

RETURN BIDS TO:
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Public Works Government Services Canada- Bid
Receiving / Réception des soumissions
189 Prince William Street
Room 405
Saint John
New Brunswick
E2L 2B9

SOLICITATION AMENDMENT MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

All questions are to be submitted in writing to
 Gisele Doucet - Email: gisele.doucet@pwgsc.gc.ca
 or Fax no. (506) 636-4376.

Vendor/Firm Name and Address

Raison sociale et adresse du
 fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution

Public Works Government Services Canada- Bid
 Receiving / Réception des soumissions
 189 Prince William Street
 Room 405
 Saint John
 New Bruns
 E2L 2B9

Title - Sujet Roof & Penthouse Moncton NB	
Solicitation No. - N° de l'invitation EC015-152406/A	Amendment No. - N° modif. 001
Client Reference No. - N° de référence du client R.063297.001	Date 2015-04-16
GETS Reference No. - N° de référence de SEAG PW-\$PWB-004-3600	
File No. - N° de dossier PWB-4-37180 (004)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2015-05-06	Time Zone Fuseau horaire Atlantic Daylight Saving Time ADT
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Doucet, Gisele PWB	Buyer Id - Id de l'acheteur pwb004
Telephone No. - N° de téléphone (506) 636-4541 ()	FAX No. - N° de FAX (506) 636-4376
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction:	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

Cette modification à l'invitation numéro un (1) est soumise pour inclure l'addenda numéro 1 suivant.

La modification qui suit apportée aux documents de soumission entre en vigueur dès maintenant. L'Addenda fera partie des documents de contrat.

Toutes autres conditions ne changent pas.

Addenda numéro 1.

1. DEVIS

Veillez **RENOMMER** la Section 14 12 60 existante avec **Section 14 12 60a**.

Veillez **AJOUTER** la **Section 14 12 60b - Removal / Re-Install Elevator #6** ci-attachée.

PART 1 - GENERAL

1.1 Scope of Work

- .1 The Work described herein includes for all labour, materials, machinery, cranes, tools, and any other equipment or machinery including overtime labour or fees required to meet the project schedule and details. It includes to remove all machine room elevator equipment, once done, install adequate weather tight protection for the hoist-way enclosure, safely and efficiently remove all equipment in the elevator machine room and from the roof area, store in a safe weather resistant location and re-install all approved equipment associated with (1) gearless passenger elevator designated on site as elevator # 6 located at GOCB Moncton, New Brunswick. Provide all work required for a completed project accepted by the Authority Having Jurisdiction including:
- .2 Remove and re-install, or replace if deemed necessary the overhead traction machines permanent Magnet AC gearless for Elev 6.
- .3 Remove, re-install or replace existing AC hoist motors.
- .4 Remove, re-install or replace regenerative, motor drives for closed loop speed control.
- .5 Remove, re-install or replace existing non-proprietary, GAL, microprocessor-based solid state electrical controllers.
- .6 Remove, re-install, or replace existing overspeed and uncontrolled speed protection for cars and counterweights.
- .7 Protect all equipment in the elevator hoistway, such as existing car door operators, hoistway door locks, door closers and related hardware. Replace if damaged by construction related work as directed by the Lift Engineering Department Representative.
- .8 Protect existing hall position indicators in car and at the main floor. Replace if damaged by construction related work as directed by the Lift Engineering Department Representative.
- .9 Protect newly refurbishment of car cab interiors. Replace any damage components or parts as directed by the Lift Engineering Department Representative.
- .10 Provide extended full parts and labour preventive maintenance on existing equipment during modernization period and on new equipment for a subsequent twenty (24) month period.

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- .11 Repair or replace any components or parts of the recently refurbish car safety devices or existing new speed governors as directed by the Lift Engineering Department Representative.
- .12 Protect and replace any damaged components of existing automatic emergency recall and in-car emergency service as directed by the Lift Engineering Department Representative.
- .13 Re-connect emergency power operation electrical system. Verify operations and commission as directed by the Lift Engineering Department Representative.
- .14 All existing electrical inside the machine room shall be removed and replaced with new wiring, devices, and electrical components associated electrical work as outlined herein.
- .15 Re-connect existing Lift Net remote monitoring and command system. Verify operations and commission as directed by the Lift Engineering Department Representative.
- .16 Please note that: It is the sole responsibility of the elevator contractor to ensure that all elevator system components, equipment, wiring, or other components forming part of car # 6 does not sustain any type of damage during the removal and re-installation process. Equipment, components, wiring, and all other related parts associated with elevator car # 6 can only be re-used if approved in writing by the Lift Engineering Department Representative.
- .17 Above is a brief description only. The following specifications detail the Work.

1.2 Related Work

- .1 Provide related work:
 - .1 Provide new auxiliary main-line disconnect switches if required by new equipment layout.
 - .2 Re-confirm existing crosshead data plates on car tops complete with all pertinent information required by Code.
 - .3 Protect interior hoist way form water, moisture, dust or other foreign objects that may enter the interior of the elevator hoistway enclosure including but not limited to the car, pit enclosure, or through cracks, of holes that could

have such foreign materials or objects enter the building at all floor landing areas. Patch all redundant holes in machine room floor and landing walls.

- .4 Make all necessary modifications to existing fire alarm panel to bring recall signal to elevator machine rooms including main recall level, alternate recall level, and machine room. Utilize a Certified Fire Alarm Technician for all required modifications.
- .5 Install two new 120 volt GFIC receptacles, exact locations to be approved by the Lift Engineering Departmental Representative, one in the machine room, and one in the top of hoist-way enclosure.
- .6 Protect newly installed code-complaint pit stop switches, positively actuated and red in colour. Replace if damaged as directed by the Lift Engineering Departmental Representative.
- .7 Protect newly installed new code-complaint florescent pit light fixtures and protective enclosure. Replace if damaged as directed by the Lift Engineering Departmental Representative.
- .8 Protect drip existing drip pans under the portion of machine room sprinklers overhead of elevator equipment. Replace if damaged as directed by the Lift Engineering Departmental Representative.
- .9 Protect new code compliant pit ladders for Elev # 6. Replace if damaged as directed by the Lift Engineering Departmental Representative.
- .10 Protect or replace wall finishes inside hoistway of Elev. 6. Repair or replace if damaged as directed by the Lift Engineering Departmental Representative.
- .11 Ensure all replaced and new components from this section to be located and detailed on the new General Arrangement Drawings - section 1.10 of this document.

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- .2 The following work to be provided by the general contractor.
 - .1 Provision of new machine room heating and cooling to ensure machine room temperatures remain between 17 C and 33 degrees C.
 - .2 Alter the machine room lighting of Elev. 3 so the only controls switch is within the elevator machine room.

1.3 Reference Standards

- .1 Perform work to the following minimum standards:
 - .1 CAN/CSA-B44-10 Safety Code for Elevators including updates
 - .2 CSA C22. No.77 Motors with Inherent Overheating Protection.
 - .3 CSA C22.2 No. 141 Unit Equipment for Emergency Lighting.
 - .4 Provincial Elevator Act and Regulations.
 - .5 C22.1 Canadian Electrical Code, particularly Section 38.
 - .6 National Building Code.
 - .7 CAN/CSA B651
 - .8 ED 16200-2013 PWGSC Elevator Design Guidelines.
- .2 In case of discrepancy, the above standards take precedence over details elsewhere in this specification.

.4 Power Supply

- .1 Make all necessary modifications to the electrical services relating to the elevators such as supplementary disconnect devices and connections to the controllers.
- .2 Design equipment to operate using the existing 3 phase power supply.
- .3 Provide necessary grounding, shielding, or bonding required to accommodate the new elevator equipment.
- .4 Carry out any electrical modifications outside of the hoistway and machine room by a Licensed Electrician and arrange and pay for inspection by hydro utility as required. Provide a copy of utility permit to Departmental Representative.

