

DFO Elevator Upgrade  
IOS Building  
Sidney, BC  
Project No. 9R114



January 2016

INDEX TO SPECIFICATIONS

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PART 1 - GENERAL

1.1 RELATED  
REQUIREMENTS

.1 Division 14.

1.2 ACCESS AND  
EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.3 USE OF SITE AND  
FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work; provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Use only elevators, dumbwaiters, conveyors or escalators existing in building for moving workers and material.  
.1 Protect walls of passenger elevators, to approval of Departmental Representative prior to use.  
.2 Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 Closures: protect work temporarily until permanent enclosures are completed.

1.4 ALTERATIONS,

.1 Execute work with least possible interference or

ADDITIONS OR  
REPAIRS TO EXISTING  
BUILDING

disturbance to building operations and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.5 EXISTING  
SERVICES

- .1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 7 days of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3 Provide safe access and egress for personnel and vehicular traffic.

1.6 SPECIAL  
REQUIREMENTS

- .1 Paint and carpet public or Departmental Representative occupied areas Monday to Friday from 18:00 to 07:00 hours only and on Saturdays, Sundays, and statutory holidays.
- .2 Carry out noise generating Work Monday to Friday from 18:00 to 07:00 hours and on Saturdays, Sundays, and statutory holidays.
- .3 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .4 Keep within limits of work and avenues of ingress and egress.
- .5 Ingress and egress of Contractor vehicles at site is limited. To be discussed with the Departmental Representative during pre-construction start-up meeting.
- .6 Deliver materials outside of peak traffic hours 17:00 to 07:00 and 13:00 to 15:00 unless otherwise approved by Departmental Representative.

1.7 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security:
  - .1 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.
  - .3 Security escort:
    - .1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.
    - .2 Submit an escort request to Departmental Representative at least 14 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.
    - .3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 4 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.
    - .4 Calculation of costs will be based on average hourly rate of security officer for minimum of 8 hours per day for late service request and of 4 hours for late cancellations.

1.8 BUILDING  
SMOKING ENVIRONMENT

- .1 Comply with smoking restrictions. Smoking is not permitted.

PART 1 - GENERAL

1.1 RELATED  
REQUIREMENTS

.1 Division 14.

1.2 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Provincial Regulations

.1 Occupational Health and Safety Act

1.3 ACTION AND  
INFORMATIONAL  
SUBMITTALS

.1 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.2 Submit three copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and or authority having jurisdiction, daily.

.3 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.4 Submit copies of incident and accident reports.

.5 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor. Revise plan as appropriate and resubmit plan to Departmental Representative.

.6 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed

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as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

- .7 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- .8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

#### 1.4 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

#### 1.5 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

#### 1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

#### 1.7 REGULATORY REQUIREMENTS

- .1 Do Work in accordance with local Regulatory Requirements.

#### 1.8 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
  - .1 Departmental Representative

#### 1.9 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

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- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- 1.10 RESPONSIBILITY
- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- 1.11 COMPLIANCE REQUIREMENTS
- .1 Comply with Occupational Health and Safety Act, Occupational Health and Safety Regulations.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.
- 1.12 UNFORSEEN HAZARDS
- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.
- 1.13 HEALTH AND SAFETY CO-ORDINATOR
- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
- .1 Have site-related working experience.
- .2 Have working knowledge of occupational safety and health regulations.
- .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and



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Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of Registered Occupational Hygienist and or site supervisor.

1.14 POSTING OF  
DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

1.15 CORRECTION OF  
NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.16 POWDER  
ACTUATED DEVICES

- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.17 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

PART 1 - GENERAL

1.1 FIRE DEPARTMENT  
BRIEFING

- .1 Departmental Representative will co-ordinate arrangements for contractor for briefing on Fire Safety at pre-work conference by Fire Chief before work is commenced.

1.2 REPORTING FIRES

- .1 Know location of nearest fire alarm box and telephone, including emergency phone number.
- .2 Report immediately fire incidents to Fire Department as follows:
  - .1 Activate nearest fire alarm box; or
  - .2 Telephone.
- .3 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify location.

1.3 INTERIOR AND  
EXTERIOR FIRE  
PROTECTION AND  
ALARM SYSTEMS

- .1 Fire protection and alarm system will not be:
  - .1 Obstructed;
  - .2 Shut-off; and
  - .3 Left inactive at end of working day or shift without authorization from Fire Chief.
- .2 Fire hydrants, standpipes and hose systems will not be used for other than fire-fighting purposes unless authorized by Fire Chief.

1.4 FIRE  
EXTINGUISHERS

- .1 Supply fire extinguishers, as scaled by Fire Chief, necessary to protect work in progress and contractor's physical plant on site.

1.5 INSTALLATION  
AND/OR REPAIR OF

- .1 Notify Fire Chief of location of asphalt kettles and dates that kettles will be in use. Ensure personnel use

ROOF TO INCLUDE  
CONTRACTORS  
PHYSICAL PLANT AT  
SITE

and take precautions as follows:

- .1 Use kettles equipped with thermometers or gauges in good working order.
- .2 Locate kettles in safe place outside of building or, if approved by Fire Chief, on non-combustible roof. Locate to avoid danger of igniting combustible material below.
- .3 Maintain continuous supervision while kettles are in operation and provide metal covers for kettles to smother flames in case of fire. Provide fire extinguishers as required in 1.4.
- .4 Prior to start of work, demonstrate container capacities to Fire Chief.
- .5 Use only glass fibre roofing mops.
- .6 Do not leave used roofing mops unattended on roof. Store mops away from building and combustible materials.
- .7 Store roofing materials no closer than 3 m to structures.

1.6 BLOCKAGE OF  
ROADWAYS

- .1 Advise Fire Chief of work that would impede fire apparatus response. This includes violation of minimum overhead clearance, as prescribed by Fire Chief, erecting of barricades and digging of trenches.

1.7 SMOKING  
PRECAUTIONS

- .1 Observe smoking regulations.

1.8 RUBBISH AND  
WASTE MATERIALS

- .1 Keep rubbish and waste materials at minimum quantities.
- .2 Burning of rubbish is prohibited.
- .3 Removal:
  - .1 Remove rubbish from work site at end of work day or shift or as directed.
- .4 Storage:
  - .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.
  - .2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove specified.

1.9 FLAMMABLE AND  
COMBUSTIBLE LIQUIDS

- .1 Handling, storage and use of flammable and combustible liquids governed by current National Fire Code of Canada.
- .2 Keep flammable and combustible liquids such as gasoline, kerosene and naphtha for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of Fire Chief.
- .3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.
- .4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.
- .5 Do not use flammable liquids having flash point below 38 degrees C such as naphtha or gasoline as solvents or cleaning agents.
- .6 Store flammable and combustible waste liquids, for disposal, in approved containers located in safe ventilated area. Keep quantities minimum and Fire Department is to be notified when disposal is required.

1.10 HAZARDOUS  
SUBSTANCES

- .1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, in accordance with National Fire Code of Canada.
- .2 Obtain from Fire Chief a "Hot Work" permit for work involving welding, burning or use of blowtorches and salamanders, in buildings or facilities.
- .3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of Fire Chief. Contractors are responsible for providing fire watch service for work on scale established and in conjunction with Fire Chief at pre-work conference.
- .4 Provide ventilation where flammable liquids, such as lacquers or urethanes are used, eliminate sources of

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ignition. Inform Fire Chief prior to and at cessation of such work.

1.11 QUESTIONS  
AND/OR  
CLARIFICATION

- .1 Direct questions or clarification on Fire Safety in addition to above requirements to Fire Chief.

1.12 FIRE  
INSPECTION

- .1 Co-ordinate site inspections by Fire Chief through Departmental Representative.
- .2 Allow Fire Chief unrestricted access to work site.
- .3 Co-operate with Fire Chief during routine fire safety inspection of work site.
- .4 Immediately remedy unsafe fire situations observed by Fire Chief.

1.13 HOT WORKS

- .1 Comply with IOS site Hot Works policies.

PART 1 - GENERAL

1.1 RELATED  
REQUIREMENTS

.1 Division 14.

1.2 REFERENCES

.1 Definitions:

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

.2 Reference Standards:

.1 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations (including Addendum 2007).

.2 Rating System Addenda for New Construction and Major Renovations LEED Canada-NC Version 1.0-Addendum 2007.

.3 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

.4 LEED Canada 2009 for Design and Construction-2010, LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide

.5 LEED Canada for Existing Buildings, Operations and Maintenance-2009, LEED Canada 2009 Leadership In Energy and Environmental Design Green Building Rating System Reference Guide.

.2 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-2008 Stipulated Price Contract.

.3 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832/R-92-005-92, Storm Water

Management for Construction Activities, Chapter 3.  
.2 EPA General Construction Permit (GCP) 2012.

1.3 ACTION AND  
INFORMATIONAL  
SUBMITTALS

- .1 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
- .2 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .3 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .4 Include in Environmental Protection Plan:
  - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
  - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
  - .3 Names and qualifications of persons responsible for training site personnel.
  - .4 Descriptions of environmental protection personnel training program.
  - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
  - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
  - .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
    - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
  - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
    - .1 Plan to include measures for marking

limits of use areas and methods for protection of features to be preserved within authorized work areas.

- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
- .13 Waste Water Management Plan identifying methods and procedures for management and or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
- .15 Pesticide treatment plan to be included and updated, as required.

#### 1.4 FIRES

- .1 Fires and burning of rubbish on site permitted only when approved by Departmental Representative.
- .2 Where fires or burning is permitted, prevent staining or smoke damage to structures, materials or vegetation which is to be preserved.
  - .1 Restore, clean and return to new condition stained or damaged work.
- .3 Provide supervision, attendance and fire protection measures as directed.

#### 1.5 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and



sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations, EPA 832/R-92-005, Chapter 3.

- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING  
AND PLANT  
PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage.
  - .1 Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.7 WORK ADJACENT  
TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Use waterway beds for borrow material only after written receipt of approval from Departmental Representative.
- .3 Waterways to be kept free of excavated fill, waste material and debris.
- .4 Design and construct temporary crossings to minimize

erosion to waterways.

- .5 Do not skid logs or construction materials across waterways.
- .6 Avoid indicated spawning beds when constructing temporary crossings of waterways.
- .7 Blasting is allowed only above water and 100 m minimum from indicated spawning beds.

1.8 POLLUTION  
CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
  - .1 Provide temporary enclosures where indicated.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.9  
HISTORICAL/  
ARCHAEOLOGICAL  
CONTROL

- .1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.
- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.

1.10 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal,

Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
  - .1 Take action only after receipt of written approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

## PART 2 - EXECUTION

### 2.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Bury rubbish and waste materials on site where directed after receipt of written approval from Departmental Representative.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

1.1 RELATED  
REQUIREMENTS

.1 Division 14.

1.2 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)  
.1 CCDC 2-94, Stipulated Price Contract.

1.3 PROJECT  
CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .7 Dispose of waste materials and debris at designated dumping areas on Crown property.
- .8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation

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systems is not permitted for this purpose.

- .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

#### 1.4 FINAL CLEANING

- .1 Refer to CCDC 2, GC 3.14.
- .2 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris other than that caused by Owner or other Contractors.
- .6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site, unless approved by Departmental Representative.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls and floors.
- .10 Clean lighting reflectors, lenses, and other lighting surfaces.
- .11 Vacuum clean and dust building interiors, behind grilles, louvres and screens.

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- .12 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
  - .13 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
  - .14 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
  - .15 Remove dirt and other disfiguration from exterior surfaces.
  - .16 Clean and sweep roofs, gutters, areaways, and sunken wells.
  - .17 Sweep and wash clean paved areas.
  - .18 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
  - .19 Clean roofs, downspouts, and drainage systems.
  - .20 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
  - .21 Remove snow and ice from access to building.
- 
- 1.5 WASTE  
MANAGEMENT AND  
DISPOSAL
- 
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

PART 1 - GENERAL

1.1 WASTE  
MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.
- .2 PWGSC's Waste Management Goal 75 percent of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced.
- .3 Accomplish maximum control of solid construction waste.
- .4 Preserve environment and prevent pollution and environment damage.

1.2 RELATED  
REQUIREMENTS

- .1 Division 14.

1.3 REFERENCES

- .1 LEED Canadian Green Building Council (CGBC), Green Building Rating System, For New Construction and Major Renovations LEED Canada-NC, Version 1.0 - December 2004.

1.4 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.
- .3 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .4 Inert Fill: inert waste - exclusively asphalt and concrete.

- .5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items including pallets or unused products to vendors.
- .10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .11 Separate Condition: refers to waste sorted into individual types.
- .12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
- .13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill. Refer to Schedule A.
- .14 Waste Management Co-ordinator (WMC) : contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).



1.5 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
  - .1 Waste Audit.
  - .2 Waste Reduction Workplan.
  - .3 Material Source Separation Plan.
  - .4 Schedules A, B and C completed for project.

1.6 WASTE AUDIT  
(WA)

- .1 Conduct WA prior to project start-up.
- .2 Prepare WA: Schedule A.
- .3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

1.7 WASTE REDUCTION  
WORKPLAN (WRW)

- .1 Prepare WRW prior to project start-up.
- .2 WRW should include but not limited to:
  - .1 Destination of materials listed.
  - .2 Deconstruction/disassembly techniques and sequencing.
  - .3 Schedule for deconstruction/disassembly.
  - .4 Location.
  - .5 Security.
  - .6 Protection.
  - .7 Clear labelling of storage areas.
  - .8 Details on materials handling and removal procedures.
  - .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .4 Describe management of waste.
- .5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
- .6 Post WRW or summary where workers at site are able to review content.

- .7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
- .8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.8 DEMOLITION  
WASTE AUDIT (DWA)

- .1 Prepare DWA prior to project start-up.
- .2 Complete DWA: Schedule C.
- .3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

1.9 COST/REVENUE  
ANALYSIS WORKPLAN  
(CRAW)

- .1 Prepare CRAW: Schedule D.

1.10 MATERIALS  
SOURCE SEPARATION  
PROGRAM (MSSP)

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in areas which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
  - .1 Transport to approved and authorized recycling facility.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.

- .1 Ship materials to site operating under Certificate of Approval.
- .2 Materials must be immediately separated into required categories for reuse or recycling.

1.11 WASTE  
PROCESSING SITES

- .1 Contact Province.

1.12 STORAGE,  
HANDLING AND  
PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove co-mingled materials to off-site processing facility for separation.
  - .3 Provide waybills for separated materials.

1.13 DISPOSAL OF  
WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral

spirits, oil and or paint thinner into waterways, storm, or sanitary sewers.

- .3 Keep records of construction waste including:
  - .1 Number and size of bins.
  - .2 Waste type of each bin.
  - .3 Total tonnage generated.
  - .4 Tonnage reused or recycled.
  - .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.14 USE OF SITE  
AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures established by existing facility.

1.15 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - EXECUTION

2.1 SELECTIVE  
DEMOLITION

- .1 Reuse of Building Elements: this project has been designed to result in end of project rates for reuse of building elements as follows: do not demolish building elements beyond what is indicated on Drawings without approval by Departmental Representative's.
  - .1 Building Structure and Shell: 75 percent.
  - .2 Interior Non-Shell Elements: 50 percent.

2.2 APPLICATION

- .1 Do Work in compliance with WRW.
- .2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

2.3 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

2.4 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
  - .1 Mark containers or stockpile areas.
  - .2 Provide instruction on disposal practices.
- .2 On-site sale of salvaged, recovered, reusable and or recyclable materials is not permitted.
- .3 Demolition Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Acoustic Tile	50	_____
Acoustical Insulation	100	_____
Carpet	100	_____
De-mountable Partitions	80	_____
Doors and Frames	100	_____
Electrical Equipment	80	_____
Furnishings	80	_____
Marble Base	100	_____
Mechanical Equipment	100	_____
Metals	100	_____
Rubble	100	_____
Wood (uncontaminated)	100	_____
Other		_____

- .4 Construction Waste:

Material Type	Recommended Diversion %	Actual Diversion %
Cardboard	100	_____
Plastic Packaging	100	_____
Rubble	100	_____
Steel	100	_____
Wood (uncontaminated)	100	_____
Other		_____

2.5 WASTE AUDIT .1 Schedule A - Waste Audit (WA):  
 (WA)

(1) Material Category	(2) Material Quantity Unit	(3) Estimate d Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
Wood and Plastics Material Description						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						
Doors and Windows Material Description						
Painted Frames						
Glass						
Wood						

Metal

Other

2.6 WASTE REDUCTION .1 Schedule B:  
WORKPLAN (WRW)

(1)	(2)	(3)	(4)	Actual	(5)	Actual	(6)
Material	Person(s)	Total Quantity of Waste (unit)	Reused Amount (units) Projected		Recycled Amount (unit) Projected		Material(s) Destination

Wood  
and  
Plastics  
Material  
Description

Chutes

Warped  
Pallet  
Forms

Plastic  
Packaging

Cardboard  
Packaging

Other

Doors  
and  
Windows  
Material  
Description

Painted

Frames

Glass

Wood

Metal

Other

2.7 DEMOLITION  
WASTE AUDIT (DWA)

.1 Schedule C - Demolition Waste Audit (DWA):

(1) Material Description	(2) Quantity	(3) Unit	(4) Total	(5) Volume (cum)	(6) Weight (cum)	(7) Remarks and Assumpti ons
Wood						
Wood Stud						
Plywood						
Baseboard- Wood						
Door Trim - Wood						
Cabinet						
Doors and Windows						
Panel Regular						
Slab Regular						
Wood Laminate						



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WASTE MANAGEMENT/DISPOSAL

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Byfold -  
Closet

Glazing

PART 1 - GENERAL

1.1 RELATED  
REQUIREMENTS

.1 Division 14.

