, over and above any pairs required by the elevator control system.

Shielded pairs and coaxial cable for use by the current or future elevator security card reader equipment shall be run directly to the elevator security equipment demarcation point in the elevator machine room and shall be of adequate length to do so without splicing.

Travelling cable conductors shall be grouped and provided in separate travelling cables based on the use and signal voltage of the respective conductors. High voltage signals shall be separated from low voltage signals and cables used for serial communication and other noise or interference sensitive purposes.

Travelling cables should form a continuous run from each cab to the control equipment in the machine room. Do not terminate travelling cables or splice conductors at a junction box or any other point in the hoistway.

2.29. Emergency Light and Alarm Bell

An emergency power unit employing a 12 volt, sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car and provide current to the alarm bell in the event of power failure.

Provide a translucent lens mounted integrally in the elevator car operating control panel as the illumination source.

Provide an emergency alarm bell or signal located on the elevator car top.

2.30. Top of Car Inspection Fixture

Provide a new inspection fixture on top of the car containing continuous pressure "UP" and "DOWN" buttons, an emergency stop button, and an inspection switch. The inspection switch shall make the fixture operable and, at the same time, render the door operator and car and hall buttons inoperative. The operating station shall be located such that it is visible and easily accessible when accessing the car top from a front opening. The actuating switch shall be protected against accidental operation.

Provide a permanent top of car light fixture with a readily available switch and guard.

2.31. Machine Room Floor

The machine room floor shall be painted using a durable low V.O.C water based paint upon completion of the work. Painting shall be performed only at times suitable to the Owner and outside of Gallery operating hours.

2.32. Rated Speed and Capacity

The rated speed and capacity of the elevator shall remain unchanged.

2.33. Hydraulic - Power Unit

Provide a complete new hydraulic power unit consisting of a hydraulic fluid tank including a submersible pump and motor and new control valve system.

The tank reservoir containing pump, motor and valve shall be mounted on the machine room floor slab and shall be fastened/restrained to and sound isolated from the building structure.

Provide a new hydraulic control system of compact design suitable for operation under the required pressure and it shall be mounted in the storage tank. The control valve will be a manifold type with up, down and check valve sections. A control section including solenoid valves will direct the main valve and control up and down starting, transition from full speed to leveling speed, up and down stops, pressure relief and manual lowering. Down speed and up and down leveling shall be controlled at the main valve sections. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. All control systems shall be pre-adjusted at the factory.

The manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.

The complete hydraulic system including pump, motor, valve, piping, muffler, cooling systems and tanks shall be designed to dissipate the heat generated during the operation of the equipment based on a duty of 80 up starts per hour.

Provide a new positive displacement screw type pump to give smooth operation and specially designed and manufactured for elevator service. A screened inlet shall be provided at the suction end.

The motor shall be of the alternating current, polyphase squirrel cage induction type and shall be of a design adapted to hydraulic elevator requirements.

The elevator contractor shall ensure that the horsepower rating and power requirements of the proposed pump motor do not exceed the size of the current system.

Provide a new storage tank constructed of steel and provided with a removable cover and external oil level indicator. The pump and submersible motor shall be mounted on a reinforced isolation mount in the bottom of the tank. The control valve shall be mounted in the discharge line above the oil level and easily accessible from the top of the tank. Remove all existing hydraulic fluid and dispose of the fluid at a certified oil recycling facility. Provide a complete new supply of hydraulic fluid sufficient for proper operation of the elevator.

The tank shall be situated in the machine room to minimize the amount of piping and elbows to the cylinder.

The following valve manufacturers and products are approved for use on this project:

- Maxton
- EECO

2.34. Hydraulic – Piping, Isolation Coupling & Gate Valve

The existing piping, muffler, isolation couplings and related equipment between the machine room and cylinder head in the pit may be retained and reused. Provide new seals in the existing Victaulic fittings that are retained to ensure there is no leakage in the piping.

Provide new piping to the new power unit and near the cylinder head where the pipe rupture valve will be installed. Provide new gate/shutoff valves in the piping in both the pit and the machine room for maintenance and inspection purposes.

Pipe of adequate size and thickness shall be provided between the pumping unit and the cylinder head to ensure stable laminar oil flow.

Ensure that existing isolation couplings are retained or replaced in the pit and machine room to isolate electrical current and noise and vibration from transmitting between the piping supply line and the cylinder.

Piping shall be isolated from the building structure with neoprene rubber isolation pads where it penetrates wall or floor openings and where resting on pipe stands or other supports. Where piping penetrates a wall or floor opening, the piping should not touch the wall or slab. The space between piping and wall or floor openings shall be filled with a fire resistant material and resilient caulking to prevent the transmission of noise or vibration to the building structure.

2.35. Hydraulic – Soft Start

Provide a current in-rush limiting electronic soft starter for the hydraulic drive motor. The peak starting current shall be limited to 150% of the full load running current or less.

The elevator contractor shall ensure that the power requirements and starting currents for the new equipment do not exceed the rating of the existing power supply.