1.5 Permits and Inspections

- .1 Complete ~~new~~ updated Design Submission and related research necessary for regulatory approval of Work. Make submission to Province within 2 weeks of approved General Arrangement Drawings.
- .2 Obtain ~~new~~ and pay for necessary Municipal or Provincial inspections and permits and make such tests as are called for by the regulations of such authorities. Make tests in the presence of the authorized representatives of authorities.
- .3 Provide the Departmental Representative with copies of complete inspection reports the same day they are received from authorities.

1.6 Taxes

- .1 Pay all taxes properly levied by law including Federal, Provincial and Municipal. HST to be invoiced as an identified extra.

1.7 Measurements

- .1 Before the execution of the work, re-verify all dimensions with the actual site conditions. Ensure new layout drawings are true and accurate prior to submitting to the inspection authority and PWGSC for review.

1.8 Quality of Work

- .1 All work performed during the removals and re-installations shall meet the approvals in writing of the manufacturer who engineered and supplied materials for the existing installation. Re-installed equipment must have accompanying shop drawings approved for installations and warranted by the original manufacturer of the components or equipment. Example of such, only equipment that is approved in writing and accompanied with up to date shop drawings by the original manufacturer shall be approved for re-installation. This includes all components identified by the Lift Engineering Departmental representative to be replaced.
- .2 Comply with all applicable provisions of all federal, provincial and local labour laws.

1.9 Samples

- .1 Re-submit to the Lift Engineering Departmental Representative for approval, upon request, samples of any visible elevator finishes including:
 - .1 Cab wall finishes;
 - .2 Cab ceilings;
 - .3 Fixture faceplates.

1.10 General Arrangement Engineered Layout Drawings, Shop Drawings and Product Data

- .1 Before re-installation of the work begins, prepare new layout drawings to show the general arrangement of the elevator equipment that has been removed, relocated or remained within the elevator system and other data which is called for and are to be submitted for review. Provide these drawings within two (2) weeks of notification of award of contract.
- .2 Drawing review is for the sole purpose of ascertaining conformance with the general design concept and does not mean approval of the design details inherent in the shop drawings, responsibility for which shall remain with the Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract including this specification.
- .3 Use metric units of measurement.
- .4 Provide soft version in AutoCAD format and submit five (5) copies of each shop drawing for review. Format for printing as 11" x 17".
- .5 Indicate to scale on general arrangement drawings:
 - .1 Plan view of driving machine, controller, governor and all other components in machine room.
 - .2 Plan view of car, counterweight, sheaves, supporting beams, guide rails, buffers and other components in hoistway.
 - .3 Section view of the hoistway including elevation of each floor served, pit depth and overhead.

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- .4 Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
- .5 Location in hoistway or machine room for connection of travelling cables for car light and communication system.
- .6 If requested by the Lift Engineering Representative, signal and operating fixtures, and all associated fixtures.
- .7 Locations and size of trap doors and access doors and load on hoist beam and location of trolley beams.
- .8 Heat dissipation of elevator equipment in machine room.
- .10 If requested by the Lift Engineering Departmental representative, provide detailed elevator cab interior drawings.
- .11 Do not commence manufacture or order materials before shop drawings are approved as well as stamped by a Professional Engineer in the province of work and submitted to the provincial safety authority .

1.11 Project Record Documents

- .1 Before final acceptance of the elevator, provide three (3) sets of reproducible as-built wiring diagrams as well as three (3) sets of all final issue shop drawings including General Arrangement Drawings - machine room plan, hoistway plan and hoistway section. All drawings to be laminated or enclosed in plastic protectors and marked "as-built". Provide all drawings stamped as "as built" by a Professional Engineer registered in the province.
- .2 Provide one soft copy of the above information in AutoCAD format. Insert as-builts into building architectural and structural drawings, as provided by PWSGC.
- .3 Mark up all field changes or additions to original wiring diagrams in red.
- .4 Submit drawings and data in accordance with General Requirements specification, if distributed with this tender.

1.12 Operation and Maintenance Data

- .1 Provide three (3) copies of manufacturer's instructions and operation and maintenance manuals.

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- .2 Include the following maintenance data:
 - .1 Description of elevator system's method of operation and control including motor control system, door operation, emergency recall operation and special or non-standard features provided.
 - .2 Replacement parts list.
 - .3 Include all wiring diagrams for all equipment on controllers.
 - 4 Maintenance: Use clear drawings, diagrams or manufacturers' literature which detail the following:
 - lubrication products and schedules
 - trouble shooting procedures
 - adjustment techniques
 - operational checks.
 - .5 Spare Parts:
 - List recommended spares to be maintained on site to ensure optimum efficiency
 - List all special tools and appropriate unique applications.
 - Detail manufacturer and supplier names and addresses.
- .3 Include in the manuals a copy of the registered design submission and safety authority inspection reports.
- .4 For a fifteen (15) year period following acceptance of Work, provide further information that is required for the safe and efficient maintenance of the elevator equipment, including any solid state equipment or devices supplied under these specifications. Fee for parts, is agreed to be manufacturing cost plus 40%.

1.13 Maintenance Service - Interim and Warranty

- .1 Include at no extra cost Interim maintenance of all existing and newly re-installed equipment covered under this and previous elevator upgrade project from the day of contract award and continue maintenance for an additional period of twenty-four (24) months from the date of the Final Certificate of Completion of the project. Meaning, all elevator components, absolutely no exclusions.

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- .2 Carry out maintenance inspections and tests on a monthly basis in accordance with provincial regulations, Section 8.6 of the ASME 17.1/CSA B44-10 Safety Code for Elevators and Escalators, CSA Standard B44.2-07 Maintenance Requirements and Intervals for Elevators, Escalators, Dumbwaiters Appendix J of the CAN/CSA-B44 Safety Code and the PWGSC standard Elevating Devices Maintenance Specification distributed with this tender, as a minimum.
- .3 Systematically clean, lubricate and adjust all of the equipment as required.
- .4 Repair or replace electrical and mechanical parts of any equipment as required, whether due to defect or normal wear and tear.
- .5 Use only genuine standard parts of manufacturer of equipment.
- .6 Perform work by competent personnel under supervision and in direct employ of manufacturer, or manufacturer's licensed agent.
- .7 Schedule work during regular Elevator Trade working hours with Lift Engineering Departmental Representative.
- .8 Maintain locally an adequate stock of parts for replacement or emergency purposes and have qualified staff available to ensure fulfilment of parts requirements in a timely fashion.
- .9 Include complete and full 24 hour call-back service required by equipment stoppage or malfunction at all times at no additional cost. Provide staffing to ensure a minimum of 30 minute response to emergency calls throughout interim and warranty maintenance.
- .10 Ensure no unit is out of service longer than 12 hours - keep Departmental Representative completely informed of equipment malfunctions on a continuing basis.
- .11 Remove garbage monthly.

1.14 Layout

- .1 Design equipment to suit existing space including hoistway cross-sections, overhead dimensions, pit depths, machine room dimensions and machine room location.

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- .2 In the event that design changes are proposed by the Contractor with respect to any of the above-noted dimensions, required either for convenience or by physical necessity, notify Departmental Representative in writing without delay.

1.15 **Warranty**

- .1 Provide a warranty that the materials and workmanship of the apparatus installed under these specifications and previous projects remains in first-class condition in every respect and make good any defects, not due to improper use or care, which may develop within two (2) years from the date of acceptance.
- .2 Commence warranty at date of certification of Final Completion, as certified by the Departmental Representative.

1.16 **Departmental Representative's Certification of Payment**

- .1 The Departmental Representative will certify progress payments for work only after it has been installed.
- .2 Progress payments may be withheld for, whether or not certified by the Departmental Representative, for any of the following:
 - .1 Defective work or deficiencies not corrected.
 - .2 Failure of Contractor to make payments properly to Sub-contractor(s) or for material and labour.
 - .3 Failure to work to schedule.
 - .4 Damage to the building or another contractor.
 - .5 Failure to meet specifications or performance criteria.