1.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)  
.1 CCDC 2-2008, Stipulated Price Contract.  
.2 DOC 14-2000, Design-Build Stipulated Price Contract.  
.3 DOC 15-2000, Design-Builder/ Consultant Contract.
- .2 Canadian Environmental Protection Act (CEPA)  
.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE  
REQUIREMENTS

- .1 Acceptance of Work Procedures:  
.1 Contractor's Inspection: Contractor: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.  
.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.  
.2 Request Departmental Representative inspection.
- .2 Departmental Representative Inspection:  
.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.  
.2 Contractor to correct Work as directed.
- .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:  
.1 Work: completed and inspected for compliance with Contract Documents.  
.2 Defects: corrected and deficiencies completed.  
.3 Equipment and systems: tested, adjusted and balanced and fully operational.  
.4 Certificates required by Boiler Inspection Branch, Fire Commissioner and or Utility companies: submitted.  
.5 Operation of systems: demonstrated to

- Owner's personnel.
- .6 Work: complete and ready for final inspection.
- .4 Final Inspection:
  - .1 When completion tasks are done, request final inspection of Work by Departmental Representative, and Contractor.
  - .2 When Work incomplete according to Owner and Departmental Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
  - .1 When Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .2 Refer to CCDC 2: when Work deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
- .8 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

PART 1 - GENERAL

1.1 RELATED  
REQUIREMENTS

.1 Division 14.

1.2 REFERENCES

.1 Canadian Environmental Protection Act (CEPA)  
.1 SOR/2008-197, Storage Tank Systems for Petroleum  
Products and Allied Petroleum Products Regulations.

1.3 ADMINISTRATIVE  
REQUIREMENTS

.1 Pre-warranty Meeting:  
.1 Convene meeting one week prior to contract  
completion with contractor's representative and  
Departmental Representative to:  
.1 Verify Project requirements.  
.2 Review manufacturer's installation  
instructions.  
.2 Departmental Representative to establish  
communication procedures for:  
.1 Notifying construction warranty defects.  
.2 Determine priorities for type of defects.  
.3 Determine reasonable response time.  
.3 Contact information for bonded and licensed  
company for warranty work action: provide name,  
telephone number and address of company authorized for  
construction warranty work action.  
.4 Ensure contact is located within local service  
area of warranted construction, is continuously  
available, and is responsive to inquiries for warranty  
work action.

1.4 ACTION AND  
INFORMATIONAL  
SUBMITTALS

.1 Two weeks prior to Substantial Performance of the Work,  
submit to the Departmental Representative, four final  
copies of operating and maintenance manuals in English.  
.2 Provide spare parts, maintenance materials and special  
tools of same quality and manufacture as products  
provided in Work.  
.3 Provide evidence, if requested, for type, source and  
quality of products supplied.

1.5 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
  - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dwg format on CD.

1.6 CONTENTS -  
PROJECT RECORD  
DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
  - .1 Date of submission; names.
  - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems,

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to show control and flow diagrams.

1.7 AS -BUILT  
DOCUMENTS AND  
SAMPLES

- .1 Maintain, in addition to requirements in General Conditions one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
  - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.8 RECORDING  
INFORMATION ON  
PROJECT RECORD  
DOCUMENTS

- .1 Record information on set of blue line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in

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relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications required by individual specifications sections.

.7 Provide digital photos, if requested, for site records.

## 1.9 EQUIPMENT AND SYSTEMS

.1 For each item of equipment and each system include description of unit or system, and component parts.

.1 Give function, normal operation characteristics and limiting conditions.

.2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.

.1 Include regulation, control, stopping, shut-down, and emergency instructions.

.2 Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .14 Underground storage tank inspection documentation, registration, forms, decommissioning and removal in accordance with CEPA SOR/2008-197.
- .15 Additional requirements: as specified in individual specification sections.

1.10 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
  - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual



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specifications sections.

1.11 MAINTENANCE  
MATERIALS

- .1 Spare Parts:
  - .1 Provide spare parts, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
  - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
  - .2 Provide items of same manufacture and quality as items in Work.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
  - .1 Provide special tools, in quantities specified in individual specification section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to site; place and store.
  - .4 Receive and catalogue items.
    - .1 Submit inventory listing to Departmental Representative.
    - .2 Include approved listings in Maintenance Manual.

1.12 DELIVERY,  
STORAGE AND  
HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.

- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Departmental Representative.

1.13 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

- .9 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and commissioned systems such as fire protection, alarm systems, sprinkler systems and lightning protection systems.
  - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.
    - .5 Names, addresses and telephone numbers of sources of spare parts.
    - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
    - .7 Cross-reference to warranty certificates as applicable.
    - .8 Starting point and duration of warranty period.
    - .9 Summary of maintenance procedures required to continue warranty in force.
    - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
    - .11 Organization, names and phone numbers of persons to call for warranty service.
    - .12 Typical response time and repair time expected for various warranted equipment.
  - .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
  - .5 Procedure and status of tagging of equipment covered by extended warranties.
  - .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.14 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
  - .1 Type of product/material.
  - .2 Model number.
  - .3 Serial number.
  - .4 Contract number.
  - .5 Warranty period.
  - .6 Inspector's signature.
  - .7 Construction Contractor.

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PART I GENERAL

1.1 General Scope  
Of Dumbwaiter Work

- .1 The work described herein includes for all labour and material, including required overtime to meet the Project Schedule, to modernize to working, BCSA accepted first-rate standards two (2) traction, counter weighted, dumbwaiters to include, but not limited to the following:
- .2 New traction geared machines.
- .3 New hoist motors.
- .4 New electrical controller and all associated wiring.
- .5 New stainless steel l.e.d.-illuminated buttons.
- .6 New car complete with new frame, gates, and all other components
- .7 New rails and guides.
- .8 New landing doors, hardware and locks.
- .9 New safety devices including limits, cab safety, overload, gate and machine access door interlock.
- .10 New wire roping and all sheaves.
- .11 Full parts and labour preventive maintenance for a subsequent twelve (12) month period.
- .12 All related demolition, removals and patching.
- .13 Above is a brief description only. The following specifications detail the Work.

1.2 Related Work  
Contractor

- .1 Provide an updated crosshead data plate on the car top complete with all pertinent re capacity, speed, roping, installation date etc.
- .2 Patch all redundant holes in hoistway and machine space.
- .3 Retain existing main-line disconnect switch.
- .5 Provide two (2) new, metal-guarded, 110 volt work lights in shaft. One light to be permanently mounted at machine, one to be mounted on car top. Arrange to maximize useful illumination.

1.3 Shaft Repairs

- .1 Make any shaft alteration required to fit new dumbwaiter.
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- |  |    |  |
|--|----|--|
| <u>1.4 Procedure</u>                         | .1 | Obtain Owner's approval before beginning work.   |
|  | .2 | Any contract resulting from this tender will be executed on Owner's standard form terms and conditions.  |
|  |    |  |
| <u>1.5 Fire and Safety Requirements</u>      | .1 | Comply with National Building Code (Part 8, Health and Safety Measures at Construction and Demolition Sites) and Provincial Regulations for Construction Projects.   |
|  | .2 | Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to Labour Canada. |
|  | .3 | Comply with the Owner's site security regulations.   |
|  | .4 | Comply with Owner's "Fire Precautions Guide", distributed with this specification.   |
|  |    |  |
| <u>1.6 Powder Actuated Fastening Devices</u> | .1 | Do not use powder actuated tools using explosives, unless approved in writing by the Consultant, and in conformance with CAN3-Z166.2, <i>Use and Handling of Powder Actuated Tools</i> .   |
|  |    |  |
| <u>1.7 Cutting, Patching and Making Good</u> | .1 | Cut existing surfaces as required to accommodate new work.   |
|  | .2 | Patch and make good surface cuts, damaged or disturbed, to Consultant's approval. Match existing material, colour, finish and texture.   |
|  |    |  |
| <u>1.8 Building Smoking Environment</u>      | .1 | Obey and direct sub-contractors, suppliers and delivery people to obey, Owner's site restrictions on smoking.  |
|  |    |  |
| <u>1.9 Dust Control</u>                      | .1 | Provide dust tight screens or partitions to localize dust generating activities and for protection of workers, finished areas of work and public.  |
|  | .2 | Maintain and relocate protection until such work is completed.   |
-

- .3 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.

1.10 Scheduling

- .1 Within two (2) weeks of obtaining Owner's intent to proceed with the Work, submit to Consultant a bar chart construction schedule for the Work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Consultant take necessary measures to complete the Work within the scheduled time. Do not change the schedule without notifying the Consultant.
- .2 Include, in this schedule, the following information:
  - .1 Material lead time.
  - .2 Modernization time.
  - .3 Final adjustment and finish-up period.
  - .4 Proposed progress billing schedule.

1.11 Occupied Building

- .1 Make allowances for the Work being carried out in the food preparation area of 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 is unavoidable, make arrangements with the Owner to complete that portion of the Work at a mutually agreed time.
  - .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 Owner or Consultant.
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1.12 Protection of  
Work and Hoistways

- .1 Comply with Canadian Code for Construction Safety and the Provincial Construction Safety Act.
- .2 Confirm that any existing structural beams are safe and suitable before lifting loads.
- .3 Erect barrier and warning signage at each floor where there is an unlocked hoistway door.
- .4 Protect existing floors by covering with 13 mm plywood and tarpaulins as a minimum, when removing or delivering materials.
- .5 Protect finished work against damage until take-over.
- .6 Protect premises against spread of dust and dirt beyond work areas. Use all possible measures to prevent dust.
- .7 Protect occupants and other users of site from all hazards.

1.13 General  
Conditions

- .1 Before beginning Work, submit for Consultant's approval detailed drawings as specified herein. Submit appropriate drawings to Authorities having jurisdiction.
  - .2 Perform the erection of this equipment by certified Elevating Device Mechanics skilled in the installation of elevator machinery and elevator entrances. Provide adequate supervision of this work. Dress all construction personnel in company uniforms or coveralls identified with the Contractor's name and logo.
  - .5 Continuously maintain adequate protection of the Work from damage and protect the Owner's property from injury or loss. Make good any damage, injury or loss arising from Work except if not caused by the Contractor, its agents, sub contractors or suppliers.
  - .6 Remove rubbish daily as it accumulates. Keep the building and premises clean during the progress of the work.
  - .7 Perform the Work in compliance with all applicable provisions of all Federal, Provincial and local labour laws.
  - .8 After the award and signing of the Contract, all business relating to the Work shall be transacted through the office of the Owner unless otherwise instructed.
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- 1.17 System Description .1 The elevator system consists of two (2) geared dumbwaiters as follows.
- .1 Capacity: Provide 227 KG (500 pounds)
  - .2 Speed: Provide 0.25 m/s (50 fpm)
  - .3 Control: Call and send operation with levelling accuracy to within 6 mm
  - .4 Doors: Provide new manual vertical floor loading 36" wide by 54" high
  - .5 Floors: Retain existing arrangement
  - .5 Car: Retain existing 36" x 36" x 48" high
  - .6 Travel: Serve existing
- 1.18 Control and Operation
- .1 Provide one button per floor operation with UP / DOWN buttons.
  - .2 Locate centre line of button no more than 1070 mm above finished floor.
  - .3 Dispatch car from one terminal to other terminal when the appropriate floor button is pressed and the doors are closed.
  - .4 Indicate arrival of car at landing by an audible gong, and lighted "car here" indicator.
  - .5 Inactivate buttons while car is in motion or while any door is open.
- 1.19 Power Supply and Electrical Services
- .1 Make all necessary modifications to the electrical services relating to the equipment such as supplementary disconnect devices and connections to the controllers.
  - .2 Design equipment to operate using the existing power supply.
  - .3 Provide necessary grounding, shielding, or bonding required to accommodate the new elevator equipment.
  - .4 Carry out electrical modifications by a Licensed Electrician and arrange and pay for inspection by hydro utility as required. Provide a copy of utility permit and to Owner.
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1.20 Permits and Inspections

- .1 Obtain and pay for necessary Municipal or Provincial inspections and permits including design submissions and make such tests as are called for by the regulations of such authorities. These tests shall be made in the presence of the authorized representatives of such authorities. Pay for reinspections carried out as long as any Contractor related deficiencies remain unresolved
- .2 Provide the Owner and the Consultant with copies of reports, the same day they are received from authorities.

1.21 Samples

- .1 Submit to the Consultant, with shop drawings, samples of elevator finishes for:
  - .1 Signal and operating fixtures.
  - .2 Interior cab finishes including stainless steel.

1.22 Shop Drawings

- .1 Before beginning work, prepare all drawings necessary to show the general arrangement of the elevator equipment and other data which is called for and are to be submitted for review.
- .2 Shop 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. 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 Documents.
- .3 Submit five (5) paper copies of each shop drawing for Consultant's review.
- .4 Detailed drawing showing all fixtures, position indicators, push buttons, car operating stations, corridor control panels, and any other special fixtures pertaining to the project.
- .5 Include catalogue illustrations of operating and signal fixtures.
- .6 Do not commence manufacture or order materials before shop drawings are reviewed.

1.23 Record Drawings and Data

- .1 Provide three (3) sets of reproducible as-built wiring diagrams as well as three (3) sets of all final issue shop drawings. All drawings to be laminated or enclosed in plastic protectors and marked "as-built". Provide layouts stamped by a Professional Engineer registered in the province.

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- .2 Provide one soft copy of the above information in AutoCAD format.
  - .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.

1.24 Operations and Maintenance Information

- .1 Provide three (3) hard copies and one (1) PDF format and CADD format of drawings, and Manufacturer's instructions and operation and maintenance manuals."
  - .2 Bind data in vinyl hard cover 3"D" ring type loose leaf binders for 212 x 275 mm size paper. Binders must not exceed 75 mm thick or be more than 2/3 full.
  - .3 Enclose title sheet labelled "Operation Data and Maintenance Manual", project name, date and list of contents. Show project name on binder face and spine.
  - .4 Provide Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
  - .5 Include the following maintenance data for each dumbwaiter in a complete MCP (maintenance control plan):
    - .1 Description of dumbwaiter system's method of operation and control including, but not restricted to, motor control system, emergency power operation, door operation, and special or non-standard features provided;
    - .2 Replacement parts list.
  - .6 Provide legible schematic wiring diagrams covering all electrical equipment as supplied and installed, including all changes made in final work, with all symbols listed corresponding to identity or markings on both machine room and hoistway apparatus. Cover one (1) copy in plastic or glass, frame and mount in machine room. Include lubrication chart.
  - .7 Include all wiring diagrams for all equipment on controllers.
  - .8 List information on each piece of equipment including:
    - approval drawing number
    - model, part and serial number
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- .9 Detail the following maintenance information:
    - lubrication products and schedules
    - trouble shooting procedures
    - adjustment techniques
    - operational checks
    - maintenance of special finishes
    - planned maintenance tasks and their frequencies
  - .10 List recommended spare parts to be maintained on site to ensure optimum dumbwaiter efficiency. List all special tools and appropriate unique applications. Detail manufacturer and supplier names and addresses.
  - .11 Include in the manuals a copy of the registered design submission and provincial inspection reports.

1.25 Maintenance Service

- .1 Provide complete maintenance of equipment, including monthly inspections, for a period of twelve (12) months from the date of the Final Certificate of Completion of dumbwaiter project.
  - .2 Carry out maintenance inspections and tests in accordance with the Owner's contract form, the MCP as well as local applicable regulations as a minimum.
  - .3 Regularly, systematically, monthly examine, clean, lubricate and adjust any of the equipment.
  - .4 Repair or replace electrical and mechanical parts of any equipment as required due to defect and normal wear and tear.
  - .5 Use only genuine standard parts of product line of manufacturer of equipment.
  - .6 Perform work by competent personnel under supervision and in direct employ of elevator manufacturer, or manufacturer's licensed agent.
  - .7 Schedule work during regular trade working hours, with Owner.
  - .8 The Elevator Contractor must have successful experience in the complete maintenance of dumbwaiters, employs competent and qualified personnel to handle this service, maintains locally an adequate stock of parts for replacement or emergency purposes and has qualified men available to insure fulfilment of this service in a reasonable time.
  - .9 Include 24 hour call-back service due to equipment stoppage or malfunction at all times at no additional cost.
  - .10 The dumbwaiter must not be out of service longer than 12 hours - the Owner is to be completely informed on a continuing basis.
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- .11 Maintain a standard type locked metal cabinet, in machine room with a supply of parts known to require frequent replacement, acceptable lubricants and cleaning materials together with schematic wiring diagrams.
  - .12 Remove garbage at each examination.
- 1.26 Quality of Work
- .1 Perform the work using mechanics skilled in the installation of elevator machinery and elevator entrances.
  - .2 Guard and protect the hoistway, from commencement to completion of the work.
  - .3 Comply with all applicable provisions of all federal, provincial and local labour laws and with all applicable union regulations contained in the union agreement, including any travelling and incidental expenses involved in the work.
- 1.27 Coordination
- .1 Coordinate work of all subcontracted to Contractor as required to complete this contract.
- 1.28 Markings
- .1 Make all identifications and instructions in English or with international symbols.
- 1.29 Storage and Handling
- .1 Store materials in machine room or other area designated by the Owner in a manner offering adequate protection against bodily injuries, interference with work in progress or damages to work already completed.
  - .2 Adequately protect painted or finished surfaces of all materials delivered to the site.
- 1.30 Warranty
- .1 Provide a written warranty that the material and workmanship of the apparatus installed under these specifications are first-class in every respect and that any defects - to new or refurbished materials - not due to improper use or care, which may develop within one (1) year from the date of final acceptance will be made good.
  - .2 Commence warranty on all elevators at date of certification of Final Completion of final elevator, as certified by the Consultant.
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1.31 Bidder's Instructions .1

Submission of bid will be considered presumptive evidence that Bidder is familiar with local facilities and conditions, requirements of the documents and of pertinent provincial and local codes, state of labour and material markets and has made due allowance in his proposal for all difficulties. Should Bidder's investigation of local codes or rules reveal stipulations contrary to the specifications, he shall advise the Consultant without delay. Should a Bidder find any discrepancy in, or omissions from any of the specifications, or be in doubt as to their meaning, he shall advise the Consultant. Bids are assumed to be in complete conformance with this specification unless explicitly written on the bid submission otherwise. Any qualification or exception to the bid may disqualify it, depending upon Owner's tendering policies.