The following manufacturers and products are approved for use on this project:

- Siemens. – “Serius Soft Starter”
- Specher & Shuh - Series PCEC

2.36. Hydraulic - Emergency Battery Lowering

Provide a battery powered emergency lowering device for the hydraulic elevator as follows:

Provide a means of automatically lowering the elevator to a lower floor level when there is a power failure. This operation shall bring the car to the next/lowest landing and open the elevator doors to allow passengers to exit the elevator. A separate battery operated power supply system shall be provided for this operation.

The operation of the device shall conform to B44-07 section 2.27.3.1.6.(n)

2.37. Pipe Rupture/Overspeed Valve

Provide a pit overspeed pipe rupture safety valve located at the input to the cylinder. The safety valve shall be so installed to stop and hold the elevator cab with rated load at any point when the maintained pressure drops below the minimum operating pressure.

The safety valve shall be located in the pit as close as possible to the cylinder input and in the oil supply line to the cylinder. The existing piping shall be modified to accommodate the new valve. The contractor shall ensure that any existing pipe support stands remain after the work is completed.

The safety valve shall be of the pressure sensitive type and shall not be electrically operated. It shall be actuated by an oil flow rate not greater than 125% of the oil flow rate required to produce the rated operating speed in the down direction.

The safety valve shall be sized to suit the pipe size at the input of the cylinder, and to suit the oil flow rate for the elevator. In the event the flow rate is too large, two safety valves connected in parallel may be used per valve manufacturer’s instructions.

The contractor shall provide all necessary pipe couplings and hardware necessary to install the overspeed/pipe rupture valve. If Victaulic couplings are used, the appropriate oil rated gaskets shall be provided and installed.

The following manufacturer and overspeed valve product is approved for use on this project:

- Maxton – OSV B44

2.38. Hydraulic Cylinder

The existing in-ground hydraulic cylinder shall be retained and reused. Provide any changes, modifications or alterations required to ensure proper operation with the new equipment provided.

The cylinder head shall be refurbished and retrofitted with a new seal / packing to replace the existing seal. The piston shall be examined and checked for smoothness and surface imperfections. The Elevator Contractor shall refurbish the piston and grind or polish any imperfections or surface roughness to ensure a smooth running surface with the cylinder head seal. Seals shall be adjusted to provide suitable ride quality without noticeable leakage of hydraulic fluid. The Owner requires an inspection report to be completed and submitted following the initial disassembly and inspection of the existing cylinder head. The Elevator Contractor shall allow for additional refurbishment and remedial actions that may be required based on the results of the inspection.

2.39. Hydraulic Cylinder Corrosion Protection

Provide a new reference anode for the corrosion protection system as part of the Cash Allowance included for this sub-contractor work.

The successful Elevator Contractor shall provide access to the pit and assistance to the sub-contractor as part of the base bid. This shall include jack-hammering and removal of concrete at the pit floor around the cylinder and to expose the cylinder hole casing and cavity or fill between the cylinder and the hole casing. The Elevator Contractor shall also restore the pit floor and concrete around the cylinder head on completion of this work. Noisy work such as jack hammering shall be done outside of regular Gallery hours at times suitable to the Owner

The intent is that this work would proceed within 60 days of award of the contract and should this work to install a new reference anode be unsuccessful then the Owner may elect to proceed with optional cylinder replacement.

Pre-approved sub-contractors approved for use on the Cash Allowance portion of this project are:

- Corrosion Services, Delta, BC - Ph. (604) 521-1234, Ross Armstrong or Scott Lee

2.40. Hydraulic Cylinder Replacement - Optional

Indicate in the proposal submission the separate, optional extra price to provide a new replacement hydraulic cylinder assembly and other changes for the elevator as follows, assuming a standard installation. The Owner may only consider this work if the work to install a new reference anode for the corrosion protection system is unsuccessful.

Remove the concrete pit floor and pedestal around the cylinder and dispose of the same. Noisy work such as jack hammering shall be done outside of regular Gallery hours at times suitable to the Owner. The concrete pit floor shall be re-poured and repaired upon completion of the cylinder replacement to form a smooth even surface. Provide a new concrete pedestal as necessary for support of the pit steel channels should these not rest evenly on the pit floor level. The floor shall be sealed as required to prevent the entry of water into the elevator pit.

Remove the existing cylinder and dispose of the same. Provide any and all tools or equipment including jacks, chain blocks, slings, scaffolding, jackhammers, compressors, welders, etc. to remove the cylinder from the existing well hole. Provide suitable means for hoisting the equipment and jack if not already in place and review by a Registered Professional Engineer if necessary. Allow a minimum of 3 days for removal of the cylinder once all of the means are in place to proceed with this work such as scaffolding, chain blocks, structural support, jacks, compressor, hose, etc. Should difficulty be encountered in the early stages of removal the contractor shall provide a compressor and air or water supply and other necessary means to inject compressed air and/or water in the cylinder hole and down to or near the bottom of the hole to loosen up the materials that may be in the hole and to “bubble” the materials to release the cylinder.