1.17 **Use of Elevators by Persons With Physical Disabilities**

- .1 Arrange all controls and fixtures to be easily reached and operated by disabled persons. Meet requirements of Appendix E of the CAN/CSA-B44 Safety Code for Elevators, including:
- .2 Retain existing hall lanterns above each hoistway entrance. Lanterns to be refurbished with new stainless steel faceplates, new lexan covers over new

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LED illuminated bulbs and new electronic chimes to sound once for UP direction and twice for DOWN. Chime to be adjustable.

- .3 Provide voice annunciation indication of each floor, when served and of car direction. Provide volume control adjustable from behind car station. Provide high-power speakers, minimum of two (2) per car so no distortion is readily noticeable to passengers.

Provide sample of annunciations, to be in French and English languages and in a feminine voice, with shop drawings.

- .4 Provide new metal hall braille/tactile plates.

1.18 Elevator Performance

- .1 With equipment adjusted to the required parameters, operate elevator with smooth acceleration and provide a comfortable and agreeable ride to the passengers.
- 2 Meet required parameters in conjunction with dependable, consistent elevator operation and without undue wear or excessive maintenance over the life of the elevator installation.
- .3 Provide brake to brake time required to travel between 3350 mm floor not to exceed 5.1 seconds for 350 fpm car speed and not to exceed 6.4 seconds for 200 fpm car speed.
- .4 Set 1067 mm wide car doors to safely close in 2.4 seconds and open in 1.7 seconds. Set 1200 mm wide car doors to safely close in 4.5 seconds and open in 2.7 seconds.
- .5 Provide adjustable dwell times and independent dwell settings for car and hall calls.
- .1 Set the dwell times to 2 seconds for car, and 3 seconds for hall initially.
- .6 Maintain floor levelling accuracy of 5 mm or better.
- .7 Set door detector interrupt and nudging time to 20 seconds.
- .8 Limit cab noise levels to 60 dB when moving and 68 dB during a door operation cycle, as measured by a sound meter located in the centre of the

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cab and set on the "A" scale with an "F" response.

- .9 Limit horizontal vibrations in both the post-to-post and front-to-back axis to 20 milli-g in the 2 - 10 hz range.
- .10 Vertical and Horizontal vibrations along hoist-way enclosure, and car loading up and down movements must meet Lift Engineering Departmental Representatives approval prior to project completion.
- .11 Adjust typical acceleration rate to between 1.0 and 1.1 m/s².
- .12 Limit jerk rate (change in rate of acceleration) to 2.44 m/s².
- .13 Provide car speed to within 5% of contract speed in both directions.

PART 2 - PRODUCTS

2.1 Description of Elevators

- .1 The elevator system consists of one (1) AC Unit installed by CKG Elevators
- .2 Class: Passenger
- .3 Capacity: Elev. 6: Retain existing 2,500 pounds.
- .4 Speed: Elev. 6: Retain existing 200 fpm.
- .5 Control: Elev. 6: GAL Simplex Selective Collective Automatic.
- .6 Doors: Retain existing arrangements:
Elev. 6: 1067 mm wide, centre open.
- .7 Travel: Per existing site conditions. Serve floors:
Elev. 6: floors 0,1-4.

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- | | | |
|---|-------------------|---|
| 8 | Overhead: | Per existing site conditions
Elev. 6 - Approx. 3632 mm |
| | | |
| 9 | Pit Depth: | Per existing site conditions

Elev. 6 - Approx. 1232 mm |
| | | |
| | Special Features: | Independent service operation;
FEO operation, phase 1 and phase 2;
Emergency power operation - sequenced for duplex;
Monitoring and command feature at remote computer;
Retain any existing card reader functionality. |
| | | |
| | Signals: | Dupar US buttons
Car position indicators;
Hall position indicator at main landings front and rear;
New hall lanterns at all floors but with new electronic chime and LED illumination
Full compliance with Appendix "E" of CAN/CSA-B44 Safety Code for Elevators
All signals to be LED-illuminated |

2.2 Components

- .1 Use only major elevator components from existing standard product line of the same manufacturer of the existing elevator installation unless otherwise approved in writing by the Lift Engineering Departmental Representative
- .2 Use components only which have performed satisfactorily together under conditions of normal use in not less than three (3) other elevator installations of similar design and for a period of at least two (2) years. Furnish names and addresses of owners or managers of buildings, in which proposed combination of major components has so performed.
- .3 Major components are defined to include motors, motor drives, controllers and machines.
- .4 Furnish materials and equipment in new condition as directed by the Lift Engineering Departmental Representative in writing. New means that full two year warranty will apply once the final inspection certificate has been issued.

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- .5 Provide only system designs field tested for the application, with adequate capacity to meet all performance criteria and to provide long term, reliable operation.
- .6 Provide stainless steel to ASTM A480M, type 304, no. 4 satin finish .
- .7 Use paint with CGSB 1-GP-104Ma, alkyd enamel semi-gloss, for machinery, colour to be selected by Architect.

2.3 Electrical Components. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- 1 Furnish and install all new insulated wiring to connect all parts of the equipment including travelling cable, all wiring in hoistway, new components on car top and new wiring from disconnect switch to controllers and motors.
- .2 Use steel set screw type fittings where electrical metallic tubing is used.
- .3 Provide a communication system junction box on the outside of the controller appropriately identified. Provide shielded wiring from the assistance button in car and the speaker in the car to a junction box located at controller in machine room.
- .4 Provide a separately-identified box for the fire alarm connection.
- .5 Include at least 10% spare conductors in each cable. Tape and legibly identify all spare wires.
- .6 In travelling cable and terminating at controller and car station, include at least six (6) pairs of 18 gage twisted/shielded wires for audio or other electronic equipment. Include one (1) co-ax RG-59 for video signal.
- .7 Do not parallel conductors to increase current carrying capacity unless individually fused.
- .8 Install a separate green bond wire in all raceway, including EMT and flexible conduit.
- .9 Provide additional disconnect switches and wiring if required by Code, to suit new machine room layout.
- .10 Include wiring, and connections to elevator devices remote from hoistway and between elevator machine rooms.

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- .11 Connect all wiring where required to building fire alarm system.
 - .12 Limit use of flexible conduit on car top to items that require movement or periodic adjustment.
 - .13 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Wiring shall be run in metal conduit, metallic tubing or wire ducts.
 - .14 When using conduits or troughs through floor, extend conduit or trough at least 100 mm above floor.
 - .15 Do not run conduit or wiring along the pit floor. Install all conduit and wiring a minimum of 150 mm above pit floor.
 - .16 Existing trough or conduit may be retained where is serviceable condition.
 - .17 Use type ETT travelling cables.
 - .18 Suitably suspend the travelling cables to relieve strain in the individual conductors.
 - .19 Run 600 volt wiring in electrical metallic tubing or other galvanized steel raceway. Include a covered ground wire same size as feeders in the raceway.
 - .20 Fabricate wiring that is run in conduit or tubing to Table 6 of CEC Part 1.
- 2.4 **Sound Isolation. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Include resilient pads to effectively isolate machine from machine beams or flooring. Use a minimum of 37 mm thick pads. Do not use built-up pads.
 - .2 Prevent lateral displacement of machine.
- 2.5 **Car and Counterweight Guides. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**

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1. Equip passenger car and counterweight with roller guides, individually spring loaded, mounted on top and bottom of car and counterweight frames. Provide minimum diameter 150 mm (6") for car, 75 mm (3") for counterweight.
2. Provide each guide with durable, oil resistant and resilient tired ball bearing rollers to run on three finished rail surfaces.
3. Do not lubricate guide rails. Maintain each roller on its respective guide in uniform contact with rail surface at all times by means of substantial adjustable springs or by resilient mountings.
4. Provide guide operation, which is inaudible to passengers in car or outside hoistway with car operating at rated speed and car fan turned off.
5. Use roller tire material which will not develop flat spots after standing idle for 72 hours under average environmental conditions.