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PART 2 PRODUCTS

2.1 Components

- .1 Use only major components 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.
- .2 Provide all materials and equipment new and installed in a neat, accurate, workmanlike manner. Supply material in accordance with the approved samples.
- .3 Provide only system designs field tested for the application, with adequate capacity to meet all performance criteria and to provide long term, reliable operation.

2.2 Electrical Wiring  
Conduits and Fittings

- .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 Do not parallel conductors to increase current carrying capacity unless individually fused.
- .4 Install a separate green bond wire in all raceway, including EMT and flexible conduit.
- .5 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Wiring shall be run in metal conduit, metallic tubing or wire ducts.
- .6 Do not run conduit or wiring along the pit floor. Install all conduit and wiring a minimum of 150 mm above pit floor.
- .7 Suitably suspend the travelling cables to relieve strain in the individual conductors.
- .8 Fabricate wiring that is run in conduit or tubing to Table 6 of C.E.C. Part 1.

2.3 Lubrication

- .1 Include means of lubricating bearings, requiring periodic lubrication.
  - .2 When used, provide grease fittings which fit same gun.
  - .3 Where grease cups are provided, use auto feed compression type.
  - .4 Provide visible and easily accessible lubrication points.
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2.4 Ropes

- .1 Provide a minimum of 2 ropes, 6 mm 3 x 19 traction steel cable with safety factor per code.

2.5 Machine, Brake and Motor

- .1 Include quiet operating worm geared, machine equipped with anti-friction bearings with gearing, sheave, brake and motor mounted on common cast iron or welded structural steel base.
- .2 Cut worm from solid steel forging or steel bar stock, integral with worm shaft and worm gear of bronze.
- .3 Include means to inspect gear.
- .4 Use machined driving sheave designed for at least one re-machining of grooves.
- .5 Provide smooth machined grooves and flanges for all driving and deflector sheaves.
- .6 Sheaves with cracks, sandholes or other imperfections are not acceptable.
- .7 Provide direct current electro-magnetic brake, spring applied and electrically released.
- .8 Use motor with high starting torque and low starting current and high internal resistance squirrel cage rotor.
- .9 Impregnate windings with insulation and bake to prevent absorption of moisture and oil.
- .10 Provide not less than one megohm insulation resistance between motor windings and frame.
- .11 Rate motor in accordance with standards of IEE for 50° for 15 minutes with rated load at rated speed without overheating.
- .12 Provide reverse phase and phase failure protection.
- .13 Provide manual reset inherent motor overheating protection to CSA C22.2 No. 77.

2.6 Car

- .1 Include new car constructed of 16 gauge # 4 satin polished stainless steel.
- .2 Provide three (3) removable shelves. Lock shelves in position during normal operation and design for removal and height adjustment without the use of tools.

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- .3 Including necessary framing to ensure a rigid construction. Provide all new car frame construction sufficient to meet required load.
  - .4 Match existing car interior plan dimensions.
  - .5 Provide machined guide shoe guiding surfaces.
  - .6 Provide recessed incandescent light fixture with medium base porcelain socket and guard flush in car top.
- 2.7    Car Gate
- .1 Provide manual vertical sliding steel car gates and electrical contact operated by car gates.
  - .2 Finish gates in brushed stainless steel.
- 2.9    Controller
- .1 Mount controllers in approximate position as currently located.
  - .2 Provide new microprocessor controller. Enclose controller in enamelled ventilated sheet metal cabinet with hinged doors for easy access conforming to CSA C22.2
  - .3 Provide direct current operated equipment.
  - .4 Provide properly sized primary and secondary fusing for transformers.
  - .5 Provide similar switch and relay units of same manufacturer and clearly identify controller components and terminal connections to agree with wiring diagrams.
  - .6 Include reverse and open phase protection.
  - .7 Identify all switches and relays in a permanent manner.
  - .8 Cord and insulate field wiring.
  - .9 Provide only non-proprietary version:
    - .1 All required diagnostic are "on board".
    - .2 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.
    - .3 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.
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.4 The controller will not shut down or alter its functionality in any way after a pre-determined increment of time or use.

.5 All programming and diagrams required for long-term maintenance are provided with the controller.

2.10 Guide Rails  
and Brackets

.1 Rails can be re used is suitable for new equipment. Otherwise provide new rails. Check all guide rails for plumb and parallel within maximum deviation of 1.6 mm correct to comply.

.2 Tighten any loose rail brackets or rail clips.

.3 Check the condition of all fastenings in hoistway.

.4 Clean corrosion from rails.

2.11 Hoistway Frames  
and Doors

.1 Include steel dumbwaiter entrances at openings consisting of doors, sills, removable panels, supports and hardware. Finish exposed surfaces in steel painted to RPSS's selected custom colour.

.1 Provide manual vertical sliding counterbalanced doors which operate within hoistway.

.2 Furnish doors with 75 mm dia vision panel glazed with 6 mm polished Georgian wired glass fastened from hoistway side.

.3 Install black neoprene bumpers on each door to cushion doors on closing.

.4 Weld or bolt frames into one piece assembly using steel sheets combining buck, jamb and trim.

.5 Provide smooth door operation using steel tracks, adjustable chains or wire, ball bearing rollers, rubber bumpers and lift handles finished in mirror bronze to match control button face plates.

.2 Minimize damage to wall finish when removing old frames. With new frames installed, refinish wall to match existing.

.3 Provide new pit access doors to be self close and locking.

2.12 Fixture Fastening

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

.2 Patch any redundant holes from previous fixtures.

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|--|--------|---|
| <u>2.13</u> <u>Signals</u>             | .1     | Illuminate signal fixtures with intensity which produces distinct and well defined indications in daylight or dim conditions.   |
|  | .2     | Provide a “Door Open” call buzzer - to sound when a pushbutton is pressed and a hoistway door or car gate is open.  |
|  | .3     | Provide a “Car Here” light and chime - to be located in each pushbutton station. Chime shall indicate car arrival. Light shall indicate car presence.   |
|  | .4     | Provide a combination “Door Open” and “In-Use” light - to be located in each pushbutton station. Light will illuminate when car is in transit and when a pushbutton is pressed and a hoistway door or gate is open. |
| <br><u>2.14</u> <u>Hoistway Access</u> | <br>.1 | <br>Provide hoistway access at all landings.  |
| <br><u>2.15</u> <u>Counterweight</u>   | <br>.1 | <br>Provide new counterweight guides. Re balance counterweight to car with 200 pounds of load.  |

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PART III EXECUTION

- 3.1 Removal of Old equipment .1 Remove from site and dispose of all redundant elevator equipment.
- .2 Provide all patching to architectural surfaces made necessary by elevator work.
- .3 Thoroughly clean all areas related to the dumbwaiter.
- 3.2 Machine Location .1 Provide any necessary tie-down, bearing plates or transfer arrangement to accommodate the new machine fastening.
- 3.3 Arrangement of Equipment .1 Design equipment for use in existing space for hoistway width, depth, overhead, pit, controller space and machine space.
- 3.4 Clearances .1 Adjust equipment to attain Code-required running clearances for car and doors.
- 3.5 Erection .1 Thoroughly clean down hoistways and all equipment.
- 3.6 Protection .1 Provide protective coverings for finished surfaces.
- 3.7 Painting .1 Paint the following equipment in the hoistway:
- .1 All pit equipment including floor.
- .2 Use paint materials listed on the CGSB qualified products list and to IOS standards only. All exposed painting to RPSS's selected custom colours.
- 3.8 Touch Up .1 Upon completion, touch-up and restore to new conditions all factory finished surfaces where damaged or defaced.
- .2 Replace damaged or defaced items if required.
- 3.9 Test Data .1 Within 24 hours of final inspection by Provincial authority, provide consultant with a copy of the inspection report.
- 3.10 Field Quality Control .1 Perform and meet tests required by CSA/CAN-B44 Safety Code for Elevators.
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- .2 Supply instruments and carry out full load and balance loads tests.
- .3 Furnish test and approval certificates issued by jurisdictional authorities.
- .4 Provide 2 weeks written notice of date and time of tests.
- .5 Maintain a copy of this specification on site during construction.
- .6 Attend at job site meetings pertaining to the Work.

3.11 Burning  
Torches

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

3.12 Welding

- .1 Identify field welds with welder's identification stamp. Carry out welding after regular working hours in the building.

3.13 Consultant

- .1 The Consultant has general supervision and direction of the Work. He may be authorized to stop the Work whenever the stoppage is necessary to ensure the proper execution of the contract.
- .2 Furnish courteous, competent men and equipment for inspecting and directing speed, load and such other acceptance tests as the Consultant may reasonably deem required.
- .3 Provide a competent Mechanic or Adjuster to assist the Consultant in carrying out one inspection. Allow for up to two (2) hours of on-site assistance.
- .4 The Consultant's work is for the convenience of the Owner and does not relieve the Contractor of any duties or obligations which would otherwise be applicable.
- .5 Notify the consultant
  - .1 One week prior to commencement of work.
  - .2 On booking of provincial inspection.
  - .6 On completion of deficiencies.

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PART 1 - GENERAL

1.1 Scope of Work

- .1 The work described herein includes for all labour and material, including overtime required to meet the agreed project schedule, to modernize One (1) hydraulic passenger elevator located at Sidney Institute of Ocean Sciences, complete with new non-proprietary electrical controller, pumping unit, valve, motor and oil storage tank. Work includes:
- .2 Supply and install new PVC protected buried cylinder and piston including removal of old and hole improvements.
- .3 Supply and install new vandal resistant stainless steel illuminated car and hall push buttons to comply with handicap requirements.
- .4 Supply and install new heavy-duty car door operator, clutch assembly, hoistway door locks, pick-up roller assemblies and related hardware.
- .5 Supply and install battery lowering system.
- .6 Supply and install new car-cab interior.
- .7 New signals including car direction and position indicators and lobby position indicators.
- .8 Removal and disposal of all redundant elevator equipment.
- .9 This is a brief description, specifications detail complete work.

1.2 Related Work  
to be Carried  
Out by Elevator  
Contractor

- .1 Arrange for connection to owner's emergency cab communication system to the new telephone provided in the elevator cab. Include for any required assistance by communications contractor to make system functional.

- .2 Paint the machine room floor grey at the completion of project. Paint machine room walls. Use a minimum of two (2) coats of latex white semi-gloss paint to Engineer's approval.
- .3 Patch all redundant holes in machine room walls and ceilings prior to painting.
- .4 Provide one new high efficiency, 1220 mm long, dual tube fluorescent light fixture in the pit (100 lux). Provide mechanical guarding of the lights. Supply and install all wiring and conduit. Provide illuminated light toggle switch accessible from the lowest landing.
- .5 Provide new positive-acting pit stop switch. Mushroom type red in colour.
- .6 Provide a minimum of one 15 amp GFIC convenience receptacle at the machine room, pit and car top
- .7 Include electrician subcontract to accomplish all required conductor and conduit runs. Run new grounds as required.
- .8 Prior to fastening to, or carrying out any modifications to the building structure (ie. for hoisting of equipment), written approval must be obtained from a structural engineer. Provide a copy of this approval. Cost to be the responsibility of the elevator contractor.
- .9 Engage fire alarm subcontractor to disable fire detectors as required during course of work - respecting Owner's fire regulations.
- .10 Include electrician subcontract to accomplish all required conductor and conduit runs. Run new grounds as required.
- .11 Provide new switches and conductors for all lighting and new pit stop buttons.
- .12 Engage security subcontract to remove, reinstall and as required, reprogram existing security system. Add new card readers systems with swipe features on the exterior and interior of the car. Include programming feature capability to allow building O&M staff to program cards when required.



- .13 Include complete removal of redundant elevator components while working in an occupied building.
- .14 Include full costs of material movement - new materials in and redundant materials out, including crane costs, permits, removals of walls (to be made good after). Include for overtime costs of disruptive work.
- .15 Include for required protection of work area - signage, dust control, floor protection and barricades - to accomplish elevator modernization in an occupied building.
- .16 Carry out all noisy and disruptive work after hours including any work audible at more than 30 dB over ambient measured 1 meter on the tenant's side of barricades.
- .17 Supply any required garbage dumpster. Keep building cleared of rubbish.
- .18 Provide required cutting, patching and making good of new fixtures.
- .19 Provide new Code compliant pit ladder, including retractable with electrical switch, if required by new equipment arrangement.
- .20 Provide any required hoistway repairs including patching of holes, fire stopping and beveling of ledges or setbacks 100 mm or greater.
- .21 Provide all required supervision, coordination, safety meetings as required by multiple trades on site. The Division 14 contract will be the General Contractor. Include for required municipal and provincial work permits.

### 1.3 Related Work to be Carried Out by Owner

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- .1 Arrange for live telephone line to the elevator machine room if existing is not compatible with new telephone.

- .2 Provide a new three phase main line switch or alternatively re-use existing switch including new auxiliary contact for battery lowering.
- .3 Include dry contact to elevator controller for activation of emergency power.
- .4 Install new fire signals to the elevator controller. This includes signal for main fire alarm, signal for a fire alarm emanating from the elevator machine room and/or elevator hoistway and thirdly a signal for a fire alarm emanating from the ground floor - used to drive the elevator to the recall floor. Include for new fire sensing devices in front of the elevator at each floor's lobby. Provide for this work being done by a certified fire alarm technician and provide required commissioning and testing of modifications to the fire alarm panel.
- .5 Provide new lighting in the elevator machine room, operated by new switch. Lighting to provide 200 Lux ambient at the machine room floor level employing a minimum of two, dual 48" T8 fluorescent fixtures at 4100 k. Provide mechanical guarding of the lights.

#### 1.4 Reference Standards

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- .1 Perform work to the following minimum standards:
  - .1 ASME A17-2010/CSA-B44-10 Safety Code for Elevators and Escalators
  - .2 CSA C22. No77 Motors with Inherent Overheating Protection.
  - .3 CSA C22 No. 141 Unit Equipment for Emergency Lighting.
  - .4 BC Elevator Act and Regulations.
  - .5 C22 Canadian Electrical Code, particularly Section 38.
  - .6 National Building Code.
  - .7 CAN/CSA B651 Barrier-Free Design Guidelines.
  - .8 CAN/CSA Z320 Building Commissioning Standards.
  - .9 Canada Labour Code, Part 2, Occupational Safety and Health Regulations including Section 13.13.
  - .10 Occupational Health and Safety Act.
  - .11 CSA Z432-04 Safeguarding of Machinery.

- .2 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.
- .3 In case of discrepancy, the above standards take precedence over details elsewhere in this specification.

### 1.5 Type of Elevators

- .1 One (1) Hydraulic passenger elevator.
- .2 Power Supply
  - .1 600 Volts nominal, 3 Phase, 3 Wire, 60Hz.
  - .2 Lighting supply: 120 volts, 1 phase, 60Hz.
  - .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 the Owner.

### 1.6 Permits and Inspections

- .1 Complete Design Submission and related research necessary for regulatory approval of Work.
- .2 Obtain 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 Owner and the Consultant with copies of inspection reports the same day they are received from authorities.

### 1.7 Taxes

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

### 1.8 Measurements

- .1 Before the execution of the work, verify all dimensions with the actual site conditions.

### 1.9 Quality of Work

- .1 Perform work by mechanics skilled in the installation of hydraulic elevators and in the control system used. Provide adequate supervision.
- .2 Comply with all applicable provisions of all federal, provincial and local labour laws.

### 1.10 Samples

- .1 Submit to Consultant for approval, upon request, samples of any visible elevator finishes including:
  - .1 Cab wall finishes.
  - .2 Cab ceilings.
  - .3 Cab doors.
  - .4 Hoistway entrance doors and frames.
  - .5 Signal and operating fixtures.

### 1.11 Shop Drawings and Product Data

- .1 Before beginning work, prepare all drawings necessary to show the general arrangement of the elevator equipment and other data which is called for and is to be submitted for review. Provide these drawings within two (2) weeks after notification of award of contract.