If the cylinder cannot be removed after all traditional methods have been exhausted (including jacks, compressors, chain blocks etc.) the situation shall be reviewed by the Elevator Contractor, Owner and Consultant. If it has been determined that reasonable methods have been unsuccessful in removing the cylinder, extraordinary methods will be considered as an extra to this contract.

Provide and install a complete new jack unit; consisting of cylinder, piston, piston stop ring, guide bearing and packing, all designed to suit the service, the speed, the rated capacity of the existing elevator.

Include a cylinder with protection against corrosion as specified.

Include new cylinder supporting channels and/or beams and suitable oil line connections as required. Existing buffers may be retained provided they suit the new pit channels. If necessary provide new buffers and buffer stands to suit the alterations made in the pit.

Cylinder Corrosion Protection

The cylinder of the jack unit shall be protected from corrosion with a PVC or HDPE encapsulating cylinder liner. The cylinder liner shall be provided with fittings and internal tubing to permit inspection and evacuation of the annulus. Provide equipment in accordance with the latest version of the B44 Elevator Safety Code.

Upon completion of the installation, the annulus shall be pressurized and the air pressure measured and recorded. The pressure reading shall be measured 24 hours later to ensure that no air leaks exist in the system.

Should the installation of an encapsulating liner be impossible or difficult an alternative form of corrosion protection may need to be considered.

Cylinder Hole

It is the intent of the specifications that the existing cylinder hole shall be reused.

Remove all backfill, oil, groundwater and other materials from the hole in preparation for the installation of the new cylinder. Take full responsibility to remove all such materials from the site and dispose of the same. Retain the use of an outside contractor with powerful truck mounted pumping and/or vacuum equipment to clean out the cylinder hole as required. Noisy work such as work employing a vacuum truck shall be conducted outside of regular hours at times suitable to the Owner. The elevator contractor shall supervise

the work of the vacuum truck excavation to ensure that only the required amount of materials are removed from the cylinder hole.

The Elevator Contractor shall notify the Owner and Elevator Consultant once the cylinder has been removed and before the cylinder hole is cleaned or pumped out so that the Owner may arrange for testing of the backfill or other contents of the cylinder hole. Removal of the backfill and/or water from the cylinder hole shall not take place until test results are available.

Immediately upon removal of the existing cylinder and backfill the Elevator Contractor shall assess the condition of the existing hole including the depth and diameter and shall immediately determine the feasibility of installing the new cylinder and encapsulation assembly. Should the size, depth, plumbness or other feature of the hole make the installation of the assembly impossible then the Owner, with the assistance of the Elevator Consultant, will attempt to alter the hole or an active cathodic protection corrosion system may need to be considered as an alternative.

Should drilling be required to enlarge the hole this will be treated as an extra to the contract.

Provide sand for backfilling after hydraulic cylinder is in place.

Provide pumps, hose, storage containers and any other equipment necessary to remove accumulations of groundwater and ensure that groundwater is not permitted to damage the building or finishes. This responsibility shall commence immediately upon the commencement of this portion of the work.

2.41. Cathodic Protection – Separate Optional Price

Indicate in the submission the separate optional extra price to provide a cathodic protection corrosion system designed by a corrosion expert for the optional new buried cylinder should the installation of an encapsulating liner be impossible or difficult. Portions of the existing cathodic protection system may be reused at the discretion of the Corrosion Services expert. Alternatively provide a cathodic protection corrosion system designed by a corrosion expert. In this situation provide an impressed current cathodic protection system for the new cylinder in lieu of PVC or HDPE as follows:

Provide a system to establish and maintain a small difference in potential between the electrically isolated cylinder and the adjacent grounded steel structure including any metallic casing. The system shall be capable of indicating the relative differences in potential between the cylinder, the steel structure and the reference anodes, and of indicating protection effectiveness. The system shall be permanently connected to a source of power which may be that of the elevator controller and be equipped with at least two inert reference anodes located near the top and bottom of the cylinder to permit protection verification. The system shall be provided with permanent, clear instruction for verifying effective cylinder protection at any time.

The elevator contractor shall make any modifications required to isolate the hydraulic cylinder from the pit steel and the cylinder well hole casing and to isolate the piston from the elevator cab.

The elevator contractor shall employ the use of a corrosion services expert sub-contractor for design, installation, testing and commissioning of the system.

Pre-approved sub-contractors approved for use on this project:

- Corrosion Services, Delta, BC - Ph. (604) 521-1234, Ross Armstrong or Scott Lee

2.42. Controller

Provide a micro-computer based control system to perform all of the functions of safe elevator motion. Included shall be all of the hardware required to connect, transfer and interrupt power, and to protect the motor against overloading.