2.6 Guide rails and Brackets. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

1. Existing car and counterweight rails may be retained and refurbished if aligned to below noted standards. For new, provide car guide rails of 15 lbs/ft and counterweight rails of 8 lbs/ft minimum.
2. Align and file all joints.
3. Erect guide rails plumb and parallel within maximum deviation of 1.6 mm per any 6,000 mm section and 0.1 mm per any 25 mm section.
4. Use metal shims only and provide lockwashers under nuts and tapped bolts.
5. Compensate for expansion and contraction of guide rails.
6. Use splice plates and guide rails with contact surfaces accurately machined to form smooth joints.
7. Provide planed steel tees, erected plumb and fasten to hoistway by heavy steel brackets.
8. Use "T" shape tongue and groove rails, connect with steel splice plates.

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- .9 Extend rails to approximately 150 mm from underside of overhead machine beams.
- .10 Bolt or weld brackets directly to steel. Do not use clips.
- .11 In concrete structures, provide inserts in concrete formwork or self-drilling expansion shell bolt anchors for support of brackets. Where Departmental Representative considers any concrete fastener improperly installed either replace fastener or demonstrate stability of fastener by performing on site test under which fastener is subjected to four times manufacturer's safe pull out or working load. Use self-drilling expansion shell bolt.
- .12 Do not burn out fastening holes.
- .13 Where pits are waterproofed, anchor guide rails in pit so as not to reduce effectiveness of waterproofing.
- .14 Include steel reinforcement for car and counterweight guide rails where necessary.

2.7 Hoist Rope. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide new hoist ropes with fibre core from same factory production run in accordance with good practice and the CSA Elevator Code.
- .2 Provide springs on the counterweight end of hoist ropes.
- .3 Use approved type wedge clamp type sockets. clip approximately 50 mm (2") above top of wedge clamp, and second clip 100 mm (4") above first clip. Tape end of the wire rope.

2.8 Oil Buffers. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide new buffers oil for over 200 fpm car speed. Use non standard reduced stroke buffers and emergency terminal stopping devices where pit depth or overhead height does not permit installation of normal stroke buffers.

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- .2 Include buffer extensions where necessary to suit pit depth.
- .3 Provide a switch on each floor mounted car buffer to prevent operation of the elevator towards buffer if buffer does not return to normal position.
- .4 Mount any conduit approximately 300 mm (12") above pit floor. Suitably support this conduit.
- .5 The existing buffers for Elev. 3 can be retained including new oil, scraping of any corrosion and painting with two coats of rust-resistant paint.

2.9 Counterweight. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Existing counterweight frame and weights may be retained and refurbished including repairs and any adjustments needed to correct deficiencies and provide smooth quiet operation.
- .2 Provide counterweight of structural or formed metal frame type with metal or concrete filler weights equal to mass of complete car plus 40% to 42.5% of rated load. Provide rods through weights and frame.
- .3 Paint in contrasting colour the maximum run-by sign on guard.
- .4 Provide blocking under counterweight, where required.

2.10 Safeties and Governor. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Refurbish the existing safety gear including a thorough cleaning and lubrication of all moving parts except replace the winding drum safeties with Type B safeties for Elev. 6.
- .2 Provide new governors, governor ropes and governor tension sheaves.

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2.11 Gearless Machine. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide new geared machines with disk-type brake.
- .2 Provide single worm geared traction machine with motor, brake, gearing, and driving sheave mounted on or integral with cast iron or steel bedplate.
- .3 Use steel worm, integral with worm shaft with ball or roller bearing thrust unit to withstand worm thrust in both directions.
- .4 Design to permit removal of thrust unit without dismantling machine.
- .5 Hob gear from bronze rim and shrink fit or press and bolt to gear spider with fitted body bolts.
- .6 Include means for lubrication and provide oil tight inspection ports for worm gear face, gear contact and gear mounting bolts.
- .7 Design brake to be spring applied electromagnetically released and quietly operated by direct current. Clean and lubricate all brake pins.
- .8 Manufacture traction sheave thick enough to permit at least one re-machining of traction grooves.
- .9 Press and key sheave shaft into worm gear and traction sheave centre or fit integral traction sheave and worm gear centre to bearings on sheave shaft.
- .10 Provide gearing which operates without discernable noise and which causes no noticeable vibration in the car.
- .11 Minimize the size of cable holes in the machine room floor. Provide guards around cable holes.
- .12 Dowel all moveable components on any machine that is to be dismantled for transport to the machine room.
- .13 Use rectifiers to supply direct current for elevator machine brake, control and operating equipment.
- .14 For Elev. 6 only provide permanent magnet AC motor and integral sheave as recommended by control manufacturer - GAL. Include base and deflector as required.

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2.12 AC Motor. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Include AC reversible type motor designed for elevator service and recommended by manufacturer of drive, as follows:
- .2 Provide Class F or H insulation system.
- .3 Provide 60 minute duty based on 180 stops per hour.
- .4 Provide less than 3% slip at full load.
- .5 Thermally protect motor.
- .6 Provide high tensile (105,000 psi or better) steel shaft with 32 micro finish or better.
- .7 Impregnate windings with insulation and bake to prevent absorption of moisture and oil.
- .8 Provide not less than one megohm insulation resistance between motor windings and motor frame.
- .9 Provide sealed bearings. Do not use motor bearings as thrust for worm shaft.

2.13 Ascending Car Overspeed and Unintended Car Movement Protection. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Equip elevators with a safety device to provide UP direction car overspeed protection.
- .2 Equip elevators with protection against unintended movement outside of door zone.
- .3 Locate devices in the elevator machine room. Provide all hardware required to fasten safety device to machine room floor or machine bed plate including raising of machine bedplate if required. Use a fastenings and support design approved by a Professional Engineer authorized to practice in the province.

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- .4 Use only a Hollister Whitney Rope Gripper.
- .5 Design safety device to be capable of setting repeatedly without damaging itself of the elevator machine or ropes.
- .6 Arrange device to be reset from a single button so-indicated in the controller.
- .7 Employ spring-powered activation, pressurized fluid retraction.

2.14 Motor Drive. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide Variable Voltage Variable Frequency AC flux vector drive system. Design equipment to operate unaffected under minor levels of voltage fluctuations and harmonics generated from within and outside the building.
- .2 Make drive system capable of producing full torque at zero speed and utilize a shaft mounted position transducer to accurately monitor the rotating frequency.
- .3 Take power for system from existing building 3 phase power supply.
- .4 Change AC voltage to DC, and a power transistor inverter circuit will change the DC voltage to AC to power the elevator motor.
- .5 Control motor speed and torque by varying the frequency and amplitude of AC voltage.
- .6 Eliminate surges on the AC line which might cause blowing of the DC line fuses or which might cause trouble in other equipment connected to AC line. Filter DC if necessary.
- .7 Modify frequencies emanating from rectifier drive which are objectionable to personnel or which interact with any building equipment.
- .8 Produce no voltage distortion or notches in excess of the limits suggested in IEEE 519. Limit EMI through the use of shielding, efficient power conductor run and filters.
- .9 Provide stepless acceleration and deceleration and smooth operation at all speeds.