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- .2 Drawing review is for the sole purpose of ascertaining conformance with the general design concept and does not constitute approval of the design details inherent in the shop drawings, responsibility for which shall remain with the Contractor. 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 Documents.
  - .3 Indicate on shop drawings:
    - .1 Size and location of pumping unit and controller.
    - .2 Details on pumping unit components, including:
      - 1. Pump and pump motor.
      - 2. Valve.
      - 3. Drain location.
      - 4. Oil line diameter and location.
      - 5. Ball valve.
      - 6. Muffler.
    - .4 Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
    - .5 Heat generation of equipment in machine room.
    - .6 Cross section drawing of jack unit. Include the following details:
      - .1 Finished plunger, plunger and casing diameter and length.
      - .2 Plunger wall thickness.
      - .3 Pit depth.
      - .4 Total load.
      - .5 Oil inlet location.
    - .7 Size and location of car, hoisting beam, guide rails and other components in hoistway as required.
    - .8 Detailed drawing showing all fixtures, position indicators, push buttons, car operating stations, corridor control panels, and any other special fixtures pertaining to the project.
    - .9 Do not commence manufacture or order materials before shop drawings are reviewed.
    - .10 Provide product data for:

- .1 Signal and operating fixtures, operating panels and indicators.
- .2 Cab design and components.

### 1.12 Project Record Documents

- .1 Before final acceptance of equipment, 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 Drawing. One set of 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 Record actual locations of equipment, names of equipment manufacturers and suppliers, concealed conduit and boxes, concealed devices, disconnects and shut-off valve.
- .3 Mark up all field changes or additions to original wiring diagrams in red.

### 1.13 Operation and Maintenance Data

- .1 Provide three (3) hard copies and one (1) soft copies, in English of the Operation and Maintenance manuals. Include in the manuals a copy of the safety authority registered design submission and inspection reports.
- .2 Bind data in vinyl hard cover 3D ring type loose leaf binders for 212 x 275 mm size paper. Binders must not exceed 75 mm thick or be more than 2/3 full.
- .3 Enclose title sheet labelled "Operation Data and Maintenance Manual", project name, date and list of contents. Show project name on binder face and spine.

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- .4 Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
  - .5 Include the following maintenance data for each elevator:
    - .1 Description of elevator system's method of operation and control including, but not restricted to, motor control system, emergency power operation, door operation, and special or non-standard features provided.
    - .2 Consolidated replacement parts list.
  - .6 Provide legible schematic wiring diagrams covering all electrical equipment as supplied and installed, including all changes made to final work, with all symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
  - .7 Include all wiring diagrams for all equipment on controllers.
  - .8 List information on each piece of equipment including:
    - .1 Approval drawing number.
    - .2 Model, part and serial number.
  - .9 Detail the following maintenance information:
    - .1 Lubrication products and schedules.
    - .2 Trouble shooting procedures.
    - .3 Adjustment techniques.
    - .4 Operational checks.
    - .5 Maintenance of special finishes.
    - .6 Planned maintenance tasks and their frequencies.
  - .10 List recommended spare parts to be maintained on site to ensure optimum efficiency. List all special tools and appropriate unique applications. Detail manufacturer and supplier names and addresses.

#### 1.14 Maintenance Service

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- .1 Provide complete interim maintenance of the elevators during the construction period until twelve (12) months from date of Final Certificate of Completion.
- .2 As a minimum all inspections, tests and maintenance procedures are to be carried out in accordance with provincial standards
- .3 Provide a separate price for maintenance service term of 60 months from the issuance of the Final Certificate of Completion of the last elevator.
- .4 Systematically clean, lubricate and adjust all of the equipment as required.
- .5 Repair or replace electrical and mechanical parts of any equipment as required, whether due to defect or normal wear and tear.
- .6 Use only genuine standard parts of manufacturer of equipment.
- .7 Perform work by competent personnel under supervision and in direct employ of manufacturer, or manufacturer's licensed agent.
- .8 Schedule work during regular Elevator Trade working hours with Owner.
- .9 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.
- .10 Include 24 hour call-back service required by equipment stoppage or malfunction at all times at no additional cost.
- .11 Ensure no unit is out of service longer than 12 hours - keep Owner completely informed of equipment malfunctions on a continuing basis.
- .12 Remove garbage at each examination.
- .13 Provide a log book in the machine room, record all callbacks and repairs, as work is carried out. Provide an "acknowledgement of inspection" form at each inspection. Do not employ a computerized log book.



- .14 Provide a storage cabinet in the machine room suitable for storing spare parts and project documents.
- .15 Provide an approved container in the machine room for the storage of oil and rags. Empty on a regular basis.

### 1.15 Layout

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

### 1.16 Guarantee

- .1 Guarantee that the materials and workmanship of the apparatus installed under these specifications are first-class in every respect and make good any defects, not due to improper use or care, which may develop within one (1) year from the date of acceptance.
- .2 Provide an extended warranty of an additional two (2) years for finished surfaces visible to elevator passengers. Warranty coverage to include imperfections that may develop on painted and architectural steel surfaces, as well as shifting, delamination, bending or other imperfections of joints, panels and skins. Warranty does not cover damage by mis-use.
- .3 Commence warranty of work at date of certification of Final Completion, as certified by the Consultant.

### 1.17 Procedure

- .1 Notify the Owner and Consultant in writing, at least two (2) weeks prior to removing the elevator from service.

### 1.18 Fire and Safety Requirements

- .1 Comply with Provincial Regulations for Construction Projects.
- .2 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to Labour Canada.
- .3 Comply with owner's site security and safety regulations.
- .4 Comply with Owner's "Hot Works" policy as required.

#### 1.19 Powder Actuated Fastening Devices

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- .1 Do not use powder actuated tools using explosives, unless permitted expressly by the Consultant; comply with requirement of CAN3-Z166.2. (Use and Handling of Powder Actuated Tools.)

#### 1.20 Cutting, Patching And Making Good

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- .1 Cut existing surfaces as required to accommodate new work.
- .2 Patch and make good surface cuts, damaged or disturbed, to Consultant's approval. Match existing material, colour, finish and texture.

#### 1.21 Dust Control

- .1 Provide dust tight screens or partitions to localize dust generating activities and for protection of workers, finished areas of work and public.
- .2 Maintain and relocate protection as required until such work is completed.

- .3 Protect all furnishing within work area with low fire spread tarps or screen during construction. Remove film during non-construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function.

## 1.22 Scheduling

- .1 Within two (2) weeks after award of contract, submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Consultant, take necessary measures to complete work within scheduled time. Do not change schedule without notifying Consultant. Comply with all lead time's set out in the Tender documents.
- .2 Include, in this schedule, the following information:
  - .1 Shop drawing submission lead time.
  - .2 Material lead time.
  - .3 Material delivery to site by March 31, 2016 and mobilization.
  - .4 Modernization construction time (per car).
  - .5 Adjustment and finish-up time.
- .3 Provide a detailed cost breakdown schedule for invoicing purposes.

## 1.23 Occupied Building

- .1 Make allowance for the work being carried out in an occupied building including the possibility of persons with impaired judgment near the work area.
- .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 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 Owner or Consultant.
- .5 Where excessive noise or obstruction is unavoidable, make arrangements with the Owner to complete that portion of the Work at a mutually agreed time and include for overtime costs. Overtime work will be required where, in the reasonable judgement of the Consultant, building operations are being affected including:
  - .1 Noisy work that is clearly audible outside of the work space.
  - .2 Work generating fumes or noxious odours such as may arise from welding, painting and PVC glue.
  - .3 Disruptive work involving moving large materials through the common areas.

#### 1.24 Use of Elevators by Handicapped

- .1 Arrange all controls and fixtures to be easily reached and operated by disabled persons. Meet all requirements of Appendix "E" of the ASME CSA-B44-10 Safety Code for Elevators.
- .2 Provide flush mounted Arabic numerals 16 mm in height raised 0.8 mm immediately to left of floor buttons to identify floor buttons.
- .3 Provide tactile indications (arabic), 50 mm floor numerals raised 0.8 mm, on the hoistway door panel jambs. Locate 1.5 metres above finished floor.
- .4 Locate uppermost button in elevator cab control panel at less than 1220 mm above floor level.
- .5 Include braille markings on car operating panel fixtures.

- .6 Provide new vandal resistant car lanterns. Lanterns to illuminate/ chime, green/once for Up direction, and red/twice for DOWN.
- .7 Provide new tactile indications on hoistway door panel jambs.
- .8 Provide stainless steel handrails on all cab walls, set at 850 mm from floor, with space of 40 mm between rail and cab wall.
- .9 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 English, with shop drawings.

#### 1.25 Markings

- .1 Make identifications and instructions in English or alternatively with international symbols.

#### 1.26 Trademarks and Labels

- .1 Do not place permanent labels, trademarks or nameplates on materials.

#### 1.27 Storage and Handling

- .1 Store materials in elevator machine room or other space authorized by the Owner.

#### 1.28 Non Proprietary Guarantee

- .1 Provide a written guarantee from the manufacturer of the equipment, including controller, that the equipment is non-proprietary. This includes:
  - .1 Extra spare parts are available for purchase, not just exchange. Parts may be purchased by anyone, not just the building owner. A price list of parts, including all circuit boards, is to be supplied with shop drawings.
  - .2 All diagnostics are on board. All wiring diagrams, documentation and special tools required for maintenance are supplied with the elevator as the Owner's property.
  - .3 The elevator programming does not expire, self-alter or degrade in any way.

#### 1.29 Protection of Hoistway and Work Area

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- .1 Comply with Canadian Code for Construction Safety.
- .2 Erect hoarding at any floor where there is an unlocked elevator hoistway door.
- .3 On removal of hoardings, make good damage to surfaces of walls, floors and ceilings.
- .4 Fasten by bolts, plywood hoarding from floor to height of 2134 mm, 12 mm thick and at least as wide as the elevator entrance.
- .5 Use hoarded entrance for removal of redundant material and delivery of new equipment.
- .6 Protect existing floors by covering with 12 mm plywood and tarpaulins, when removing or delivering materials.
- .7 Protect the floor surface from dirt and damage during regular work hours where workers travel.
- .8 Upon completion of the project, clean and make good, all work areas, hallways and stairwells where used.
- .9 Create a work space inside hoardings of at least 1200 mm deep.

- .10 As a minimum allow for floor to ceiling hoarded area at the main floor with included self-closing, self-locking door. Include for enclosure of 200 square feet, wall locations as directed by Consultant designed to maximize work area while minimizing disruption to the adjacent corridor.

### 1.30 General Conditions

- .1 General requirements section and all other conditions apply to all the Work and are part of this section. Read in full all sections included in the specification document. Adapt this Work to that of the other trades.
- .2 Perform the erection of this equipment by certified Elevating Device Mechanics skilled in the installation of the qualified elevator machinery and associated equipment. Provide adequate supervision of this work. Dress all construction personnel in company uniforms or coveralls identified with the Contractor's name and logo.
- .3 Remove rubbish daily as it accumulates. Keep the building and premises clean during the progress of the work.
- .4 Be responsible for all equipment, products, tools and material not turned over for use by The Owner, whether or not equipment, products, tools or materials have been certified or paid for by either or both the Owner and/or the Consultant.
- .5 The Work may be viewed by the Consultant at any time during construction.

### 1.31 Consultant's Certification of Payment

(refer to front end documents)

### 1.32 Definition of Terms

- .1 The term "Contractor" as used herein refers to any person, partners, firm or corporation having a contract with the Owner to furnish labour and material for the execution of the work described therein.
- .2 The term "Sub-contractor" as used herein refers to any person, partners, firm or corporation having a contract with the Contractor to furnish labour and materials for the execution of the work described herein.
- .3 All of the terms in the specifications have the definitions given in the CSA-B44-10 Safety Code for Elevators.
- .4 The term "provide" or "furnish" where used, means to supply and install new equipment.
- .5 The term "refurbish" where used, shall mean the provision necessary labour, modifications, parts, etc., which will result in returning the component to "like new" operating condition. Bidders should state any assumptions where the extent of refurbishment required is not clear.

### 1.33 Elevator Performance

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- .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 elapsed time required to travel a typical floor not to exceed 14.0 seconds, measured when the fully-opened doors start to close until the car is level with the next floor and the car and hall doors are open to three-quarters of the fully-open position. The above time shall be measured with full load in the car in both directions of travel. For other conditions of loading, the time shall not vary more than 10% in the UP direction and 15% in the DOWN direction.



- .4 Set two-speed side opening doors to safely doors to safely close in 6 seconds and open in 4.1 seconds.
- .5 Provide adjustable dwell times and independent dwell settings for car and hall calls. Set the dwell times to 2 seconds for car, and 3 seconds for hall initially.
- .6 Maintain floor levelling accuracy of 6 mm or better.
- .7 Set door detector interrupt and nudging time to 20 seconds. Set door to close at reduced speed in nudging mode.
- .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 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 Limit vertical vibrations to 20 milli-g.
- .11 Adjust typical acceleration rate to 0.03 g.
- .12 Limit jerk rate (change in rate of acceleration) to 10 f/s/s/s.

PART 2 - PRODUCTS

2.1 Description  
 of Elevators and  
 Features

**Table A - Overview**

<b>FIELD</b>	<b>REQUIRED</b>
Type	Hydraulic
Class	Passenger
Capacity	6000lbs
Speed	50 fpm
Landings	1,2,3 to front and rear
Travel	Per existing
Pit Depth	Per existing
Door Opening	62" wide x 84" high Two speed side opening
Hall Entrance Finish	Painted to RPSS's selected custom colour.
Type of Control	Microprocessor based
Type of Operation	Simplex selective collective

**Table B - Special Features**

<b>FIELD</b>	<b>REQUIRED</b>
Fire Fighters' Operation	Phase I recall and Phase II in-car operation
Emergency Power	Battery back-up
Independent Service	Include in each cab
Seismic	Zone 4 design
Remote Monitoring	Not required
Card Reader	Required in-car
Keyed lockouts	Not required

**Table C - Signals**

<b>FIELD</b>	<b>REQUIRED</b>
Push Buttons	Stainless steel, LED illuminated
Car Operating Panels	One car operating panel
Hall fixtures	Flush mounted
Position Indicators	Required in car operating panel and main lobby

Lanterns	Required in each car door jamb
Appendix "E" of B44	Full compliance required
Emergency Phone	Provide two-way communication in cab

## 2.2 Components

- .1 Use major elevator components from standard product line of one manufacturer unless otherwise approved.
- .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 new, the best of their respective kinds and installed in a neat, accurate, workmanlike manner.
- .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 or XL-Blend S as specified.
- .7 Use paint with CGSB 1-GP-104Ma, alkyd enamel semi-gloss, for machinery, colour to be selected by Architect.
- .8 Provide elevator control equipment manufactured and installed by one of the following companies:
  1. Otis Canada Inc.
  2. Motion Control Engineering (MCE)
  3. GAL Manufacturing
  4. KONE Inc.
  5. ThyssenKrupp Elevator
  6. Automatisations JRT Inc.
- .9 Other manufacturers are not acceptable unless approved in writing by tender-issuing authority.

## 2.3 Electrical Components

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- .1 Provide insulated wiring to connect all parts of the equipment.
- .2 Use steel compression type fittings where electrical metallic tubing is used. Fittings with set screws are not acceptable unless a separately identified grounding conductor is also installed inside raceway.
- .3 Provide suitable communication system and any security system junction boxes on the outside of the controller. Provide uninterrupted shielded wiring from the communication system in car to junction box located at controller in machine room. Clearly label junction boxes accordingly.
- .4 Provide a separately identified box for the fire alarm connection and emergency power signal.
- .5 Include at least 10% spare conductors in each cable. Terminate spares at terminal blocks, suitably identified.
- .6 Include spares of at least six (6) pairs of shielded wires and one (1) CAT 5 cable for audio, video or other electronic equipment, such as a card reader system.
- .7 Do not parallel conductors to increase capacity unless individually fused.
- .8 Do not use armoured flexible metal conduit as grounding conductor.
- .9 Install anti-shorts at all wiring entry points.
- .10 Provide additional disconnect switches and wiring as required to suit machine room layout. Provide and install all required conduit and wiring from disconnect switches to elevator controllers.
- .11 Include wiring for run in conduit, by others, for connections to elevator-related devices remote from hoistway.

- .12 Connect all wiring where required to building fire alarm system. Fire alarm signal are to be brought to a demarcation point and labeled in the elevator machine room by Division 16.
- .13 Limit use of flexible conduit on car top to items that require movement or periodic adjustment.
- .14 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Run wiring in metal conduit or tubing or wire ducts.
- .15 When using conduits or troughs through floor, extend conduit or trough at least 100 mm (4") above floor.
- .16 Do not run conduit or wiring along the pit floor. Install all conduit and wiring a minimum of 300 mm (12") above pit floor.
- .17 Use type ETT travelling cables.
  - .1 Suitably suspend the travelling cables to relieve strain in the individual conductors.
  - .2 Install travelling cables with a continuous run from the controller to the elevator cab. Do not terminate or couple the travelling cables under the car or in the hoistway.
  - .3 Suitably protect travelling cables from damage where they make contact with the hoistway, hoistway equipment or trimmer beams.
- .18 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.
- .19 For wiring that is run in conduit or tubing, comply with Table 6 of CEC Part 1.

## 2.4 Existing Electrical Services

- .1 Design equipment to operate using the existing 3 phase power supply. Contractor to confirm power supply on site.
- .2 The voltage supply may fluctuate plus or minus 10%.

- .3 Provide a true earth ground, shielding, or bonding required to accommodate the new elevator equipment.
- .4 Any modifications carried out to the existing electrical system relating to the elevator work shall be carried out by a licensed electrician and be inspected by the Electrical Safety Authority at the completion of the work. Provide a copy of the inspection permit and report.