The controller cabinet containing memory equipment shall be properly shielded from line pollution. The micro-computer system shall be designed to accept reprogramming of common variables on site. As a minimum the following variables shall be site programmable:

- a) Door Open, Close and Dwell Times
- b) Parking Floors and Options
- c) Recall Levels

The controller shall be provided with on-board diagnostics and status indicators as an integral part of the controller to aid in troubleshooting, adjusting and maintenance of the equipment. Permanent status indicators shall be provided to indicate the status of the following as a minimum:

- a) Safety Circuit
- b) Door Locks
- c) High Speed
- d) Independent Service
- e) Inspection Operation
- f) Emergency Recall Operation (future use)
- g) Out of Service Timer

On-board diagnostics shall include an event and fault log, a real time clock and a method of displaying the status of all inputs, outputs and internal variables. Provide switches, push buttons, a display and instructions to view the diagnostic information. Provide non-proprietary diagnostics.

The new control, cabinets shall be located such that the existing feeder wiring from the electrical power disconnect switches can be reused and connected to the new equipment.

New feeders if required due to a change in the location of the equipment shall be the responsibility of the Elevator Contractor.

The control system shall have non-proprietary diagnostics and have technical support and spare parts available to any qualified party.

The following manufacturers and controller products are approved for use on this project:

- GAL – Galaxy 4
- MCE – Motion-2000
- Elevator Controls – Pixel

The elevator contractor shall provide the connections from the mainline disconnect switch to the controller including flex, wire and all junctions required.

The elevator contractor shall provide the connection from the car light disconnect switch to the controller.

The elevator contractor shall provide the connection from the auxiliary microswitch in the mainline disconnect switch to the elevator controller for the battery lowering system operation.

Portions of this work may be subcontracted to an approved electrical subcontractor at the Elevator Contractors discretion.

2.43. Hydraulic - Low Oil Control or High Oil Temperature

Provide low oil control feature designed to automatically cause up-travelling car to descend to lower terminal landing if reservoir oil level is insufficient or if oil temperature is too high to ensure proper operation of the elevator.

Arrange control so that the oil reservoir must be refilled or the oil temperature must reduce before elevator can be returned to service.

Open car and hoistway doors automatically at lower terminal landing. Deactivate control buttons in car operating panel, except door-open button, and close hoistway doors.

2.44. Security Card Access Interface

Provide an interface as follows to connect the new elevator control equipment to a restricted access security system or for future use:

Car Call Interface: Provide a pair of input terminals for each car call for each elevator controller. Connect circuitry to the elevator control system such that an external closed contact at the input terminals shall permit registration of the car call and an open contact shall render the car call inactive.

Hall Call Interface: Provide a pair of input terminals for each floor hall fixture for each elevator. Connect circuitry to the elevator control system such that an external closed contact at the input terminals shall permit registration of either an Up or Down hall call at the respective floor and an open contact shall render the hall calls at the respective floor inactive.

Arrange that the elevators will park at the last call served or the main lobby. If the control system includes other forms of parking where an elevator is assigned to and moves to a zone to park arrange that this feature will be disabled when the security system is active or that the activation of the door open button will cause the elevator to travel to the main lobby and open its doors if a car call is not registered for the landing.

Arrange internally that the restricted access system and circuitry shall be bypassed when the elevators are switched to in-car emergency service operation.

Arrange the circuitry so that Independent service operation does not bypass the restricted access security system.

Provide the input and output terminals and terminate the wiring from each elevator on terminals located in clearly marked demarcation boxes mounted on the exterior of the elevator control cabinets or in a centrally

located demarcation box located in the elevator machine room. The security systems contractor shall provide all wiring and conduit from the demarcation boxes to the security system equipment.

Arrange to test the interface with the Elevator Consultant.

2.45. CCTV Camera Interface

Provide the following for interfacing the elevator wiring with a CCTV security camera system and for the connection and mounting of CCTV security cameras in each elevator cab:

The Elevator Contractor shall provide CCTV camera interface traveling cables as specified elsewhere herein. The spare shielded pair and/or coaxial cables shall be terminated with appropriate connectors in a demarcation box in the elevator machine room. Two (2) of the 14 AWG power cables shall be terminated to terminal strips in the interface cabinet. Twenty (20) feet of excess traveling cable conductor wiring shall be provided on top of the elevator cab. The spare shielded pair and coaxial cable shall be terminated and left looped at the top of the elevator cab with the spare power cable in a suitable junction box or wiring trough for protection.

Mount and connect a security camera device in each cab or assist the security systems contractor to mount and connect these devices in the cab. The CCTV camera & housing equipment will be provided by others.

Arrange to test the system with the security systems contractor.

2.46. Seismic Restraint & Operational Features

Provide protection for seismic risk zone 3 or greater as required by the regulatory authority for the proposed alterations.

All equipment shall be mounted and secured to the building structure to prevent displacement or toppling when subjected to horizontal seismic forces resulting in accelerations equal to $\frac{1}{2}$ the rate of acceleration of gravity.