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- .10 Limit machine room noise level, with all elevators operating, to 70 dBA as measured from the centre of the machine room on an "S" response.
 - .11 Include braking of motor during deceleration by feeding power generated by motor, back to ac power lines. Failure of the drive's system to remove regenerated power shall cause the drive's output to be removed from the hoist motor.
 - .12 Provide closed loop tachometer feedback control. Continuously monitor the elevator speed signal from the velocity transducer and compare it with the intended signal to verify proper and safe operation of the elevator and to correct the actual elevator speed to match the intended speed.
 - .13 Automatically re-start equipment which has stopped due to ac power failure.
 - .14 Limit Voltage Total Harmonic Distortion to 2%, and limit any individual harmonics to 0.5%.
 - .15 Limit Current Total Harmonic Distortion to 5%, and limit any individual harmonics to 3%.
- 2.15 **Sheaves and Supporting Beams. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Existing deflector sheaves and beams may be retained and refurbished including new bearings and provided no tracking of sheave is evident at time of project substantial completion. Otherwise provide deflector sheaves, idler sheaves and overhead sheaves, including bearings and beams, necessary for roping arrangement.
 - .2 Provide sheaves of cast iron, accurately machined and grooved for the diameter of ropes used.
 - .3 Provide all sheaves sufficiently larger than that required by Code, in pitch diameter and thickness, to permit at least one regrooving of sheave.
- 2.16 **Controller and Cabinet. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Provide new GAL non-proprietary controllers with flux vector drive.
 - .2 Enclose the controller in enamelled, ventilated, sheet steel cabinet, with

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swing-type doors at front.

- .3 Provide relays and contactors particularly designed for elevator duty.
 - .1 Provide battery back-up for all circuits containing volatile memory.
- .4 Provide a suitable communication system junction box on the outside of the controller and identify it accordingly. Provide a separate identified box for the fire alarm connection and emergency power signal.
- .5 Cord all field wiring and insulate from metal contact.
- .6 Permanently identify all switches and relays.
- .7 Provide protection against reverse and open phasing of main feeders.
- .8 Include properly sized primary and secondary fuses for each transformer used in the controller. Provide a solid state controller equipped with programable logic microprocessor controls and self-diagnostic features.
- .9 Provide permanently marked junction studs in a designated area in the controller connecting all field wiring.
- .10 Include properly sized primary and secondary fuses for each transformer used in the controller.
- .11 Govern car motion control by means of real position of car in hoistway. Do not employ stepper relays.
- .12 Provide fully non-proprietary version of all control equipment including:
 - .1 All required diagnostic are "on board".
 - .2 All programming and diagrams required for long-term maintenance are provided with the controller.
 - .3 The controller will not shut down or alter its functionality in any way after a pre-determined increment of time or use.
 - .4 Any elevator contractor shall be allowed to purchase parts, supplies, diagrams, support or training directly from the factory at the same cost level as the original installer. A published price list shall be supplied with the controller.

- .5 Parts including circuit boards shall be available for direct purchase from the factory in numbers and not on an one-for-one "exchange only" basis.

2.17 Control and Performance. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide microprocessor based selective collective automatic operation to fully integrate and coordinate the movement of the elevators. Provide duplex control logic for Elev. 4 and 5, simplex for Elev. 3 and 6.
- .2 When lifting rated load, do not permit car speed to vary from rated speed by more than 5%.
- .3 Arrange each car so that momentary pressure of one or more of its car buttons causes car to start.
- .4 Do not start car unless the car door is in the closed position and all hoistway doors are locked in the closed position.
- .5 Allow only one car to stop in response to any one landing call.
- .6 Programmable options and parameters shall be stored in nonvolatile memory. As a minimum, there shall be a 32-character alphanumeric display to be used for programming and diagnostics.

The programmable parameters and options shall include, but not be limited to, the following:

- Number of Stops/Openings Served (Each Car)
- Programmable Fire Code Options
- Fire Floors (Main, Alternates)
- Floor Encoding (Absolute PI)
- Digital PIs/Single Wire PIs
- Programmable Door Times
- Programmable Motor Limit Timer
- Nudging
- Emergency Power
- Parking Floors
- Door Pre-Opening
- Hall or Car Gong Selection
- Attendant Service
- Anti-nuisance - Light Load Weighing and Photo Eye

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- .7 Each elevator shall have its own computer and dispatching algorithm. Should one computer lose power or become inoperative in any way, the other computer shall be capable of accepting and answering all hall calls. When both computers are in operation, only one shall assume the role of dispatching the hall calls to both elevators.
- .8 The dispatching algorithm for assigning hall calls shall be real time, based on estimated time of arrival (ETA). In calculating the estimated time of arrival for each elevator, the dispatcher shall consider, but is not limited to, location of each elevator, direction of travel, existing hall call and car call demands, door time, flight time, lobby removal time penalty and coincidence calls.
- .9 The controller shall have field programmable outputs to activate different functions based on customer needs. These functions can be outputs such as those listed below.
 - Fire Phase I Return Complete Signal
 - Fire Phase II Output Signal
 - Hall Call Reject Signal
 - Emergency Power Return
- .10 The controller shall have a serial port for communication with any data or computer terminal such as a CRT terminal, modem, etc.
- .11 The controller shall have an RFI Filter to help reduce EMI and RFI noise.

2.18 Automatic Emergency Power Operation. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 The emergency power system shall be arranged by the Owner so that:
 - .1 The emergency power will be provided on the same lines and the same disconnect as the normal power.
- .2 Arrange elevator circuits, wiring and controls so that:
 - .1 A signal light marked "ELEVATOR EMERGENCY POWER" is illuminated in the main lobby control panel and at the central alarm and control facility.
 - .2 Any car delayed by some malfunction is by-passed.
 - .3 Elevator control equipment and motor drive are not damaged on transfer to and from emergency power.

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- .4 For duplex, on Automatic setting, the second elevator will continue to operate on emergency power after the first has been recalled.
- .3 For duplex elevators provide a switch marked AUTO - 1 - 2 for emergency power selection. Engrave faceplate "ELEVATOR EMERGENCY POWER".
- .4 Make any necessary modifications to the transfer switch to provide an advance warning signal as required.

2.19 Phase I Emergency Recall Operation. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide for all cars emergency recall service which will be initiated automatically or manually by any recall switch. When recall has been initiated:
 - .1 The elevator controlled by the recall switch and on automatic operation, including independent service operation, shall return directly to the recall level where the doors shall open and remain open. The elevator shall not respond to the landing or car call buttons. Travelling to a terminal landing first and then reversing to travel to the recall level is not acceptable.
 - .2 The elevator that is stopped with the doors closed, or is travelling towards the recall level, shall proceed non-stop to the recall level.
 - .3 The elevator travelling away from the recall level shall reverse at or before the next available landing without opening its doors.
 - .4 A car stopped at a landing shall have its emergency stop switch rendered inoperative as soon as the doors are closed and the car starts to move. A moving car shall have its emergency stop switch rendered inoperative.
 - .5 All call registered lights and directional lanterns shall be extinguished and remain inoperative. Position indicators, in the car and at the recall level, should remain in service.
 - .6 The car shall be provided with a visual and audible signal system which shall be activated to alert passengers that the car is on the emergency recall operation and at least the visual signal shall remain operative until the car reaches the recall level.

- .7 An elevator stopped at a floor other than the recall level with doors open shall close its doors and proceed non-stop to the recall level.
- .8 Door re-opening devices that may be affected by smoke or hot gases shall be rendered inoperative.
- .9 If the elevator is on inspection operation, a signal shall warn the inspector to return the car to the recall level. The elevator shall remain under the control of the inspector.
- .10 The recall operation shall be terminated when both switches at the main control panel and lobby panel are in the "RESET" or "OFF" position, as is appropriate.
- .11 Include for connecting the fire alarm signal through the recall switch.