## 2.5 Controller and Cabinet

- .1 Provide a solid state controller equipped with programmable logic microprocessor controls and self-diagnostic features. Provide fully non-proprietary version of all control equipment including:
  - .1 All required diagnostic are "on board".
  - .2 All programming, tools and diagrams required for long-term maintenance are provided with the controller as the Building Owner's property.
  - .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 a one-for-one "exchange only" basis.
- .2 Enclose the controller in enamelled, ventilated, sheet steel cabinet, with swing-type doors at front.
- .3 Provide relays and contactors particularly designed for elevator duty.
- .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, emergency power signal and any security cabling.

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- .5 Cord all field wiring and insulate from metal contact.
  - .6 Permanently identify all switches, relays and fuses.
  - .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.
  - .9 Mount all controller components, including resistors, inside the cabinets. Do not mount components on controller doors or removable panels.
  - .10 Govern motion of cars by means analysing real position of car in hoistway. Position device shall be positively connected to the car by mechanical or electrical means. Travelling to a terminal landing for recycling is not acceptable. Stepper relays are not acceptable.
  - .11 Do not employ components or controller logic which will disable or otherwise alter the operation of the elevator after a pre-determined number of starts, door cycles, etc.
  - .12 Use microprocessors for all logic related functions such as dispatcher, car controller and motion control. Provide crystal regulated frequencies. Provide a dispatching program in ROM, with at least 40% spare capacity. Power each processor from a separate power supply. Isolate the inputs and outputs by optical devices or relays.
  - .13 Use easily removable printed circuit boards for all solid state devices other than high power SCR's and rectifiers. Use gold plated edge connectors. Protect circuits from oxidation. Make all wiring connections through properly dimensioned pads.
  - .14 Design solid state circuits to operate in the anticipated environment. Provide means to restart the elevator system efficiently in the event of power interruption. Incorporate noise suppression devices in power supplies, inputs and outputs.

- .15 To facilitate testing and troubleshooting, arrange control circuits to ground one side of the control power supply used for external circuits. (External circuits are those outside of microprocessors or solid state devices, such as relays, lights, limits, locks and buttons.) Arrange the design so that safety circuits are not compromised by accidental grounding of control circuits.
- .16 Install wiring runs neatly. Terminate wiring at studs or terminal strips, using connections that assure substantial electrical and mechanical integrity. Identify all major components exactly as they are indicated on wiring diagrams. Use engraved lamicaid or metal tag mounted immediately adjacent to the component.
- .17 Provide battery back-up for all circuits containing volatile memory to retain all information for at least 48 hours without regular power.

## 2.6 Selective Collective Automatic Operation

- .1 Provide Simplex selective-collective automatic operation:
- .2 Provide two (2) operating devices in the car with stainless steel faceplate containing flush mounted LED illuminated type vandal resistant stainless steel push buttons to correspond with landings served, keyed switch for car light, alarm button and keyed emergency stop switch.
- .3 When lifting rated load, do not permit car speed to vary from rated speed by more than 10%.
- .4 Arrange each car so that momentary pressure of one or more of its car buttons causes car to start.



- .5 When the car has been started, either in response to its own car button calls or to landing calls, respond to its own car button calls and to landing calls registered for direction in which car is travelling in order in which landings are reached, irrespective of sequence in which calls were registered. When travelling down the car will not respond to up calls, but these will remain registered and be answered on the next up trip.
- .6 Return car to clear all its calls to the first floor.
- .7 If no car buttons are pressed and a car starts up in response to several down calls, it shall proceed first to the highest down call and reverse to collect other down calls. Similarly, up calls shall be collected when the car starts down in response to such calls.
- .8 If the car stops for a landing call and a car button is pressed within a pre-determined interval thereafter, corresponding to the direction in which the car is travelling, the car shall proceed in the same direction regardless of other landing calls registered.
- .9 If down landing buttons are pressed while the car is travelling up, the car shall not stop at these landings, but shall allow these calls to remain registered.
- .10 After the highest car and landing calls have been answered and the door interlock circuit is established, the car shall automatically reverse and respond to down car and landing calls.
- .11 Provide a time relay to hold the car for an adjustable interval at landings at which stops are made to enable passengers to enter or leave the car.
- .12 Cause the car to start before this time upon registration of a car button for another landing.
- .13 Permit a car to be registered to establish direction of travel when car has answered the furthest call, even if other landing calls are registered.

- .14 Do not start car unless the car door is in the closed position and all hoistway doors are locked in the closed position.
- .15 The opening of the emergency stop switch shall interrupt the passage of oil into the cylinder independently of the regular operating device. Opening the emergency stop switch shall not cancel registered calls and after the switch is closed the car shall continue to answer calls in the normal manner.
- .16 Provide the elevator with a self-levelling feature that will automatically bring the car to the floor landings. Self-levelling shall, within its zone, be entirely automatic and independent of the operating device, shall correct for over travel or under travel and shall maintain the car within 10 mm of the landing irrespective of load and direction of travel.
- .17 The main floor as described in this operation is Ground floor.
- .18 Provide independent service by means of key operated switch in car service panel which will allow the car to operate independently of hall calls.

## 2.7 Cylinder and Plunger

- .1 Remove the existing jack unit and install a complete new jack unit. Size jack unit accordingly to allow easy access in to the existing hoistway. Do not perform any hoisting from the suspended car cab.
- .2 Familiarize with existing siding ground conditions and viewed be responsible for cylinder well hole.
- .3 Steel Casings: Provide schedule 80 steel outer casing for each well hole, 508 mm (20") in diameter greater than the wrapped diameter of the protected cylinders drilled to a depth 1524 mm (60") deeper than required for the in ground jack assembly. The steel casing shall extend the full depth of the well hole even if rock is encountered. The bottom of the steel cased well hole shall be plugged with a continuous welded end cap or provided as approved 601 mm (24") of non-shrink concrete as approved.

- .4 Weld seams solid at multiple casing joints.
- .5 Provide a steel ring at top of casing to be keyed into pit floor.
- .6 Provide a secondary schedule 80 PVC Casings 254 mm (10") in diameter greater than the wrapped diameter of the protected cylinders 254 mm (24") deeper than the jack assemblies. With watertight sealed couplings and bottom end caps.
- .7 Extend PVC above pit floor to fit snug against cylinder head or pit channels.
- .8 Seal top of PVC and provide a 50.8 mm (2") diameter, 4-in. long PVC inspection port with threaded cap.
- .9 For inground cylinder system, comply with the following:
  - .1 Set cylinder and PVC casing within steel casing.
  - .2 Set PVC casing plumb within 6.35 mm (1 /4").
  - .3 Set Jack assembly plumb within 3.17 mm (1/8").
  - .4 Provide watertight seal at pit floor between cylinder and PVC and between PVC and steel casing using waterproof resin sealer.
  - .5 Cylinder: Steel pipe, factory tested for 600 pounds per square inch working pressure. Sandblast or wire brush outside of cylinder to remove rust and scale. Paint with heavy coat of epoxy.
  - .6 Plunger: Use seamless steel pipe or tubing. Plunger shall be no more than 0.010 inch out of round and straight within 1.59 mm (1/16"). Protect during shipping and installation to avoid damage. Isolate plunger top from car frame. Plungers with follower guides are not acceptable.
- .10 Include safety bulkhead on cylinder in accordance with B44 code.

## 2.8 Pumping Unit

- .1 Provide a complete new pumping unit.
- .2 Design pumping unit as an integral unit combining motor, pump, valves and reservoir in one enclosure.

- .3 Reduce airborne noise with sound deadening material, submerge pump and motor in oil reservoir.
- .4 Provide swing panels or panels equipped with quick release fasteners for convenient access to parts of equipment requiring adjustment.
- .5 Use positive displacement screw type pump with direct connection between drive motor and pump through flexible coupling, specially designed for quiet service.
- .6 Where necessary, install oil tight drip pan beneath unit to retain leakage of hydraulic fluid.
- .7 Install thermostatically controlled heaters or other means to maintain fluid viscosity within limits necessary to provide consistent, reliable operation at all times.
- .8 Install thermostatic protection of oil temperature in reservoir where pump or motor is submerged in reservoir.

## 2.9 Motor

- .1 Provide new pump motor. Do not exceed existing horsepower. If a change in horsepower is required, clearly note the change on the submitted shop drawings for Consultant approval.
- .2 Do not exceed EEMAC Design B locked rotor current.
- .3 Design for minimum locked rotor torque of 150% and minimum breakdown torque 200% at normal voltage.
- .4 Provide data plate on motor showing motor connections.
- .5 Limit starting current of elevator motor to not more than four (4) times full load running current.
- .6 Include Class B motor insulation.

- .7 Include manually reset integral overheating protection to CSA C22.2.
- .8 Design motor for 100 starts per hour.

## 2.10 Motor Controller

- .1 Provide a CSA approved modular microcomputer controller to provide solid state soft starting.
- .2 Provide the following protection during the starting and running modes.
  - .1 Start fault.
  - .2 Line fault.
  - .3 Temperature fault.
  - .4 Stall motor.
  - .5 Provide LED indicators for advisory status and fault annunciation.
  - .6 Design controller to be capable of delivering its rated current and ambient temperatures ranging from 5 C to 36 C.

## 2.11 Oil Storage Tank

- .1 Provide oil storage tank capacity equal to volume of oil required to lift elevator to top terminal plus reserve of not less than 10% or 40 litres, whichever is greater. Provide all new "green" fully biodegradable, elevator hydraulic fluid. Provide viscosity Index of 190 with Flash point of 200 degrees C or better. Include permanent signage on reservoir indicating the type of oil required and viscosity index.
- .2 Clearly and permanently indicate minimum permissible oil level.
- .3 Include gauge glasses to indicate oil level if top of tank is more than 1.5 metres above floor level.

- .4 Provide filtering screen mounted over the suction inlet.
- .5 Provide a drain connection.

### 2.12 Low Oil Control

- .1 Provide low oil control feature to automatically cause up-travelling car to descend to main landing if reservoir oil level is insufficient.
- .2 Arrange control so that oil reservoir must be refilled before elevator can be returned to service.
- .3 Open car and hoistway doors automatically at lower landing. Inactivate control buttons in car operating panel except door open button.

### 2.13 Sound Isolation

- .1 Include resilient pads to effectively isolate pumping unit from machine flooring and plungers from car frame. Design for transmissivity of less than 10% at full speed and full load. Use a minimum of 17 mm thick pads. Do not use built-up pads.
- .2 Prevent lateral displacement of pumping unit.
- .3 Isolate oil line from building structure through the use of isolation hangers or rubber.

### 2.14 Muffler

- .1 Minimize transmission of fluid pulsations in pipeline between pumping unit and cylinder head with blow-out proof muffler.

### 2.15 Piping

- .1 Provide new piping from machine room to cylinder. Remove existing oil lines.
- .2 Use threaded couplings or mechanical couplings which mechanically prevent separation of adjoining members.
- .3 Welding is permitted providing interior of pipe is thoroughly cleaned after welding or where welding method prohibits introduction of foreign material into interior of pipe.
- .4 Provide sound isolation couplings in pipeline between pump and cylinder.
- .5 Provide two (2) gate valves in the line to facilitate maintenance and adjusting of the elevator, one in the machine and one in the pit.
- .6 Locate piping where it can be serviced. Buried piping is not acceptable.
- .7 Remove all redundant oil from existing piping.
- .8 Provide overspeed valve within 300mm (12") of the hydraulic jack. Activate on pressure drop - not electrical connection. Provide adjustable flow initially set to activate at 125% of contract speed.

## 2.16 Roller Guides

- .1 Equip car with heavy duty roller guides, individually spring loaded, mounted on top and bottom of car. Provide minimum roller diameter of 102mm (4").
- .2 Provide each guide with durable, oil resistant and resilient tired ball bearing rollers to run on the 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 24 hours under average environmental conditions.

### 2.17 Guide rails and Brackets

- .1 Retain and refurbish existing guide rails if compatible with new equipment.
- .2 Examine all rails to be plumb and parallel with a maximum deviation of 1.6 mm. Make any adjustments as required.
- .3 Align and file any joints as needed.
- .4 Tighten any loose rail brackets or rail clips.
- .5 Examine the condition of all fastenings in hoistway.
- .6 Thoroughly clean and remove any rust from rails prior to the installation of the new roller guides. Include for grinding of rails if required to remove grease, dirt and/or rust.
- .7 Paint all non-running surfaces of the rails.

### 2.18 Buffers and Pit Work

- .1 Provide new spring buffers and support steel. New buffers and steel supports must suit the reconfigured pit arrangement.
- .2 Wire brush and thoroughly examine existing rails, fastenings and steel channels. Replace any badly corroded fastenings.
- .3 Paint all pit equipment with rust resistant paint.
- .4 Mount any conduit approximately 300 mm above pit floor. Suitably support all conduit.
- .5 Install data plates on all buffers.



## 2.19 Position

### Transducer

- .1 Arrange the closed loop feedback power control to continuously monitor the actual elevator speed signal from the velocity transducer and compare it with the intended speed signal to verify proper and safe operation of the elevator.
- .2 Accomplish electrical stepping using solid state devices, pulse generators or magnetic switches. Do not use electro-mechanical stepper switches or tape readers. Design the unit so that parts are accessible for easy adjustment.

## 2.20 Security

### System Provisions

- .1 Provide a security system interface to provide restrictive operation to the car and hall calls of the elevators with a proximity card reader system. Security system will be supplied and installed by others.
- .2 A labelled security interface system junction box shall be provided on the outside of the controllers and the wires shall be identified for the security system. Provide as a minimum, eight (8) pairs of shielded cables, #18 AWG. Terminate cables in the junction box on terminal strip, clearly designating these cables as for future security system use. Secure other end of cables behind the car operating station to allow for future interconnection with proximity card reader.
- .3 Provide a 240 mm wide x 100 mm high cut out at each car operating panel. Provide space behind cut-out and provided translucent, smoked, plexiglass, 7 mm thick, flush mounted in cut-out opening.
- .4 Isolate all car and hall call circuits to prevent electrical feedback through any inter-connections with proximity card reader controls.

- .5 Run wiring between the elevator machine room and car operating panel without splices, breaks, or joint connections.
- .6 Include for coordinating the installation of the proximity card reader devices as well as coordinating the interfacing and connection requirements to ensure a workable security system.
- .7 Provide ability to restrict calls to specific floors.
- .8 Provide security override for Emergency Service operation.
- .9 Provide keyed manual over-ride of security system, in case of system malfunction. Provide one over-ride per car and one global over-ride. Locate key switches as indicated at time of shop drawing review.

## 2.21 FEO - Phase I Emergency Recall Operation

- .1 Provide emergency recall service which will be initiated automatically. 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.

## 2.22 FEO - Phase II Emergency In-Car Operation

- .1 Provide in-car emergency service for each elevator initiated by a key switch located in the car station. 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.
- .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.

## 2.23 Independent Service

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- .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. Car position indicator to remain operational.

- .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 Render the door detector inoperative.

#### 2.24 Access to Pit, Hoistway and Top of Car Inspection

- .1 At all landings, provide a hoistway door unlocking device. Provide a collar for holes in door.
- .2 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: 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 The speed of the elevator shall be not more than 150 fpm and not less than 50 fpm while on inspection mode.

- .3 Working light switches shall be accessible from the hoistway entrances.
- .4 Provide a car top guard rail on all non-access sides of the elevator car top except where the distance to a wall does not exceed 356 mm.
  - .1 Include for an intermediate rail and toe board.
  - .2 Weigh the elevator before and after installation.
  - .3 On the crosshead data plate, record the pre-alteration weight, weight added to elevator, current weight, installation date, contactor name and alteration type.
  - .4 Provide an alteration data plate on the controller and record work performed in the maintenance log book.
  - .5 Paint the railing and toe board yellow.
  - .6 Provide an outline of the top of car refuge area.

## 2.25 Work

### Light and Receptacles

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

## 2.26 Emergency Lighting

- .1 Include emergency lighting in the cars, with a minimum of two (2) lamps.
- .2 Use battery operated emergency lighting equipment to CSA C22 No. 141-1985, 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.

### 2.27 Car Platform

- .1 Provide nickel-silver threshold to accept flooring thickness chosen by the Owner.
- .2 Existing car sling, frame and steel platform may be retained if compatible to specified new equipment and refurbished including the correction of all deficiencies such as broken welds.
- .3 Provide isolation pads. Vulcanize steel plates to top and bottom of pads. Arrange for fastening top plate to platform and bottom plate to isolation frame.
- .4 Provide rubber isolation of car enclosure to sides of uprights.
- .5 Install a sub floor made of plywood as required for class of loading.
- .6 Ensure clearance between the car and all hall sills is within code requirements. Make all necessary adjustments.

### 2.28 Car Cab Enclosure

- .1 Paint cabs walls, new checker plate floor, cab rails and bumper rails to RPSS's selected custom colours.
- .2 Fabricate front return panel, entrance columns and car doors of matching, steel.
- .3 Provide new 3/16" aluminum checker plate flooring, brushed finish. Accommodate weight and space of flooring at sill.