2.47. Security Room – Remote / Monitoring Panel

The existing remote elevator monitoring and control panel located in the security room shall be retained, reused and altered as follows:

Existing conduit and wiring between the elevator machine room and the remote security room may be retained and reused. Provide any new conduit and wiring required for connection of the remote panel components to the new control system.

The existing position indicator, distress indicator and in-service indicator for the Gallery passenger elevator in the remote panel shall be retained and reused. Replace existing illuminating indicator bulbs with long life LED replacement lamps and connect the position indicator, distress indicator and in-service indicator to the new elevator controls to show the location of the elevator or the floor it is passing, to indicate when the alarm button is pressed and to indicate when the elevator is in or out of service.

The existing passenger elevator “parking” keyed switch is no longer required and the keyed switch shall be removed, disconnected and covered with a blank stainless steel cover. The freight elevator components in the panel shall remain unchanged by the alterations. See attached photos of the remote monitoring panel and additional instructions on the attachment.

3. Execution

3.1. Grounding

Ground the control system and all field apparatus using colour coded bonding wire.

The occurrence of a single accidental ground or short circuit shall not defeat any safety device and shall not permit the car to start or run if any hoistway door or gate interlock is unlocked or if any hoistway door or car door gate contact is not made.

3.2. Sound Isolation

Isolate all new equipment producing noise and vibration from the building structure using sound and vibration isolation mounts. Isolate the hydraulic piping in the pit where it is in contact with the structure or pipe stands. Provide rubber isolation at the piston platen plate to isolate the hydraulic jack from the cab platform.

3.3. Door Operation

Door operation shall be automatic at each landing with opening being initiated as the car arrives at the landing and closing taking place upon expiration of a predetermined adjustable time interval. A minimum of three separate and independent door dwell times shall be provided. Doors shall remain open for an adjustable time period as follows:

- a) A car call time shall predominate when a car call only is being answered.
- b) A hall call time shall predominate when a hall call or both a hall call and car call are being answered.
- c) A short door time value shall predominate after door reversal from the door detector or door open button.

The values for the timers shall be independently field adjustable.

3.4. Inspection Operation

An enabling switch shall be provided in the car operating panel to permit operation of the elevator from on top of the car for inspection purposes, and shall make car and hall buttons inoperative.

On top of the car an operating fixture shall be provided containing continuous pressure "UP" and "DOWN" buttons, an emergency stop button, and a toggle switch. This toggle switch makes the fixture operable and, at the same time, makes the door operator and car and hall buttons inoperative. The operating station shall be located such that it is visible and easily accessible when accessing the car top from a front opening.

3.5. Door Nudging Operation

If there is either a hall call anywhere in the group or a car call in the car in question and the doors are prevented from closing for a fixed time period, the door protective device shall be rendered inoperative, an audible signal shall sound on the car and the doors shall close at reduced torque. Normal operation shall resume at the next landing reached by the car.

Arrange that the nudging feature can be easily disconnected or disabled in the field so that the audible signal will sound but the doors will not close until such time that the door detector system indicates that the entrance is clear.

3.6. Door Failure Protection

If the doors fail to fully close or open within a predetermined, adjustable time period further attempts to open or close the doors shall cease and the doors shall return to the open or closed position.

After a short time period the control system will attempt to complete the door cycle in a similar manner. In the event that three consecutive failures occur the car shall be removed from service and shutdown by the control system.

3.7. In-Car Lantern Operation

In car lanterns shall illuminate to indicate the direction of travel when answering a hall or car call. A chime shall sound once for “Up” and twice for “Down” to indicate the direction of travel of the elevator as the doors are opening.

In car lanterns shall activate at the initiation of the door opening cycle. The illumination shall remain active until the door dwell open time has elapsed.

Do not activate lanterns upon a door reversal unless the car is reversing its direction of travel.

3.8. Advance Door Opening

Arrange that the doors commence opening as the car is levelling into the landing. The amount of advanced opening shall be consistent regardless of the direction or travel and load in the car and in no case should the doors be open more than 2' before the car stops level with the landing.

3.9. Performance Criteria

The equipment provided shall be capable of operation within the following performance criteria and shall be adjusted accordingly:

Motion Control					
Elevator # or Group	Maximum Flight Time	Maximum Acceleration	Maximum Jerk	Levelling Accuracy	Speed Variation
1	16.0	2.0 ft/s ²	10.0 ft/s ³	+/-3/8"	+/- 5%

The flight time shall be measured from the start of the door close cycle until the doors are ¾ open at the adjacent landing on a one floor run between typical floor levels. This time is based on the existing short

floor heights at the site. The flight time, levelling accuracy and speed variation shall be obtainable in both directions of travel with loads ranging from zero to full rated capacity.

Door Operation					
Elevator # or Group	Maximum Door Opening Time	Maximum Door Closing Time	Maximum Car Call Door Dwell Time	Maximum Hall Call Door Dwell Time	Maximum Short Door Dwell Time
1	3.0	4.0	3.0	5.0	2.0

The Owner may request that the door operation be adjusted to other levels more appropriate for the specific tenancy or building environment. Arrange to perform such adjustments only upon mutual agreement and confirmation in writing of the agreed to adjustment times.