2.20 Phase II Emergency In-Car Operation. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide in-car emergency service for each elevator initiated by a key switch located in the car. The switch shall be marked "OFF - HOLD - ON" and the key shall be removable in the OFF and HOLD positions. The switch shall become effective in initiating in-car emergency operation when in the "ON" position, provided the emergency recall operation is in effect and the car has returned to the recall level. During emergency in-car operation, the elevator shall operate as follows:
 - .1 The elevator shall be operable only by a person in the elevator.
 - .2 The elevator shall not respond to elevator landing calls.
 - .3 The opening of power-operated doors shall be controlled only by continuous pressure on the "DOOR OPEN" button. If the "DOOR OPEN" button is released during the "OPEN" motion, the door shall reclose immediately. When doors are fully open, they shall remain open until closed as in point 5.
 - .4 Door re-opening devices for power-operated doors shall be rendered inoperative.
 - .5 The doors shall be closed and the car started by registering a car call and constant pressure on the "DOOR CLOSE" button or on any car call button.

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- .6 Momentary operation of the in-car emergency service switch to the "HOLD" position shall cancel registered car calls.
- .7 When the car is at a landing and the key switch in the car is turned to the "HOLD" position, the doors shall remain open and car calls cannot be registered.
- .8 When the car is at a landing and the key switch in the car is turned to the "OFF" position, the car shall automatically return to the recall level as on emergency recall operation regardless of the position of the emergency recall switch.
- .9 The elevator shall be returned from In-car operation only when the car is at the recall level and the in-car switch is in the "OFF" position.

2.21 Independent Service. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Include independent service by means of key-operated switch in car service panel to allow removal of a car from group service and to operate independently in response to car calls only and as follows:
 - .1 Render the hall lanterns and/or car riding lanterns inoperative.
 - .2 Cause the car to park with the doors open. Arrange the controls so that the car responds to any car calls registered if a button is held until the doors are closed and the interlocks made-up.
 - .3 Cause the doors to reopen if the button is released at any time up to the point at which the elevator starts to move. Render inoperative the normal door protective devices.
 - .4 Cancel all registered car calls when the direction reverses or a car

2.22 Load Weighing. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide load weighing with means to measure the load in the car within 5% of the elevator capacity.

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- .2 Adjust the load weighing device to ensure that it will operate over the required range of settings.
- .3 Verify that the load weighing device has a long term stability such that the settings do not require re-adjustment more frequently than every two years.
- .4 Use load weighing to pre-torque elevator and prevent movement in reverse direction when leaving a floor. Ensure minimum movement of the car when being loaded. **NOTE:** This feature must meet Lift Engineering Departmental Approval prior to final project approvals.

2.23 Access to Pit, Hoistway and Top of Car Inspection. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 At the top landing for all elevators, provide keyed-access to car top.
 - .1 Provide between car crosshead and hoistway door, a single operating fixture containing the following: 120 volt GFI Fixture, an emergency stop switch, continuous pressure buttons for operating the car and a switch for making the buttons on top of the car operable. Operation from top of the car shall be obtained by simultaneous, continuous pressure of the appropriate direction button and a safety operating button after these buttons have been made effective.
 - .2 Operation from top of the car shall not be possible unless all electric door contacts are closed.
 - .3 Means shall also be provided so that when the car is to be operated from the top of the car, automatic levelling, power door operation and the normal operating devices car and landing are made ineffective.
 - .4 Arrange circuits to prevent car moving away, when on top of car operation, by any other means.
 - .5 Limit the speed of the elevator shall be not more than .76 m/s and not less than 0.25 m/s.
- .2 At all landings provide a hoistway door unlocking device. Provide a stainless steel collar for holes except provide bronze in bronze finished doors.
- .3 Provide a car top railings on all non-access sides of the elevator car top except where the distance to a rear wall does not exceed 356 mm. Include for an intermediate rail and toe board. Paint the railing yellow.

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2.24 Work Lights and Receptacles. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide suitable protected light fixtures.
- .2 Provide two (2) protected light fixtures on car top. One light to be a moveable unit to be used as a hand-held light.

2.25 Emergency Lighting. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Include emergency lighting in the cars, with a minimum of two (2) fixtures.
- .2 Use battery operated emergency lighting equipment to CSA C22.2 No. 141, to provide general illumination and 10 Lx minimum illumination at car operating panel.
- .3 Include means for convenient manual operation and testing of the unit from within car. Testing means to be spring loaded or self-centring key switch.
- .4 Design battery unit of sufficient strength to support 90 KG person without causing malfunction or damage.
- .5 Include means of containing any leakage or spillage of electrolyte.
- .6 Arrange battery unit as a source of power for alarm bell during power failure.

2.26 Car Platform. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Existing steel platform may be retained and refurbished including the correction of all deficiencies such as broken welds.

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- 2.27 Car Frame. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Existing car frame may be retained and refurbished including the correction of all deficiencies such as broken welds.
- 2.28 Passenger Car. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Provide new hands-free autodial telephones. Provide an auto-dial hands-free telephone complete with wiring back to machine space. Provide telephone compliant with B44 2.27.1.1. Include readily accessible communication fixture. Provide conductors and pulled as required between the elevators and the communications fixture mounted in the hall.
 - .2 Provide new cab fans.
 - .3 Provide new nickel-silver car sills (except for Elev. 6).
 - .4 For Elev. 6 provide a new ceiling of low-voltage halogen set in a bronze pan.
- 2.29 Car Doors. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Provide all new car doors with (2) new lower guides on each car door panel. Hangers, tracks and car doors may be retained. Provide new hanger rollers. Provide new air cords and steel hanger rollers with nylon inserts.
- 2.30 Fire Rated Elevator Entrances. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Examine existing entrances and repair minor defects. Report major defects in writing.

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- 2.31 Flush Type Hoistway Doors. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Retain and refurbish landing doors.
- 2.32 Hoistway Door Hangers, Locks, Tracks and Closing Devices. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Existing hangars and tracks (but not locks and closers) may be retained and refurbished including provision of new hangar rollers and cleaning of tracks. Use self-lubricating ball or roller bearings sealed to retain grease lubrication and wipers to maintain rollers and track in clean condition. If compatible with new system, existing hall door sheaves may be retained. Supply all new air cord and sheave guards.
- .2 Provide spring-type, sill-mounted closing devices or alternatively heavy-duty spirator devices.
- .3 Provide positive electric interlocks and door closing devices. Provide new wiring to door locks including a separate green ground wire back to controller.
- .4 Provide new low-friction lower guides. Provide door safety retainers to prevent door panel displacement should the replaceable primary guiding means fail.
- .5 Dowel all hoistway door pick-up roller assemblies after final adjustments have been made.
- .6 Provide all new astragals. Adjust any loose site guards.
- 2.33 Car and Hoistway Door Operator. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)**
- .1 Provide a heavy-duty door operator to open and close the car and hoistway doors quietly and smoothly. Provide high speed, electric door operator, with solid state feedback (closed loop) control. Use only G.A.L. MOVFR. Provide door open speed of at least 2 fps.
- .2 Operate the car door and hoistway doors simultaneously.

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- .3 Provide electrical cushioning at each end of travel.
- .4 Provide two (2) gate switches per center parting car door opening, operated by a roller attached to the door panel.

2.34 Car Door Protective Devices. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide a three-dimensional sensing, solid state door reversal device on the leading edge(s) of car door panel(s). The device shall contain systems specifically designed for the application and enclosed in an insulated chassis. Arrange the device to:
 - .1 Provide long term reliable operation, include no moving parts;
 - .2 Upon failure of the device, shut the car down at the next available floor, with doors in the fully open position;
 - .3 Provide totally silent operation;
 - .4 Include visible diagnostics on the device to permit verification that the unit is functioning;
 - .5 Have all components installed behind the door jamb, so as to provide a clear opening and present a clean architectural appearance.
- .2 Design the device to provide a zone of detection a minimum of 75 mm in advance of the leading edge of each car door and arrange the operation as follows:
 - .1 Trigger the protection system when any object is located in the entrance and cause the door to reopen without engaging the object;
 - .2 Permit the protection system to be active over the full travel of the doors;
 - .3 After elapse of the normal door open dwell time, provide a limited door reversal operation. Arrange the operation so that the door retracts sufficiently to permit only the immediate entering passenger to pass. Continue closing of the door after the passenger leaves detection zone.