- .4 Provide new two-speed cab fans. Move 25 L/s of air on high speed and approximately half that flow on low speed. Limit total fan noise to 55 dBA, measured on an "S" response scale, measured 0.9 m above floor with fan on high speed.
- .5 Use bolts fitted with washers and lockwashers and fabric separators, if necessary, to assemble and guarantee entire structure to operate entirely free from squeaks and metallic sounds.
- .6 Provide new high efficiency fluorescent light fixtures at recessed into ceiling. Provide new overall energy efficient fluorescent ceiling lighting using electronic ballasts, sound rated "A". Design for light intensity measured 30" above floor of 215 Lx. Provide new caged protection.
- .7 Install new 6.5 mm x 150 mm stainless steel handrails and matching bumper rails on all non-accessible sides. Set at height of 910 mm and 100 mm above floor with 38 mm clearance between wall and handrail. Return ends to walls.
- .8 Sand and paint walls and ceilings with a minimum of two coats of enamel, painted to RPSS's selected custom colour.
- .9 Use bolts fitted with washers and lockwashers and fabric separators, if necessary, to assemble and guarantee entire structure to operate entirely free from squeaks and metallic sounds.
- .10 Provide 96" clear height in cab under ceiling.
- .11 Provide clear car entrance height of 7' 0".
- .12 Provide an emergency exit on top of the car of suitable size, equipped with an electrical device which will prevent operation of the elevator if the exit cover is open more than 50 mm and designed to comply with elevator code.
- .13 Provide stainless steel licence holder in car to suit certificate issued by enforcing authority. Design licence holder with hidden fastening.

## 2.29 Car Doors



- .1 Provide flush steel horizontal-slide doors faced with 16 gauge, steel, painted to RPSS's selected custom colour. Wrap steel around doors. Do not use binder angles.
- .2 Provide two (2) steel pins, one at each end of each door panel extending from the door into the centre of the threshold grooves to prevent the door swinging into the hoistway, should the lower guides become dislodged.
- .3 Install main guides, one at each end of each door panel.
- .4 Provide smooth and quiet door operation. Do not employ felt-covered gibs.
- .5 Provide an auxiliary closing device for multi-section doors.
- .6 Provide new cold drawn or cold rolled steel door tracks with two-point suspension hanger tracks for each panel.

### 2.30 Hoistway Door Hangers, Locks, Tracks and Closing Devices

- .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. Include provision of new two-point suspension door hangar rollers for each door panel using rollers with resilient sound absorbing wearing surfaces. Use self-lubricating ball or roller bearings sealed to retain grease lubrication and wipers to maintain rollers and track in clean condition.
- .2 Absorb upthrust with adjustable eccentric rollers equipped with ball or roller bearings.
- .3 Design for replacement of gibs without removing door from hanger tracks.

- .4 Provide spring-type, sill-mounted closing devices or alternatively heavy-duty spirator devices.
- .5 Provide positive electric interlocks and pick-up roller assemblies. Provide wiring to door locks including a separate green ground wire back to controller.
- .6 Provide door safety retainers to prevent door panel displacement should the replaceable primary guiding means fail.
- .7 Dowel all hoistway door pick-up roller assemblies after final adjustments have been made.
- .8 Provide auxiliary closing devices on multi-section doors.

### 2.31 Car and Hoistway Door Operator

- .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.
- .2 Operate the car door and hoistway doors simultaneously.
- .3 Provide a minimum motor power of 1/4 HP.
- .4 Provide electrical cushioning at each end of travel.
- .5 Provide one (1) gate switch per door panel, operated by a roller attached to the door panel. Provide wiring including a separate green ground wire back to controller.

### 2.32 Car Door Protective Devices

- .1 Provide a three-dimensional, solid state, electronically operated 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.

### 2.33 Fire Rated Elevator Entrances

- .1 Entrance frames and doors may be retained and refurbished if compatible to specified new equipment.
- .2 Examine existing entrances and repair any defects. Paint to RPSS's selected custom colour.

- .3 Install 50 mm high stainless steel arabic numerals on both sides of entrance frame and provide appropriate braille markings. Centre-line of numerals to be 1524 mm above finished floor. Include a "star" at the main egress level.
- .4 Cushion opening doors and closing doors with rubber bumpers.

### 2.34 Flush Type Hoistway Doors

- .1 Install new lower guides on all hoistway doors. Two guides per door panel.
- .2 Adjust all hoistway doors for smooth and quiet operation.
- .3 Adjust all hoistway doors to fully clear the elevator entrance when fully opened.
- .4 Cushion opening doors and closing doors with new rubber astragals.
- .5 Replace all sight guards at all floors with steel-type sight guards. Finish to match hall doors. Provide a resilient gasket between the sight guard and hoistway side of the hall doors. Use self-tapping screws.

### 2.35 Hall Sills

- .1 Retain existing sills. Wire brush and thoroughly clean the full length of all sills.
- .2 Examine existing hall sills and repair defects.

### 2.36 Fascias and Toeguards

- .1 Provide fascia and extended toe-guard to full width of entrance plus overlap.

- .2 Reinforce to walls where necessary to prevent deflection of fascia and securely fasten to entrance arrangement.
- .3 Provide final coat of paint on unfinished steel.
- .4 Be responsible for apron plates and ensure compliance with current Code requirements (size and fastening).

### 2.37 Identification

- .1 Provide 50 mm (2") numerals on all elevator equipment.
- .2 Identify all elevators at recall level. For this and any other identification of cars and floors at entrances that is visible to passengers, 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.
- .3 Provide six (6) keys of each type used with key rings and engraved gravoply discs, identifying use of key.

### 2.38 Lanterns

- .1 Provide translucent, high-impact plastic, flush mounted car riding lanterns in each door jamb (2 per car). Illuminate lantern suitably to indicate direction of car travel to waiting passengers.
- .2 Provide illuminated fixture of diameter not less than 70 mm (2.75") with stainless steel faceplates.
- .3 Sound gong or chime with the illumination of direction arrows, one gong for up and two for down. Chime to be adjustable in volume. Provide clear tone at 30 dBA approximately 8 feet from fixture. Time gong so as to be heard by passengers waiting in the hall.

### 2.39 Hall Button Fixtures

- .1 Provide LED illuminated, stainless steel push buttons (blue illumination). LED's to be rated for 100,000 hours illumination.
- .2 Install at 1066 mm to top of button above floor level.
- .3 Provide flush mounted illuminated type push button on a stainless steel, no. 4 finish faceplate. Illuminate buttons when pressed to indicate a call has been registered and retain illumination until the call has been answered.
- .4 Provide "UP" pushbutton at lowest landing and "DOWN" pushbutton at top floor and "UP and DOWN" buttons at typical floors.
- .5 Provide an Out of Service indicator in each fixture. Whenever service is denied to the elevator for any reason, the "OUT OF SERVICE" sign shall illuminate automatically. This includes top of car inspection operation and an opening in the safety circuit.

## 2.40 Special Operation Fixtures

- .1 Provide in the ground floor lobby hall station:
  - .1 A three (3) position fire recall switch, OFF - ON - RESET with pilot light.
  - .2 Engrave faceplate "FIREFIGHTERS' EMERGENCY OPERATION" in red lettering 5 mm in height.
  - .3 Provide engraved instructions adjacent to the switch for the operation of the recall switch.
  - .4 Provide an audible and illuminated visual signal adjacent to the main lobby "Fire Recall" switch labelled "ELEVATOR COMMUNICATIONS FAILURE" in red letters a minimum of 5 mm in height. Include a keyswitch to reset the alarm.
- .2 Provide at recall level near elevator hoistway a box conspicuously located and identified containing the emergency recall service keys.

2.41 Position  
Indicators/  
Voice Annunciation

- .1 Provide flush mounted position indicators over top of ground floor entrance and include one (1) additional indicator in the car station. Provide LED-illuminated, segmented, digital-display position indicators with stainless steel faceplate. Vacuum tube fluorescent is an acceptable alternative.
- .2 Use characters at least 38 mm high.
- .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 with shop drawings.
- .4 Provide in each hall station an "OUT OF SERVICE" sign/indicator.
  - .1 Whenever service is denied to the particular elevator for any reason, the "OUT OF SERVICE" sign shall illuminate automatically. This includes top of car inspection operation and an opening in the safety circuit.
  - .2 Provide an identified toggle switch on the side of the controller that shall illuminate the OUT OF SERVICE sign.

2.42 Car Operating  
Station

- .1 Provide two (2) car operating station in each car.
- .2 Provide one (1) service cabinet per car located in the auxiliary station. In cabinet, provide key-operated switches for lighting, emergency light test, 2-speed fan, independent service and out of service. Provide one spare key switch. Provide proper labeling of all switches including the spare key switch. Provide a dimmer switch for control of lighting and a 110 volt, 15 amp duplex receptacle. Provide a lockable flush-mounted door.

- .3 Use brush stainless steel cover.
- .4 Engrave all wording required on car front - do not use surface mounted plates. Engrave all characters in cover 0.8 mm deep and filled with enamel.
- .5 Use Dupar US91 or equivalent LED-illuminated stainless steel floor buttons, one for each floor served. Provide flush mounted tactile identification at side of each button. Include momentary audible signal to indicate call has been registered.
- .6 Provide a key operated stop switch and door open and close buttons.
- .7 Provide a separate lockable "Firefighters' Operation" cabinet located at the top of the car operating panel (no higher than 1800 mm from finished cab floor) housing the Fire Operation key switch, Call Cancel button, STOP switch, DOOR OPEN and DOOR CLOSE buttons, additional indicator light and operating instructions.
- .8 Engrave identification in upper or lower case, Helvetica medium, at least 9 mm, filled with red or black enamel, as required.
- .9 Engrave the car number, government installation number and maximum capacity in kilograms and lbs. and number of persons on each car station. Use wording "MAXIMUM CAPACITY".
- .10 Use international symbols wherever possible.
- .11 Provide a speaker and grille with assistance button identified on the car operating panel. Include autodialler and all wiring required to be connected to the Owner's telephone line. Install a metal guard behind the speaker to eliminate interference from car operating panel controls.
  - .1 Provide an international telephone symbol to identify the assistance button with engraved bilingual signage "HELP".
  - .2 Provide an LED visual indicator on the car operating station faceplate to indicate the call for assistance has been acknowledged. Locate button 1220 mm from finished cab floor.



- .3 The hands free emergency communications device shall contain an internal speaker and microphone to enable two-way communication with elevator passengers.
  - .4 The device shall be activated by pressing the assistance button located on the car operating station faceplate and shall automatically dial a telephone number of the Owner's choice.
  - .5 The device shall contain a ring sensor which shall allow the initiation of a call to the elevator.
- .12 Include uninterrupted telephone wiring within elevator hoistway, from car cab to a box located on the outside of controller.

#### 2.43 Terminal Stopping Devices

- .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.

#### 2.44 Barrier-free Design

- .1 Arrange all controls and fixtures to be easily reached and operated by disabled persons.
- .2 Unless otherwise specified within, arrange any new controls and fixtures to meet all requirements of Appendix "E" of the ASME A17-2010/CSA-B44-10 Safety Code for Elevators and Escalators.

#### 2.45 Signal Illumination

- .1 Illuminate signal fixtures with intensity which produces distinct and well defined indications. All signals to be LED illuminated.

#### 2.46 Fixture Fastening

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

#### 2.47 Markings

- .1 Engrave identification and instructions at least 0.8 mm deep on operating panels and on all signal equipment in English only except where design is such that inference is obvious and readily understood. Submit markings and designs for approval.

#### 2.48 Non-standard Pit and Overhead

- .1 Include for working platforms and buffer extensions if required.

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## PART 3 - EXECUTION

### 3.1 Removal of Equipment

- .1 Remove and dispose of all redundant elevator equipment from the site. Engage a licensed handler of hazardous materials to remove and dispose of power unit oil.
- .2 Include removal of the existing cylinder and improvements to hole including width and depth to accommodate new PVC- encased cylinder. Include related work such as chipping, pressurized water, vacuum truck and waste water disposal. Provide water tight repair of pit floor and cylinder head at conclusion of work.

### 3.2 Arrangement of Equipment

- .1 Arrange equipment in machine room so that equipment can be removed for repairs or replacement without dismantling or removing other equipment components.
- .2 Arrange equipment for clear passage to machine room door.
- .3 Accommodate equipment in existing spaces including machine room, pit, overhead and hoistway width and depth.

### 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 W47-92.
- .2 Identify field welds with welder's identification stamp.

### 3.4 Storage

- .1 Co-ordinate delivery and storage of materials with the Owner.

### 3.5 Field Quality Control

- .1 Perform and meet tests required by CAN/CSA-B44 Safety Code for Elevators. Supply instruments and carry out these and other tests specified herein.
- .2 Provide 2 days written notice to Consultant of date and time of tests.
- .3 Have a copy of the Specifications on site and available to the installation mechanic.
- .4 Provide Consultant with copy of all speeds and current readings taken at the time of the Provincial regulatory agency inspection.

### 3.6 Cleaning

- .1 Completely remove protective coverings from finished surfaces and components.
- .2 Maintain clean work areas and running equipment through the duration of the project.
- .3 Provide a complete final cleaning of all equipment and work areas prior to turnover of the elevator.

### 3.7 Painting

- .1 Paint the machine room walls and floor.
- .2 Paint the following equipment in the hoistway:
  - .1 Car tops and crossheads.
  - .2 Rails and strut angles and fascia plates.
  - .3 Outline of refuge space on the car top.
  - .4 Pit equipment, including pit floor and 3 feet high on the pit wall.
- .3 Use paint materials listed on the CGSB qualified products list and to IOS standards only.

- .4 Paint materials for each coating formulae to be products of a single manufacturer.
- .5 Prepare masonry, stucco and concrete surfaces to CGSB 85-GP-31M.
- .6 Prepare concrete floors to CGSB 85-GP-32M.
- .7 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.
- .8 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.

### 3.8 Burning Torches

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

### 3.9 Technical Presentation

- .1 Provide the services of a mechanic or adjustor who has worked on the project and is thoroughly familiar with the elevator control system and its operation to provide technical training to designated building authorities.
- .2 Allow at least 1 day for this training. Training session to cover but not be limited to the following features:
  - .1 Emergency power operation and emergency recall operation Phase I and Phase II including duplicate switches.
  - .2 Independent service operation.
  - .3 Voice communication system operation.
  - .4 Any special features provided on the elevators.

- .3 Provide when requested by the Engineer a hard copy of a condensed version of the elevator operational features.
- .4 The Elevator Contractor is to provide all information to the Engineer that is required for the safe and efficient maintenance of the elevator equipment, including any solid state equipment or devices supplied under these specifications. The supplier is not to refuse any information, or the supply of parts, at fair market value, that is required for elevator maintenance.

### 3.10 Field Testing and Commissioning

- .1 Furnish competent personnel to assist the Engineer during the inspection and testing of the systems should they be required.
- .2 The inspections shall be carried out to ensure document compliance.
- .3 Prior to Engineer's testing, the Elevator Contractor shall test all systems to ensure proper operation.
- .4 Upon completion of each elevator provide all personnel and necessary testing equipment to perform the following:
  - .1 Test operating times to verify performance requirements.
  - .2 Test door operating equipment to verify performance requirements.
  - .3 Test the ride to verify performance requirements.
  - .4 Test the equipment under full load and no load to verify speed variation performance requirements.
  - .5 Perform all electrical readings and complete technical data forms required by the specifications.
  - .6 Test stop ring and hydraulic system by operating elevator with rated load in UP direction against stop ring at inspection speed.

- 
- .5 Upon completion of the group of elevators, furnish technicians, adjusters or engineers fully trained in the equipment installed to test all operating systems included but not limited to, emergency power operation, special emergency service and operation of the group control system to verify the specification requirements.
  - .6 Attend at job site meetings pertaining to the Work.
  - .7 Have a copy of the Specifications available on site.
  - .8 After Provincial inspection of each elevator and before turn-over for customer use, test each elevator in simulated automatic operation without passenger access.
    - .1 Test for three (3) consecutive hours operating from floor to floor with door operation. Provide barricades and signage to indicate that an elevator test is in progress.
  - .9 Before turn-over for customer use, test elevators as following:
    - .1 Working pressure in up direction with 100% car load.
    - .2 Door timings and dwell settings.
    - .3 Operating speed, full load, up.
    - .4 Operating speed, empty car, down.
    - .5 Door close force.
    - .6 Door detector interrupt setting.
    - .7 Relief pressure setting - through pushing elevator on to stop ring.
    - .8 Testing of the integrity of the PVC.
  - .10 During warranty maintenance period closely monitor equipment for malfunctions and track reliability. Achieve a reliability rate of less than 0.6 malfunctions 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.

### 3.11 Elevator Consultant

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- .1 Consultant has general supervision and direction of the elevator work. He may be authorized by the Owner to stop the work whenever the stoppage is necessary to ensure the proper execution of the contract.
- .2 Furnish competent and co-operative mechanics for inspections and acceptance tests as the Consultant requires. Expect to have work interrupted during progress inspections by the Consultant.
- .3 Consultant will carry out one (1) Final Inspection and one (1) Re-inspection. Other inspections required due to the Elevator Contractor's failure to completely correct deficiencies previously listed may be deducted from the contract value by the Owner.
- .4 Complete deficiencies identified by Consultant promptly. Complete deficiencies identified on Consultant's final inspection report within 30 days of receipt, or alternatively provide written notice of any disputed items within 10 days of receipt. Pre-agreed compensation to the Owner shall be the extension by the same period completion of deficiencies is delayed beyond 30 days.