Maximum Acceptable Noise Levels			
Elevator # or Group	Door Operation	Cab	Machine Room
1	60 dBA	70 dBA	80 dBA

Noise levels shall be measured no further than six feet from the noise source with the meter on the "A" scale with a slow response.

3.10. Inspection Operation

An enabling switch shall be provided in the car operating panel to permit operation of the elevator from on top of the car for inspection purposes, and shall make car and hall buttons inoperative.

On top of the car an operating fixture shall be provided containing continuous pressure "UP" and "DOWN" buttons, an emergency stop button, and a toggle switch. This toggle switch makes the fixture operable and, at the same time, makes the door operator and car and hall buttons inoperative. The operating station shall be located such that it is visible and easily accessible when accessing the car top from a front opening.

3.11. Hoistway Access Operation

An enabling switch shall be provided in the elevator car operating panel or service cabinet to render all car and hall buttons inoperative and to permit operation of the elevator by means of an access keyed switch adjacent to the hoistway entrance at the access landing(s). The movement of the car away from the access landing, by means of the access keyed switch at the landing shall be limited in travel and direction in accordance with the governing safety code.

3.12. Independent Operation

A switch shall be provided in the car operating panel which, when actuated, shall cancel previously registered car calls, disconnect the elevator from the hall buttons, and allow operation from the car buttons only. Door operation shall occur only after constant pressure on the DOOR CLOSE button or on a CAR CALL button.

When on independent operation the elevator shall not activate any hall or in-car lanterns.

3.13. Hydraulic Car Stall Operation

A protective circuit shall be provided which will stop the motor and the pump and return the car to its lowest landing in the event that the car, while traveling up, does not reach its designated landing within a predetermined time interval. This circuit shall permit a normal exit from the car but prevent further operation of the elevator until the trouble has been corrected.

3.14. Automatic Self-Levelling

The car shall be equipped with two-way levelling to automatically bring the car level at any landing regardless of direction of travel and with a load ranging from zero to full rated capacity.

3.15. Firefighter's Emergency Operation – Provisions Only

Provide provisions in the control system for the future implementation of Phase I emergency recall and Phase II emergency in-car operation for the elevator in compliance with the CSA B44-07 Safety Code for Elevators.

Provide provisions consisting of PC boards, logic, wiring and wiring terminals to provide full automatic recall operation as initiated by the building fire alarm system including recall to a designated level, recall to an alternate level, machine room smoke sensor and hoistway smoke sensor recall.

Include spare wiring and other provisions for the future connection of building fire alarm system signals and keyed switches located at the main floor lobby or remote location that may be provided at a future time.

Include spare wiring to the car and other provisions including a blank Firefighters operation control cabinet in the car operating panel for the future connection of a three position keyed switch and other required components in the car for emergency in-car operation by emergency personnel.

The controller shall be equipped with features and programming resident in the software such that fire service can be activated in the future without the need for new software provided the existing code version of firefighter's emergency operation can be implemented at that time.

The recall levels shall be site programmable.

3.16. Standby Power Operation

The building is not currently provided with a standby power generator that is capable of providing power for the elevator system, however, future changes may be made in this regard.

Include provisions in the elevator control system and hoistway wiring for the possible future connection of emergency standby power for the elevator and an elevator emergency power indicator at the ground floor level. No indicators shall be provided at this time.

3.17. Simplex Operation

Operation shall be simplex selective collective automatic. The operation of one or more car or hall call buttons shall cause the car to start and run automatically. The car shall stop for the first car or hall call registered for the direction of travel. Stops shall be made in order in the direction of travel as the respective landing is reached. Regardless of the order in which they were registered. When only hall calls are registered ahead of the car for the opposite direction of travel then the car shall proceed to the furthest hall call, reverse the direction of travelling and commence collecting calls in that direction.

3.18. Parking of Elevators

Zoned or parked cars shall park with doors closed.

The elevator shall park at the last floor served or at any one of the landings served as selected by the Consultant. This parking selection shall be field adjustable. Initially arrange that the elevator will park at Main or street floor level after it is idle for a short period of time unless otherwise instructed in writing.

3.19. Temporary Maintenance Period

Upon commencement of work on the site the maintenance of the elevator shall become the responsibility of the successful Elevator Contractor. Normally the elevator will be out of service, however, should the elevator be returned to operation prior to substantial completion of the work the successful elevator contractor shall be responsible for the maintenance of the equipment during this time period. Provide full maintenance of the equipment from the date the work commences on site until substantial completion of the project. Provide a 24 hour callback service and answer all calls at no extra cost to the Owner.

The costs for the temporary maintenance shall be included in the basic quoted price.

Provide the maintenance service in conformance with the minimum standards set out in the B44.2-07 Elevator Safety Code Maintenance Requirements and Intervals.

The price for temporary maintenance shall not be subject to adjustment or escalation.