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2.35 Hall Sills. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Retain and refurbish sills as required to provide smooth and quiet door operation.

2.36 Fascias and Toeguards. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Existing fascia may be retained and refurbished including thorough cleaning and re-fastening of any loose connections. Replace any fascia that cannot be thoroughly cleaned of corrosion.
- .2 Provide new extended toeguards, 1219 mm in length, made of rust resistant material or alternatively painted with two-coats of rust-resistant paint.

2.37 Identification.

- .1 Provide 100 mm (4") numerals corresponding to floor level on hoistway side to fascia plates and locate numerals as required by Code.
- .2 Provide all bilingual engraving on faceplates as required by the Departmental Representative in Helvetica medium, upper and lower case.
- .3 Provide 50 mm (2") numerals on all elevator equipment.
- .4 Identify all elevators at recall level. Use formed metal or aluminum-coloured plastic numerals 75 mm in height and 10 mm thick. Final location and form to be confirmed at time of shop drawing review.
- .5 Provide six (6) keys of each type used with key rings and engraved gravoply discs, identifying use of key.

2.38 Car Direction Signal. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Retain existing hall lanterns above each hoistway entrance.
- .2 Refurbish hall lanterns with new lexan covers and new LED illuminated bulbs.

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- .3 Provide new electronic chimes to sound with the illumination of direction arrows. Chime to sound once to indicate UP direction and twice for DOWN. Provide clear tone at 30 dBA approximately 8 feet from fixture. Chime to be adjustable.
- .4 Provide new green illumination for up and red for down by LED.
- .5 Provide new faceplates in stainless steel or bronze as required to match adjacent finishes.

2.39 Hall Button Fixtures. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide new DUPAR US buttons including providing LED illumination.
- .2 Illuminate each button in the hall fixture when pressed to indicate a call has been registered and maintain illumination until the call has been answered.
- .3 Provide at height compliant with Appendix E of CSA B44.
- .4 Provide new faceplates as stainless steel or bronze as required to match adjacent finishes (Elev. 4, 5 and 6 to be bronze at all landings).

2.40 Position Indicators and Voice Annunciation. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Install a new digital display position indicator in each car. Locate at existing faceplates.
- .2 Use characters at least 40 mm high. Provide LED illumination.
- .3 Provide a matching new digital display hall position indicators at main floor for all elevators.
 - .1 Locate new position indicators in location approved by Departmental Representative.
- .4 Provide voice annunciation indication of each floor, when served and of car direction. Provide volume control adjustable from behind car station. Provide high-power speakers, minimum of two (2) per car so no distortion is

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readily noticeable to passengers. Provide sample of annunciations, to be in English, and French with shop drawings.

2.41 Car Operating Station. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide new car operating stations in place of existing. Incorporate a lockable service cabinet into car operating station. Service panel to be at top of car operating panel. Provide in the service cabinet key operated switches for lighting, fan, emergency light test and independent service. Provide one spare key switch.
- .2 Provide new faceplates as stainless steel or bronze as required to match adjacent finishes (Elev. 4, 5 and 6 to be bronze).
- .3 Engrave all characters on plate and fill with enamel.
- .4 Provide DUPAR US91 or equivalent to Departmental Representative LED illuminated stainless steel floor buttons, one for each floor served. Provide flush mounted tactile identification at side of button. Provide audible call registration for buttons.
- .5 Locate top floor button to be no more than 1220 mm above floor.
- .6 Provide a key operated stop switch, an alarm button, door open and close buttons, three position key switch for in-car emergency service, indicator light and buzzer for emergency recall.
- .7 Make all identification engraved in upper or lower case, Helvetica medium, minimum 10 mm filled with red or black enamel, as required.
- .8 Engrave the maximum capacity in kilograms and persons and Provincial Installation number on the car station.
- .9 Engrave the elevator number (ex. "2") on the car station, number to be 25 mm high.
- .10 Use international symbols wherever possible.
- .11 Provide a speaker and grill in the car-operating station complete with Assistance button. Provide an auto-dial telephone behind the return panel and all associated wiring back to the controller-mounted junction box. Program the telephone to dial the number provided by the Departmental Representative.

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- .12 Retain functionality of existing card-reader systems including paying and co-ordinating security contractor subcontract.

2.42 Terminal Stopping Devices. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Provide an automatic stopping device, arranged to bring car to a stop at the terminal landings independent of the regular operating device in the car.
- .2 Dowel final limits to main rails.

2.43 Signal Illumination. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Illuminate signal fixtures with intensity which produces distinct and well defined indications.

2.44 Fixture Fastening. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Fasten all fixture faceplates, including car-operating station, with tamper-proof screws.

2.45 Bilingual Markings

- .1 Engrave identification and instructions at least 0.03 mm deep on operating panels and on all signal equipment in both official languages except where design is such that inference is obvious and readily understood. Submit markings and designs for approval.

2.46 Monitoring Control and Diagnostics

Refer to separate section distributed with this tender.

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2.47 Occupational Health and Safety Act

- .1 Meet Occupational Health and Safety Act - finished elevator installations are to have appropriate guards and be Health-and-Safety-regulation compliant with respect to physical and electrical hazards to persons in the elevator machine rooms).

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PART 3 - EXECUTION

3.1 Procedure

- .1 Obtain Departmental Representative's approval before removing an elevator from group operation.
- .2 Modernize the elevators sequentially and not concurrently.
- .3 In the instance that one elevator stops operating normally during the modernization of other elevator, utilize the on-site service crew to immediately assist any trapped persons and restore one of the elevators to operation.
- .4 Provide a maximum response time of 40 minutes, 24 hours a day and seven days a week, to occurrences in which the only operating elevator malfunctions. Be responsible for all overtime labour costs.
- .5 Allow for a "run-in" period of three (3) days after the first modernized car is returned to service before removing the second car from service.
- .6 Schedule Work so as to not remove two elevators from service at one time. If necessary, obtain Departmental Representative's written approval for the time this will be undertaken. Be responsible for all overtime labour costs.

3.2 Inspection

- .1 Before fabrication of equipment, survey hoistway, pit and machine room.
- .2 Confirm electrical power is available and of correct characteristics.
- .3 Report defects in writing to the Lift Engineering Departmental Representative.

3.3 Welding

- .1 Where welding is used for cylinder and pressure piping, prepare joints and weld in approved manner using welders fully qualified to the requirements of CSA Standard W47.1.
- .2 Identify field welds with welder's identification stamp.

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3.4 Installation

- .1 Place machines directly adjacent to hoistway in existing machine rooms.
- .2 Provide all necessary fastenings, bearing plates and transfer arrangement to accomplish appropriate tie-down of machines to the machine room layout.
- .3 Arrange equipment in machine room so functioning equipment and other equipment can be removed for repairs or replacement without dismantling or removing other equipment components. Arrange for clear passage to access door.
- .4 Erect guide rails using metal shims with lockwashers under nuts and threaded bolts. Compensate for expansion and contraction of guide rails.
- .5 Use splice plates and guide rails with contact surfaces accurately machined to form smooth joints.
- .6 Provide inserts for placement in concrete form work or self drilling expansion shell bolt anchors that will perform to four times rated pull-out load.
- .7 Install hoistway door sills, frames and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
- .8 Mount copy of master schematic wiring diagrams in framed glass or plastic enclosure on machine room wall. If number of wiring drawings exceeds five (5), then mount drawings protected with clear plastic on rack permanently attached to machine room wall.
- .9 Cut existing surfaces as required to accommodate new work. patch and make good surface cuts, damaged or disturbed, to Departmental Representative's reasonable approval. Match existing material, colour, finish and texture.

3.5 Storage

- .1 Co-ordinate delivery and storage of materials with Departmental Representative's site representative.