3.12 Notification  
to Consultant

- .1 Notify the Consultant at the following project milestones:
  - .1 Two weeks prior to commencement of work.
  - .2 When new pumping unit is operational.
  - .3 On completion of car buttons and door operator.
  - .4 On booking of Regulating Authority inspection.
  - .5 On completion of any deficiencies

**Table D - Commissioning Data to Be Submitted by Contractor for Each Elevator**

PARAMETER	MEASURED
Car speed UP (fpm)	
Car speed DOWN (fpm)	
Start to stop UP (sec)	
Start to stop DOWN (sec)	
Operating pressure UP (psi)	
Relief Pressure (psi)	
Door open (sec)	
Door close (sec)	
Car call dwell (sec)	
Hall call dwell (sec)	
Door stall force (pounds)	
Door timeout (sec)	

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PART 1 - GENERAL

1.1 Scope of Work

- .1 The work described herein includes for all labour and material, including overtime required to meet the agreed project schedule, to modernize One (1) hydraulic freight elevator located at Sidney Institute of Ocean Sciences, complete with new non-proprietary electrical controller, pumping unit, valve, motor and oil storage tank. Work includes:
- .2 Supply and install new PVC protected buried cylinder and piston including removal of old cylinder and required hole improvements.
- .3 Supply and install new vandal resistant stainless steel illuminated car and hall push buttons to comply with handicap requirements.
- .4 Supply and install new powered heavy-duty dual freight door operators per entrance, power gates, dual door operators per door, door limits, door chains, door rods, interlocks, door guides, tension latches, retiring cam assemblies and astragals.
- .5 Accommate emergency power supply.
- .6 Supply and install new car-cab interior.
- .7 New signals including car direction and position indicators and lobby position indicators.
- .8 Removal and disposal of all redundant elevator equipment.
- .9 This is a brief description, specifications detail complete work.

1.2 Related Work  
to be Carried  
Out by Elevator  
Contractor

- .1 Arrange for connection to owner's emergency cab communication system to the new telephone provided in the elevator cab. Include for any required assistance by communications contractor to make system functional.

- .2 Paint the machine room floor grey at the completion of project. Paint machine room walls. Use a minimum of two (2) coats of latex white semi-gloss paint to Engineer's approval.
- .3 Patch all redundant holes in machine room walls and ceilings prior to painting.
- .4 Provide one new high efficiency, 1220 mm long, dual tube fluorescent light fixture in the pit (100 lux). Provide mechanical guarding of the lights. Supply and install all wiring and conduit. Provide illuminated light toggle switch accessible from the lowest landing.
- .5 Provide new positive-acting pit stop switch. Mushroom type red in colour.
- .6 Provide a minimum of one 15 amp GFIC convenience receptacle at the machine room, pit and car top
- .7 Include electrician subcontract to accomplish all required conductor and conduit runs. Run new grounds as required.
- .8 Prior to fastening to, or carrying out any modifications to the building structure (ie. for hoisting of equipment), written approval must be obtained from a structural engineer. Provide a copy of this approval. Cost to be the responsibility of the elevator contractor.
- .9 Engage fire alarm subcontractor to disable fire detectors as required during course of work - respecting Owner's fire regulations.
- .10 Include electrician subcontract to accomplish all required conductor and conduit runs. Run new grounds as required.
- .11 Provide new switches and conductors for all lighting and new pit stop buttons.

- .12 Engage security subcontract to remove, reinstall and as required, reprogram existing security system. Add new card readers systems with swipe features on the exterior and interior of the car. Include programming feature capability to allow building O&M staff to program cards when required.
- .13 Include complete removal of redundant elevator components while working in an occupied building.
- .14 Include full costs of material movement - new materials in and redundant materials out, including crane costs, permits, removals of walls (to be made good after). Include for overtime costs of disruptive work.
- .15 Include for required protection of work area - signage, dust control, floor protection and barricades - to accomplish elevator modernization in an occupied building.
- .16 Carry out all noisy and disruptive work after hours including any work audible at more than 30 dB over ambient measured 1 meter on the tenant's side of barricades.
- .17 Supply any required garbage dumpster. Keep building cleared of rubbish.
- .18 Provide required cutting, patching and making good of new fixtures.
- .19 Provide new Code compliant pit ladder, including retractable with electrical switch, if required by new equipment arrangement.
- .20 Provide any required hoistway repairs including patching of holes, fire stopping and beveling of ledges or setbacks 100 mm or greater.
- .21 Provide all required supervision, coordination, safety meetings as required by multiple trades on site. The Division 14 contract will be the General Contractor. Include for required municipal and provincial work permits.

### 1.3 Related Work to be Carried Out by Owner

- .1 Arrange for live telephone line to the elevator machine room if existing is not compatible with new telephone.
- .2 Provide a new three phase main line switch or alternatively re-use existing switch.
- .3 Include new 600 volt disconnect and power connection for freight doors.
- .4 Include dry contact to elevator controller for activation of emergency power.
- .5 Install new fire signals to the elevator controller. This includes signal for main fire alarm, signal for a fire alarm emanating from the elevator machine room and/or elevator hoistway and thirdly a signal for a fire alarm emanating from the ground floor - used to drive the elevator to the recall floor. Include for new fire sensing devices in front of the elevator at each floor's lobby. Provide for this work being done by a certified fire alarm technician and provide required commissioning and testing of modifications to the fire alarm panel.
- .6 Provide new lighting in the elevator machine room, operated by new switch. Lighting to provide 200 Lux ambient at the machine room floor level employing a minimum of two, dual 48" T8 fluorescent fixtures at 4100 k. Provide mechanical guarding of the lights.

### 1.4 Reference Standards

- .1 Perform work to the following minimum standards:
  - .1 ASME A17-2010/CSA-B44-10 Safety Code for Elevators and Escalators
  - .2 CSA C22. No77 Motors with Inherent Overheating Protection.
  - .3 CSA C22 No. 141 Unit Equipment for Emergency Lighting.
  - .4 BC Elevator Act and Regulations.

- .5 C22 Canadian Electrical Code, particularly Section 38.
  - .6 National Building Code.
  - .7 CAN/CSA B651 Barrier-Free Design Guidelines.
  - .8 CAN/CSA Z320 Building Commissioning Standards.
  - .9 Canada Labour Code, Part 2, Occupational Safety and Health Regulations including Section 13.13.
  - .10 Occupational Health and Safety Act.
  - .11 CSA Z432-04 Safeguarding of Machinery.
- .2 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.
- .3 In case of discrepancy, the above standards take precedence over details elsewhere in this specification.

## 1.5 Type of Elevators

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- .1 One (1) Hydraulic freight elevator.
- .2 Power Supply
  - .1 600 Volts nominal, 3 Phase, 3 Wire, 60Hz.
  - .2 Lighting supply: 120 volts, 1 phase, 60Hz.
  - .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 the Owner. Include for powered landing doors.

## 1.6 Permits and Inspections

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- .1 Complete Design Submission and related research necessary for regulatory approval of Work.
- .2 Obtain 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 Owner and the Consultant with copies of inspection reports the same day they are received from authorities.

#### 1.7 Taxes

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

#### 1.8 Measurements

- .1 Before the execution of the work, verify all dimensions with the actual site conditions.

#### 1.9 Quality of Work

- .1 Perform work by mechanics skilled in the installation of hydraulic elevators and in the control system used. Provide adequate supervision.
- .2 Comply with all applicable provisions of all federal, provincial and local labour laws.

#### 1.10 Samples

- .1 Submit to Consultant for approval, upon request, samples of any visible elevator finishes including:
  - .1 Cab wall finishes.
  - .2 Cab ceilings.
  - .3 Cab doors.
  - .4 Hoistway entrance doors and frames.
  - .5 Signal and operating fixtures.

### 1.11 Shop Drawings and Product Data

- .1 Before beginning work, prepare all drawings necessary to show the general arrangement of the elevator equipment and other data which is called for and is to be submitted for review. Provide these drawings within two (2) weeks after notification of award of contract.
- .2 Drawing review is for the sole purpose of ascertaining conformance with the general design concept and does not constitute approval of the design details inherent in the shop drawings, responsibility for which shall remain with the Contractor. 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 Documents.
- .3 Indicate on shop drawings:
  - .1 Size and location of pumping unit and controller.
  - .2 Details on pumping unit components, including:
    1. Pump and pump motor.
    2. Valve.
    3. Drain location.
    4. Oil line diameter and location.
    5. Ball valve.
    6. Muffler.
- .4 Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
- .5 Heat generation of equipment in machine room.
- .6 Cross section drawing of jack unit. Include the following details:
  - .1 Finished plunger, plunger and casing diameter and length.
  - .2 Plunger wall thickness.
  - .3 Pit depth.
  - .4 Total load.
  - .5 Oil inlet location.
- .7 Size and location of car, hoisting beam, guide rails and other components in hoistway as required.



- .8 Detailed drawing showing all fixtures, position indicators, push buttons, car operating stations, corridor control panels, and any other special fixtures pertaining to the project.
- .9 Do not commence manufacture or order materials before shop drawings are reviewed.
- .10 Provide product data for:
  - .1 Signal and operating fixtures, operating panels and indicators.
  - .2 Cab design and components.

### 1.12 Project Record Documents

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- .1 Before final acceptance of equipment, 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 Drawing. One set of 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 Record actual locations of equipment, names of equipment manufacturers and suppliers, concealed conduit and boxes, concealed devices, disconnects and shut-off valve.
- .3 Mark up all field changes or additions to original wiring diagrams in red.

### 1.13 Operation and Maintenance Data

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- .1 Provide three (3) hard copies and one (1) soft copies, in English of the Operation and Maintenance manuals. Include in the manuals a copy of the safety authority registered design submission and inspection reports.

- 
- .2 Bind data in vinyl hard cover 3D ring type loose leaf binders for 212 x 275 mm size paper. Binders must not exceed 75 mm thick or be more than 2/3 full.
  - .3 Enclose title sheet labelled "Operation Data and Maintenance Manual", project name, date and list of contents. Show project name on binder face and spine.
  - .4 Organize contents into applicable sections of work to parallel project specifications breakdown. Mark each section by labelled tabs protected with celluloid covers fastened to hard paper dividing sheets.
  - .5 Include the following maintenance data for each elevator:
    - .1 Description of elevator system's method of operation and control including, but not restricted to, motor control system, emergency power operation, door operation, and special or non-standard features provided.
    - .2 Consolidated replacement parts list.
  - .6 Provide legible schematic wiring diagrams covering all electrical equipment as supplied and installed, including all changes made to final work, with all symbols listed corresponding to identity or markings on both machine room and hoistway apparatus.
  - .7 Include all wiring diagrams for all equipment on controllers.
  - .8 List information on each piece of equipment including:
    - .1 Approval drawing number.
    - .2 Model, part and serial number.
  - .9 Detail the following maintenance information:
    - .1 Lubrication products and schedules.
    - .2 Trouble shooting procedures.
    - .3 Adjustment techniques.
    - .4 Operational checks.
    - .5 Maintenance of special finishes.
    - .6 Planned maintenance tasks and their frequencies.

- .10 List recommended spare parts to be maintained on site to ensure optimum efficiency. List all special tools and appropriate unique applications. Detail manufacturer and supplier names and addresses.

#### 1.14 Maintenance Service

- .1 Provide complete interim maintenance of the elevator during the construction period until twelve (12) months from date of Final Certificate of Completion.
- .2 As a minimum all inspections, tests and maintenance procedures are to be carried out in accordance with provincial standards
- .3 Provide a separate price for maintenance service term of 60 months from the issuance of the Final Certificate of Completion of the last elevator.
- .4 Systematically clean, lubricate and adjust all of the equipment as required.
- .5 Repair or replace electrical and mechanical parts of any equipment as required, whether due to defect or normal wear and tear.
- .6 Use only genuine standard parts of manufacturer of equipment.
- .7 Perform work by competent personnel under supervision and in direct employ of manufacturer, or manufacturer's licensed agent.
- .8 Schedule work during regular Elevator Trade working hours with Owner.
- .9 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.
- .10 Include 24 hour call-back service required by equipment stoppage or malfunction at all times at no additional cost.

- .11 Ensure no unit is out of service longer than 12 hours - keep Owner completely informed of equipment malfunctions on a continuing basis.
- .12 Remove garbage at each examination.
- .13 Provide a log book in the machine room, record all callbacks and repairs, as work is carried out. Provide an "acknowledgement of inspection" form at each inspection. Do not employ a computerized log book.
- .14 Provide a storage cabinet in the machine room suitable for storing spare parts and project documents.
- .15 Provide an approved container in the machine room for the storage of oil and rags. Empty on a regular basis.

#### 1.15 Layout

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

#### 1.16 Guarantee

- .1 Guarantee that the materials and workmanship of the apparatus installed under these specifications are first-class in every respect and make good any defects, not due to improper use or care, which may develop within one (1) year from the date of acceptance.
- .2 Provide an extended warranty of an additional two (2) years for finished surfaces visible to elevator passengers. Warranty coverage to include imperfections that may develop on painted and architectural steel surfaces, as well as shifting, delamination, bending or other imperfections of joints, panels and skins. Warranty does not cover damage by mis-use.
- .3 Commence warranty of work at date of certification of Final Completion, as certified by the Consultant.

### 1.17 Procedure

- .1 Notify the Owner and Consultant in writing, at least two (2) weeks prior to removing the elevator from service.

### 1.18 Fire and Safety Requirements

- .1 Comply with Provincial Regulations for Construction Projects.
- .2 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to Labour Canada.
- .3 Comply with owner's site security and safety regulations.
- .4 Comply with Owner's "Hot Works" policy as required.

### 1.19 Powder Actuated Fastening Devices

- .1 Do not use powder actuated tools using explosives, unless permitted expressly by the Consultant; comply with requirement of CAN3-Z166.2. (Use and Handling of Powder Actuated Tools.)

### 1.20 Cutting, Patching And Making Good

- .1 Cut existing surfaces as required to accommodate new work.

- .2 Patch and make good surface cuts, damaged or disturbed, to Consultant's approval. Match existing material, colour, finish and texture.

### 1.21 Dust Control

- .1 Provide dust tight screens or partitions to localize dust generating activities and for protection of workers, finished areas of work and public.
- .2 Maintain and relocate protection as required until such work is completed.
- .3 Protect all furnishing within work area with low fire spread tarps or screen during construction. Remove film during non-construction hours and leave premises in clean, unencumbered and safe manner for normal daytime function.

### 1.22 Scheduling

- .1 Within two (2) weeks after award of contract, submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Consultant, take necessary measures to complete work within scheduled time. Do not change schedule without notifying Consultant. Comply with all lead time's set out in the Tender documents.
- .2 Include, in this schedule, the following information:
  - .1 Shop drawing submission lead time.
  - .2 Material lead time.
  - .3 Material delivery to site by March 31, 2016 and mobilization.
  - .4 Modernization construction time (per car).
  - .5 Adjustment and finish-up time.
- .3 Provide a detailed cost breakdown schedule for invoicing purposes.

### 1.23 Occupied Building

- .1 Make allowance for the work being carried out in an occupied building including the possibility of persons with impaired judgment near the work area.
- .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 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 Owner or Consultant.
- .5 Where excessive noise or obstruction is unavoidable, make arrangements with the Owner to complete that portion of the Work at a mutually agreed time and include for overtime costs. Overtime work will be required where, in the reasonable judgement of the Consultant, building operations are being affected including:
  - .1 Noisy work that is clearly audible outside of the work space.
  - .2 Work generating fumes or noxious odours such as may arise from welding, painting and PVC glue.
  - .3 Disruptive work involving moving large materials through the common areas.

#### 1.24 Use of Elevators by Handicapped

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- .1 Arrange all controls and fixtures to be easily reached and operated by disabled persons. Meet all requirements of Appendix "E" of the ASME CSA-B44-10 Safety Code for Elevators.

- .2 Provide flush mounted Arabic numerals 16 mm in height raised 0.8 mm immediately to left of floor buttons to identify floor buttons.
- .3 Provide tactile indications (arabic), 50 mm floor numerals raised 0.8 mm, on the hoistway door panel jambs. Locate 1.5 metres above finished floor.
- .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 readily noticeable to passengers. Provide sample of annunciations, to be English, with shop drawings.

#### 1.25 Markings

- .1 Make identifications and instructions in English or alternatively with international symbols.

#### 1.26 Trademarks and Labels

- .1 Do not place permanent labels, trademarks or nameplates on materials.

#### 1.27 Storage and Handling

- .1 Store materials in elevator machine room or other space authorized by the Owner.

#### 1.28 Non Proprietary Guarantee

- .1 Provide a written guarantee from the manufacturer of the equipment, including controller, that the equipment is non-proprietary. This includes:



- .1 Extra spare parts are available for purchase, not just exchange. Parts may be purchased by anyone, not just the building owner. A price list of parts, including all circuit boards, is to be supplied with shop drawings.
- .2 All diagnostics are on board. All wiring diagrams, documentation and special tools required for maintenance are supplied with the elevator as the Owner's property.
- .3 The elevator programming does not expire, self-alter or degrade in any way.

### 1.29 Protection of Hoistway and Work Area

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- .1 Comply with Canadian Code for Construction Safety.
- .2 Erect hoarding at any floor where there is an unlocked elevator hoistway door.
- .3 On removal of hoardings, make good damage to surfaces of walls, floors and ceilings.
- .4 Fasten by bolts, plywood hoarding from floor to height of 2134 mm, 12 mm thick and at least as wide as the elevator entrance.
- .5 Use hoarded entrance for removal of redundant material and delivery of new equipment.
- .6 Protect existing floors by covering with 12 mm plywood and tarpaulins, when removing or delivering materials.
- .7 Protect the floor surface from dirt and damage during regular work hours where workers travel.
- .8 Upon completion of the project, clean and make good, all work areas, hallways and stairwells where used.
- .9 Create a work space inside hoardings of at least 1200 mm deep.