It is the intent that the successful contractor will commence maintenance services once the initial anode replacement work commences and prior to performance of the balance of the work.

3.20. Warranty Maintenance Period

A quality full maintenance service shall be provided by the Elevator Contractor for a period of twenty four (24) months after substantial completion of the project to coincide with the warranty period.

The costs for the 24 month warranty maintenance period shall be included in the basic quoted price.

Indicate in the submission the separate optional extra amount to provide maintenance of the elevator for one additional twelve (12) month period. That is, provide a separate price for maintenance of the elevator for a 3rd year – i.e. for one (1) additional year after the 2 year warranty period (the price for the 1st and 2nd year maintenance service should be included in the basic quoted price for the upgrading work).

Provide the maintenance service in conformance with the minimum standards set out in the B44.2-07 Elevator Safety Code Maintenance Requirements and Intervals.

The price for warranty maintenance period shall not be subject to adjustment or escalation.

3.21. Renewable Maintenance – Separate Price

Indicate in the submission the monthly rate for a renewable full preventative maintenance service for the elevator following the expiration of the included warranty maintenance period and optional extension if that is accepted. This shall be based on a five (5) year term contract. Acceptance of the on-going renewable maintenance service shall be at the sole discretion of the Owner.

Provide the maintenance service in conformance with the minimum standards set out in the B44.2-07 Elevator Safety Code Maintenance Requirements and Intervals.

The Elevator Contractor shall provide a copy of the maintenance agreement that the Owner would be requested to enter into as part of the submission. This shall be based on a five (5) year term contract.

3.22. Maintenance Training

Prior to commencement of the warranty maintenance period and any extended maintenance all Elevator Contractor's regular maintenance personnel and key maintenance personnel shall receive certified factory training for the preventative maintenance, repair and trouble-shooting of the new equipment, control systems and software provided. The Elevator Contractor shall be required to provide proof of this certification and training to the Consultant and the Owner as a requirement of Substantial Completion.

3.23. Signs

Signs shall be provided in the main lobby area of the building to inform staff and other users of the elevator that elevator work is in progress. The signs shall be provided by the Elevator Contractor for display over the duration of the project. The design of the signs shall be subject to the Owners approval.

The Elevator Contractor shall also provide simple paper signs (8 ½" x 11") at each floor level on the doors of the elevator that is currently out of service.

3.24. Samples and Drawings

After award of the contract and prior to commencing any work on site submit shop drawings, samples and approval forms for the review and approval of the Owner and/or the Consultant. As a minimum the following shall be submitted:

- a) A copy of the alteration submissions provided to the regulatory authorities.
- b) Shop drawings for all car and hall operating and signal fixtures.
- c) Machine Room Layout showing proposed location of new equipment.
- d) Sample push buttons for approval.
- e) Sample tactile markings for approval.
- f) Power confirmation forms confirming power requirements for new equipment being provided.

3.25. Manuals

Upon completion of the project submit hand over documentation for all of the new equipment provided. As a minimum the following shall be provided:

- a) Complete operating and maintenance manuals.
- b) As built wiring diagrams.
- c) A minimum of five (5) copies of each key used except keys specifically for maintenance and inspection personnel.
- d) One (1) archive copy of all software used in the control system, door operator, etc..

Operating and maintenance manuals and wiring diagrams shall be submitted as two (2) original printed and bound hard copies and also as an electronic file. The electronic file shall be created and provided by the Elevator Contractor upon completion, submission and approval of the original documentation by the Owner and Consultant. The electronic file shall be an exact copy of the original information submitted and shall be provided in portable document format (PDF). Ideally one complete electronic file would be provided, however. It will be acceptable to have one file containing the O & M manual, parts lists, etc. and another for the electrical schematics.

Operating and maintenance manuals shall be sufficiently detailed and shall include spare parts lists, As-Built drawings, adjustment procedures, testing procedures, troubleshooting procedures, diagnostic instructions, recommended spare part list and the manufacturer's recommended maintenance tasks and frequencies.

It is understood that the software provided shall be for archive purposes only and shall be for the Owner's exclusive use. A non-disclosure agreement will be signed by a representative of the Owner if required to protect the manufacturer's rights to the exclusivity of the software.

One (1) complete set of wiring diagrams shall be laminated and left on site in the machine room in addition to the foregoing requirements.

3.26. Special Tools

Provide any and all special tools used in the maintenance, repair, adjustments, troubleshooting and diagnostics of the equipment provided.

Special tools provided shall be for the exclusive use of the Owner or the Owner's contracted maintenance personnel and for the on-going maintenance, repair, adjustment, troubleshooting and diagnostics of the equipment.

3.27. Schedule

Submit a detailed completion schedule showing start dates, completion dates and milestone dates for the duration of the project. The schedule shall be sufficiently broken down to identify individual tasks or elements of the work. The schedule shall be reviewed regularly and revised according to the progress of the work.

Indicate in the submission the anticipated manufacturing lead time from award until delivery of materials to site to commence work and the anticipated shutdown duration for each elevator in weeks.