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3.6 Occupied Building

- .1 Make allowances for the Work being carried out in an occupied building.
- .2 Take proper care to avoid unnecessary noise, clutter or obstruction in the corridors and arrange for storage of materials and tools where they will cause minimum inconvenience.
- .3 Do not use solvents or other products in quantity that is objectionable to building tenants.
- .4 Where excessive noise or obstruction as determined by Departmental Representative is unavoidable, make arrangements with the Departmental Representative to complete that portion of the Work after hours.
- 5 Normal working hours to be 8:00 AM - 4:00 PM each Monday through Friday other than International Union of Elevator Constructors holidays. Staff the Work with a minimum of two employees each day for the duration of the project, except as explicitly directed otherwise by these Specifications or by the Departmental Representative.
- .6 Provide dust tight screens or partitions to localize dust generating activities and for protection of workers, finished areas of work and public.
 - .1 Maintain and relocate protection until such work is completed.
 - .2 Protect Owner's property adjacent to work area with low fire spread tarps or screens during construction. Remove protection during non-construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function.
- .7 Comply with Canadian Code for Construction Safety and the Provincial Construction Safety Act.
 - .1 Provide a solid partition in the hoistway between the elevators during the course of the Work. Partition to be securely fastened in place to prevent movement as elevators travel in the hoistway. Partition to run from top to bottom of hoistway and front to rear of hoistway.
 - .2 Erect hoarding at each floor where there is an unlocked elevator hoistway door. Install plywood hoarding at landing entranceways from floor to ceiling. Plywood to be a minimum of 13 mm thick. Hoarded work space to be at least as wide as the elevator entrance opening and should create a work space inside hoardings of at least 1220 mm deep. Securely fasten hoarding to wall.

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- .3 Upon removal of hoardings and partition make good all damage to surfaces of walls, floors and ceilings.
- .4 Use hoarded entranceways, and not the in-service elevator, for movement of equipment or garbage.
- .5 Protect existing floors by covering with 13 mm plywood and tarpaulins as a minimum, when removing or delivering materials.
- .6 Do not remove partition or hoarding until Work is complete and approval is given by the Departmental Representative.
- .7 Confirm that any existing structural beams are safe and suitable before lifting loads.

3.7 Field Quality Control

- .1 Perform and meet tests required by CAN/CSA-B44 2010 Safety Code for Elevators Section 8.10.2.2 providing a check-off list with name of qualified inspector and date completed for each applicable item. Supply instruments and carry out these and other tests specified herein.
- .2 Provide 2 days written notice to Departmental Representative of date and time of tests.
- .3 Have a copy of the Specifications on site and available to the installation mechanic.
- .4 Provide Departmental Representative with copy of all speeds and current readings taken at the time of the provincially-mandated inspection.

3.8 Cleaning

- .1 Completely remove protective coverings from finished surfaces and components.
- .2 Clean surfaces and components before project completion.
- .3 Provide complete cleaning of all retained components including hoistway interiors.

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.9 Painting. (Existing can only be retained if deemed undamaged, and deemed in new condition once reviewed, inspected and approved in writing by the Lift Engineering Departmental Representative.)

- .1 Paint the following equipment:
 - .1 Car tops and crossheads.
 - .2 Rails and strut angles and fascia plates.
 - .3 Machine room floors and walls.
- .2 Use paint materials listed on the CGSB qualified products list only.
- .3 Paint materials for each coating formulae to be products of a single manufacturer.
- .4 Prepare masonry, stucco and concrete surfaces to CGSB 85-GP-31M.
- .5 Prepare concrete floors to CGSB 85-GP-32M.
- .6 For concrete block and poured concrete walls and ceilings apply:
 - .1 One coat primer-sealer CGSB 1-GP-119M-Amdt-Sep-80.
 - .2 Two coats semi-gloss enamel CGSB 1-GP-57M.
- .7 For concrete floors apply:
 - .1 One coat enamel CGSB 1-GP-66M reduced by addition of 1 part CGSB 1-GP-70M thinner to eight parts enamel.
 - .2 One coat enamel CGSB 1-GP-66M.

3.10 Hoistway Projections and Fascia

- .1 Provide bevelling for projections or recesses.

3.11 Burning Torches

- .1 Do not employ burning torches in the work. Work with burnt-out holes will be rejected.

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3.12 **Consultant**

- .1 The Consultant will carry out one (1) Final Inspection. Other inspections required due to the Elevator Contractors' failure to completely correct deficiencies the responsibility of the Elevator Contractor may be deducted from the contract value.
- .2 Furnish competent and co-operative mechanics for inspections and acceptance tests as the Consultant reasonably requires. Allow up to 8 hours of on site assistance. Expect to have work briefly interrupted during progress inspections by the Consultant.
- .3 The Consultant is retained for the convenience of the Owner and/or the Architect and the work of the Consultant shall not relieve the Contractor of any of his duties or responsibilities.

3.13 **Notification to Departmental Representative**

Notify the Departmental Representative as follows:

- .1 One week prior to commencement of work.
- .2 On delivery of materials to site.
- .3 On placing of machine and controllers.
- .4 On establishment of a moving platform.
- .5 On booking of each Provincial inspection.
- .6 On completion of all deficiencies.

3.14 **Demonstration of Operation**

- .1 In the presence of the Departmental Representative, during silent hours of the building, demonstrate:
 - .1 Independent Service Operation.
 - .2 Emergency power operation;
 - .3 Emergency recall and in-car emergency service;

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- .4 Audio Equipment;
 - .5 Dispatching features.
 - .6 Monitoring and Control features.
 - .7 Full car and system operation features as required by the Lift Engineering Departmental Representative.
- .2 Train Owner's forces on operation of system in two (2) half-day sessions, conducted by a trainer himself/herself fully trained in all user interfaces to the elevator system.

3.15 Commissioning

- 1 Attend at job site meetings pertaining to the Work.
- .3 After Provincial inspection of each elevator and before turn-over for customer use, test elevators in continuous simulated automatic operation without passenger access.
- .1 Test for at least (1) hour with no load operating from floor to floor, with or without door operation.
 - .2 Test for at least (1) hour with 100% load operating from floor to floor, with or without door operation.
 - .3 Test for two (2) consecutive hours operating from floor to floor with door operation. Provide barricades and signage to indicate that an elevator test is in progress.
- .4 Before turn-over for customer use, test elevators as following:
- .1 Running current in up direction with 42% car load.
 - .2 Running current in down direction with 42% car load.
 - .3 Governor overspeed setting.
 - .4 Safety trip setting.
 - .5 Door timings and dwell settings.
 - .6 Operating speed up.

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- .7 Operating speed down.
- .8 Door close force.
- .9 Door time-out.
- .5 During warranty maintenance period closely monitor equipment for malfunctions and track reliability. Achieve a target rate of no more than 0.5 malfunction per elevator per month. Not achieving a reliability rate of 1.0 malfunction per elevator per month during the three month period preceding the expiration of the warranty maintenance period will extend the warranty maintenance, including full parts and labour, on the malfunctioning elevator(s) only until the (moving window) 90 day reliability target has been achieved.

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Table 1 - Commissioning Data to Be Submitted by Contractor - per car

PARAMETER	MEASURED
Car speed UP 125% load (fpm)	
Car speed DOWN empty (fpm)	
Brake to Brake UP (sec)	
Brake to Brake DOWN (sec)	
Running current UP 42% car load (amps)	
Running current DOWN 42% car load (amps)	
Door open (sec)	
Door close (sec)	
Car call dwell (sec)	
Hall call dwell (sec)	
Governor pull through (pounds)	
Governor overspeed switch, mechanical (fpm)	
Governor overspeed switch, electrical (fpm)	
Safety trip speed (fpm)	
Door stall force (pounds)	
Door timeout (sec)	

- end of section -