The work must be done during time slots identified by the Owner and as follows: The following time periods have been identified for completion of the work and all work must be done during these periods of time:

Time Period / Milestone	Date
Construction Start Date	January 2020
Construction Completion Date	No Later than end of March 2020

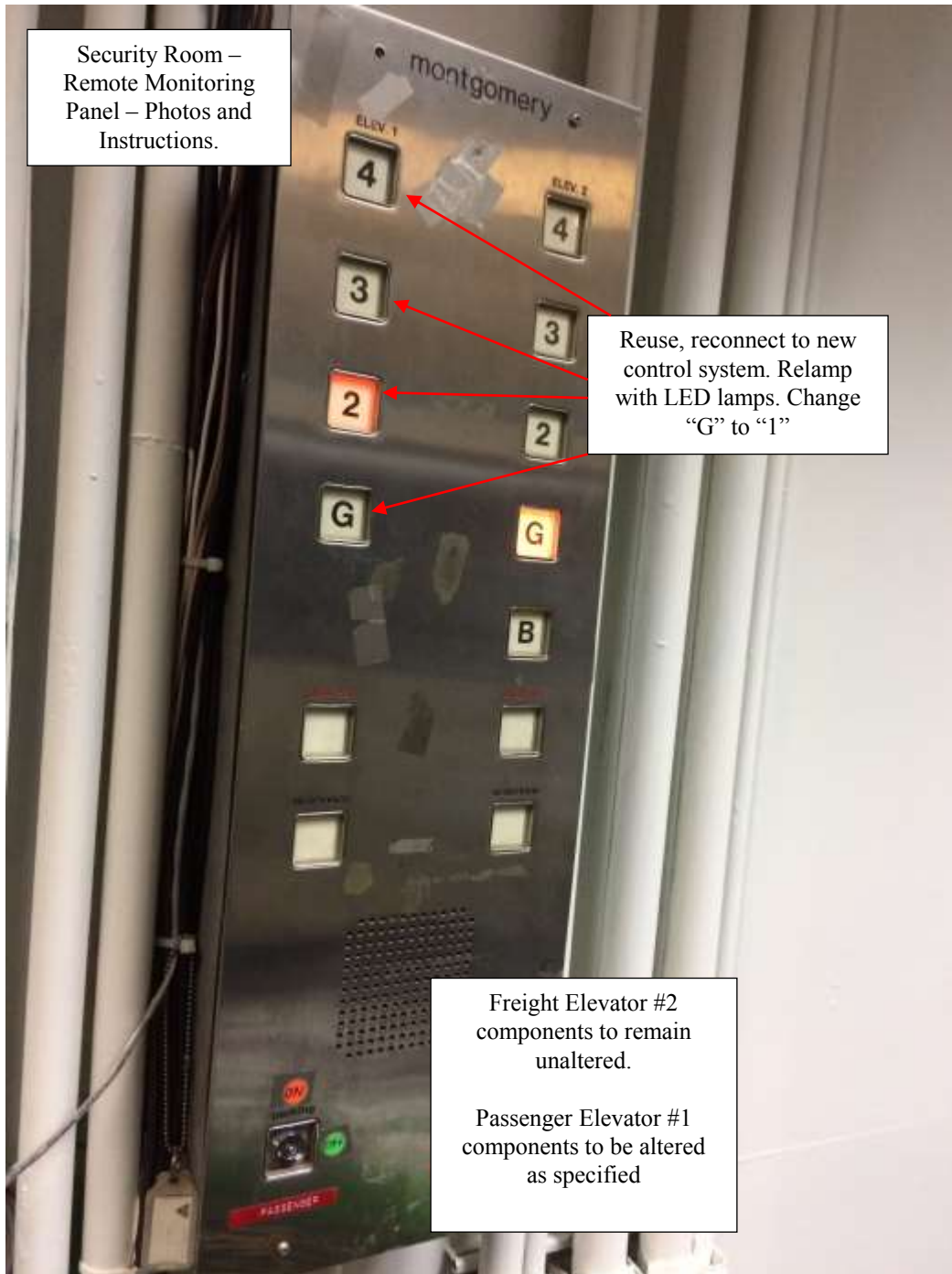
NOTE: the work to install a new reference anode for the corrosion protection system shall commence sooner than indicated above and within 60 days of award of the contract.

The Elevator Contractor shall make allowances for overtime, extra shifts, weekend work, additional manpower and supervision for performing the work during the allotted dates.

Work within the gallery shall not be performed during normal gallery hours. Work in general shall be permitted during regular gallery hours provided it is limited to the elevator machine room, hoistway and the vestibule space at each elevator landing.

Public gallery hours are 10:00 AM to 5:00 PM daily and until 9:00 PM on Tuesdays.

4. Attachment – Remote Panel Photos and Alteration Illustrations





Reuse, reconnect to new control system. Relamp with LED lamps.

Remove, disconnect and cover the "parking" switch which is no longer needed