- .10 As a minimum allow for floor to ceiling hoarded area at the main floor with included self-closing, self-locking door. Include for enclosure of 200 square feet, wall locations as directed by Consultant designed to maximize work area while minimizing disruption to the adjacent corridor.

### 1.30 General Conditions

- .1 General requirements section and all other conditions apply to all the Work and are part of this section. Read in full all sections included in the specification document. Adapt this Work to that of the other trades.
- .2 Perform the erection of this equipment by certified Elevating Device Mechanics skilled in the installation of the qualified elevator machinery and associated equipment. Provide adequate supervision of this work. Dress all construction personnel in company uniforms or coveralls identified with the Contractor's name and logo.
- .3 Remove rubbish daily as it accumulates. Keep the building and premises clean during the progress of the work.
- .4 Be responsible for all equipment, products, tools and material not turned over for use by The Owner, whether or not equipment, products, tools or materials have been certified or paid for by either or both the Owner and/or the Consultant.
- .5 The Work may be viewed by the Consultant at any time during construction.

### 1.31 Consultant's Certification of Payment

(refer to front end documents)

### 1.32 Definition of Terms

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- .1 The term "Contractor" as used herein refers to any person, partners, firm or corporation having a contract with the Owner to furnish labour and material for the execution of the work described therein.
- .2 The term "Sub-contractor" as used herein refers to any person, partners, firm or corporation having a contract with the Contractor to furnish labour and materials for the execution of the work described herein.
- .3 All of the terms in the specifications have the definitions given in the CSA-B44-10 Safety Code for Elevators.
- .4 The term "provide" or "furnish" where used, means to supply and install new equipment.
- .5 The term "refurbish" where used, shall mean the provision necessary labour, modifications, parts, etc., which will result in returning the component to "like new" operating condition. Bidders should state any assumptions where the extent of refurbishment required is not clear.

### 1.33 Elevator Performance

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- .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 Maintain floor levelling accuracy of 6 mm or better.
- .4 Limit horizontal vibrations in both the post-to-post and front-to-back axis to 20 milli-g in the 2 - 10 hz range.

- .5 Limit vertical vibrations to 20 milli-g.
- .6 Adjust typical acceleration rate to 0.03 g.
- .7 Limit jerk rate (change in rate of acceleration) to 10 f/s/s/s.

PART 2 - PRODUCTS

2.1 Description  
 of Elevators and  
 Features

**Table A - Overview**

<b>FIELD</b>	<b>REQUIRED</b>
Type	Hydraulic
Class	Freight
Capacity	4000lbs
Speed	50 fpm
Landings	1,2 to front
Travel	Per existing
Pit Depth	Per existing
Door Opening	Power vertical bi-parting
Hall Entrance Finish	Painted to RPSS's selected custom colour.
Type of Control	Microprocessor based
Type of Operation	Simplex selective collective

**Table B - Special Features**

<b>FIELD</b>	<b>REQUIRED</b>
Fire Fighters' Operation	Phase I recall and Phase II in-car operation
Emergency Power	Building supply
Independent Service	Include
Seismic	Zone 4 design
Remote Monitoring	Not required
Card Reader	Required in car
Keyed lockouts	Not required

**Table C - Signals**

<b>FIELD</b>	<b>REQUIRED</b>
Push Buttons	Stainless steel, LED illuminated
Car Operating Panels	One (1)
Hall fixtures	Flush mounted
Position Indicators	Required in car operating panel and main lobby
Lanterns	Required in each car door jamb

Appendix "E" of B44	Partial compliance required
Emergency Phone	Provide two-way communication in cab

## 2.2 Components

- .1 Use major elevator components from standard product line of one manufacturer unless otherwise approved.
- .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 new, the best of their respective kinds and installed in a neat, accurate, workmanlike manner.
- .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 or XL-Blend S as specified.
- .7 Use paint with CGSB 1-GP-104Ma, alkyd enamel semi-gloss, for machinery, colour to be selected by Architect.
- .8 Provide elevator control equipment manufactured and installed by one of the following:
  1. Otis Canada Inc.
  2. Motion Control Engineering (MCE)
  3. GAL Manufacturing
  4. KONE Inc.
  5. ThyssenKrupp Elevator
  6. Automatisations JRT Inc.
- .9 Other manufacturers are not acceptable unless approved in writing by tender-issuing authority.

## 2.3 Electrical Components

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- .1 Provide insulated wiring to connect all parts of the equipment.
- .2 Use steel compression type fittings where electrical metallic tubing is used. Fittings with set screws are not acceptable unless a separately identified grounding conductor is also installed inside raceway.
- .3 Provide suitable communication system and any security system junction boxes on the outside of the controller. Provide uninterrupted shielded wiring from the communication system in car to junction box located at controller in machine room. Clearly label junction boxes accordingly.
- .4 Provide a separately identified box for the fire alarm connection and emergency power signal.
- .5 Include at least 10% spare conductors in each cable. Terminate spares at terminal blocks, suitably identified.
- .6 Include spares of at least six (6) pairs of shielded wires and one (1) CAT 5 cable for audio, video or other electronic equipment, such as a card reader system.
- .7 Do not parallel conductors to increase capacity unless individually fused.
- .8 Do not use armoured flexible metal conduit as grounding conductor.
- .9 Install anti-shorts at all wiring entry points.
- .10 Provide additional disconnect switches and wiring as required to suit machine room layout. Provide and install all required conduit and wiring from disconnect switches to elevator controllers.
- .11 Include wiring for run in conduit, by others, for connections to elevator-related devices remote from hoistway.

- .12 Connect all wiring where required to building fire alarm system. Fire alarm signal are to be brought to a demarcation point and labeled in the elevator machine room by Division 16.
- .13 Limit use of flexible conduit on car top to items that require movement or periodic adjustment.
- .14 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Run wiring in metal conduit or tubing or wire ducts.
- .15 When using conduits or troughs through floor, extend conduit or trough at least 100 mm (4") above floor.
- .16 Do not run conduit or wiring along the pit floor. Install all conduit and wiring a minimum of 300 mm (12") above pit floor.
- .17 Use type ETT travelling cables.
  - .1 Suitably suspend the travelling cables to relieve strain in the individual conductors.
  - .2 Install travelling cables with a continuous run from the controller to the elevator cab. Do not terminate or couple the travelling cables under the car or in the hoistway.
  - .3 Suitably protect travelling cables from damage where they make contact with the hoistway, hoistway equipment or trimmer beams.
- .18 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.
- .19 For wiring that is run in conduit or tubing, comply with Table 6 of CEC Part 1.

## 2.4 Existing Electrical Services

- .1 Design equipment to operate using the existing 3 phase power supply. Contractor to confirm power supply on site.
- .2 The voltage supply may fluctuate plus or minus 10%.



- .3 Provide a true earth ground, shielding, or bonding required to accommodate the new elevator equipment.
- .4 Any modifications carried out to the existing electrical system relating to the elevator work shall be carried out by a licensed electrician and be inspected by the Electrical Safety Authority at the completion of the work. Provide a copy of the inspection permit and report.

## 2.5 Controller and Cabinet

- .1 Provide a solid state controller equipped with programmable logic microprocessor controls and self-diagnostic features. Provide fully non-proprietary version of all control equipment including:
  - .1 All required diagnostic are "on board".
  - .2 All programming, tools and diagrams required for long-term maintenance are provided with the controller as the Building Owner's property.
  - .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 a one-for-one "exchange only" basis.
- .2 Enclose the controller in enamelled, ventilated, sheet steel cabinet, with swing-type doors at front.
- .3 Provide relays and contactors particularly designed for elevator duty.
- .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, emergency power signal and any security cabling.

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- .5 Cord all field wiring and insulate from metal contact.
  - .6 Permanently identify all switches, relays and fuses.
  - .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.
  - .9 Mount all controller components, including resistors, inside the cabinets. Do not mount components on controller doors or removable panels.
  - .10 Govern motion of cars by means analyzing real position of car in hoistway. Position device shall be positively connected to the car by mechanical or electrical means. Travelling to a terminal landing for recycling is not acceptable. Stepper relays are not acceptable.
  - .11 Do not employ components or controller logic which will disable or otherwise alter the operation of the elevator after a pre-determined number of starts, door cycles, etc.
  - .12 Use microprocessors for all logic related functions such as dispatcher, car controller and motion control. Provide crystal regulated frequencies. Provide a dispatching program in ROM, with at least 40% spare capacity. Power each processor from a separate power supply. Isolate the inputs and outputs by optical devices or relays.
  - .13 Use easily removable printed circuit boards for all solid state devices other than high power SCR's and rectifiers. Use gold plated edge connectors. Protect circuits from oxidation. Make all wiring connections through properly dimensioned pads.
  - .14 Design solid state circuits to operate in the anticipated environment. Provide means to restart the elevator system efficiently in the event of power interruption. Incorporate noise suppression devices in power supplies, inputs and outputs.

- .15 To facilitate testing and troubleshooting, arrange control circuits to ground one side of the control power supply used for external circuits. (External circuits are those outside of microprocessors or solid state devices, such as relays, lights, limits, locks and buttons.) Arrange the design so that safety circuits are not compromised by accidental grounding of control circuits.
- .16 Install wiring runs neatly. Terminate wiring at studs or terminal strips, using connections that assure substantial electrical and mechanical integrity. Identify all major components exactly as they are indicated on wiring diagrams. Use engraved lamicaid or metal tag mounted immediately adjacent to the component.
- .17 Provide battery back-up for all circuits containing volatile memory to retain all information for at least 48 hours without regular power.

## 2.6 Selective Collective Automatic Operation

- .1 Provide Simplex selective-collective automatic operation:
- .2 Provide one (1) operating devices in the car with stainless steel faceplate containing flush mounted LED illuminated type vandal resistant stainless steel push buttons to correspond with landings served, keyed switch for car light, alarm button and keyed emergency stop switch.
- .3 When lifting rated load, do not permit car speed to vary from rated speed by more than 10%.
- .4 Arrange each car so that momentary pressure of one or more of its car buttons causes car to start.

- .5 When the car has been started, either in response to its own car button calls or to landing calls, respond to its own car button calls and to landing calls registered for direction in which car is travelling in order in which landings are reached, irrespective of sequence in which calls were registered. When travelling down the car will not respond to up calls, but these will remain registered and be answered on the next up trip.
- .6 Return car to clear all its calls to the first floor.
- .7 If no car buttons are pressed and a car starts up in response to several down calls, it shall proceed first to the highest down call and reverse to collect other down calls. Similarly, up calls shall be collected when the car starts down in response to such calls.
- .8 If the car stops for a landing call and a car button is pressed within a pre-determined interval thereafter, corresponding to the direction in which the car is travelling, the car shall proceed in the same direction regardless of other landing calls registered.
- .9 If down landing buttons are pressed while the car is travelling up, the car shall not stop at these landings, but shall allow these calls to remain registered.
- .10 After the highest car and landing calls have been answered and the door interlock circuit is established, the car shall automatically reverse and respond to down car and landing calls.
- .11 Provide a time relay to hold the car for an adjustable interval at landings at which stops are made to enable passengers to enter or leave the car.
- .12 Cause the car to start before this time upon registration of a car button for another landing.
- .13 Permit a car to be registered to establish direction of travel when car has answered the furthest call, even if other landing calls are registered.

- .14 Do not start car unless the car door is in the closed position and all hoistway doors are locked in the closed position.
- .15 The opening of the emergency stop switch shall interrupt the passage of oil into the cylinder independently of the regular operating device. Opening the emergency stop switch shall not cancel registered calls and after the switch is closed the car shall continue to answer calls in the normal manner.
- .16 Provide the elevator with a self-levelling feature that will automatically bring the car to the floor landings. Self-levelling shall, within its zone, be entirely automatic and independent of the operating device, shall correct for over travel or under travel and shall maintain the car within 10 mm of the landing irrespective of load and direction of travel.
- .17 The main floor as described in this operation is Ground floor.
- .18 Provide independent service by means of key operated switch in car service panel which will allow the car to operate independently of hall calls.

## 2.7 Cylinder and Plunger

- .1 Remove the existing jack unit and install a complete new jack unit. Size jack unit accordingly to allow easy access in to the existing hoistway. Do not perform any hoisting from the suspended car cab.
- .2 Familiarize with existing siding ground conditions and viewed be responsible for cylinder well hole.
- .3 Steel Casings: Provide schedule 80 steel outer casing for each well hole, 508 mm (20") in diameter greater than the wrapped diameter of the protected cylinders drilled to a depth 1524 mm (60") deeper than required for the in ground jack assembly. The steel casing shall extend the full depth of the well hole even if rock is encountered. The bottom of the steel cased well hole shall be plugged with a continuous welded end cap or provided as approved 601 mm (24") of non-shrink concrete as approved.

- .4 Weld seams solid at multiple casing joints.
- .5 Provide a steel ring at top of casing to be keyed into pit floor.
- .6 Provide a secondary schedule 80 PVC Casings 254 mm (10") in diameter greater than the wrapped diameter of the protected cylinders 254 mm (24") deeper than the jack assemblies. With watertight sealed couplings and bottom end caps.
- .7 Extend PVC above pit floor to fit snug against cylinder head or pit channels.
- .8 Seal top of PVC and provide a 50.8 mm (2") diameter, 4-in. long PVC inspection port with threaded cap.
- .9 For inground cylinder system, comply with the following:
  - .1 Set cylinder and PVC casing within steel casing.
  - .2 Set PVC casing plumb within 6.35 mm (1 /4").
  - .3 Set Jack assembly plumb within 3.17 mm (1/8").
  - .4 Provide watertight seal at pit floor between cylinder and PVC and between PVC and steel casing using waterproof resin sealer.
  - .5 Cylinder: Steel pipe, factory tested for 600 pounds per square inch working pressure. Sandblast or wire brush outside of cylinder to remove rust and scale. Paint with heavy coat of epoxy.
  - .6 Plunger: Use seamless steel pipe or tubing. Plunger shall be no more than 0.010 inch out of round and straight within 1.59 mm (1/16"). Protect during shipping and installation to avoid damage. Isolate plunger top from car frame. Plungers with follower guides are not acceptable.
- .10 Include safety bulkhead on cylinder in accordance with B44 code.

## 2.8 Pumping Unit

- .1 Provide a complete new pumping unit.
- .2 Design pumping unit as an integral unit combining motor, pump, valves and reservoir in one enclosure.

- .3 Reduce airborne noise with sound deadening material, submerge pump and motor in oil reservoir.
- .4 Provide swing panels or panels equipped with quick release fasteners for convenient access to parts of equipment requiring adjustment.
- .5 Use positive displacement screw type pump with direct connection between drive motor and pump through flexible coupling, specially designed for quiet service.
- .6 Where necessary, install oil tight drip pan beneath unit to retain leakage of hydraulic fluid.
- .7 Install thermostatically controlled heaters or other means to maintain fluid viscosity within limits necessary to provide consistent, reliable operation at all times.
- .8 Install thermostatic protection of oil temperature in reservoir where pump or motor is submerged in reservoir.

## 2.9 Motor

- .1 Provide new pump motor. Do not exceed existing horsepower. If a change in horsepower is required, clearly note the change on the submitted shop drawings for Consultant approval.
- .2 Do not exceed EEMAC Design B locked rotor current.
- .3 Design for minimum locked rotor torque of 150% and minimum breakdown torque 200% at normal voltage.
- .4 Provide data plate on motor showing motor connections.
- .5 Limit starting current of elevator motor to not more than four (4) times full load running current.
- .6 Include Class B motor insulation.

- .7 Include manually reset integral overheating protection to CSA C22.2.
- .8 Design motor for 80 starts per hour.

## 2.10 Motor Controller

- .1 Provide a CSA approved modular microcomputer controller to provide solid state soft starting.
- .2 Provide the following protection during the starting and running modes.
  - .1 Start fault.
  - .2 Line fault.
  - .3 Temperature fault.
  - .4 Stall motor.
  - .5 Provide LED indicators for advisory status and fault annunciation.
  - .6 Design controller to be capable of delivering its rated current and ambient temperatures ranging from 5 C to 36 C.

## 2.11 Oil Storage Tank

- .1 Provide oil storage tank capacity equal to volume of oil required to lift elevator to top terminal plus reserve of not less than 10% or 40 litres, whichever is greater. Provide all new "green" fully biodegradable, elevator hydraulic fluid. Provide viscosity Index of 190 with Flash point of 200 degrees C or better. Include permanent signage on reservoir indicating the type of oil required and viscosity index.
- .2 Clearly and permanently indicate minimum permissible oil level.
- .3 Include gauge glasses to indicate oil level if top of tank is more than 1.5 metres above floor level.



- .4 Provide filtering screen mounted over the suction inlet.
- .5 Provide a drain connection.

### 2.12 Low Oil Control

- .1 Provide low oil control feature to automatically cause up-travelling car to descend to main landing if reservoir oil level is insufficient.
- .2 Arrange control so that oil reservoir must be refilled before elevator can be returned to service.
- .3 Open car and hoistway doors automatically at lower landing. Inactivate control buttons in car operating panel except door open button.

### 2.13 Sound Isolation

- .1 Include resilient pads to effectively isolate pumping unit from machine flooring and plungers from car frame. Design for transmissivity of less than 10% at full speed and full load. Use a minimum of 17 mm thick pads. Do not use built-up pads.
- .2 Prevent lateral displacement of pumping unit.
- .3 Isolate oil line from building structure through the use of isolation hangers or rubber.

### 2.14 Muffler

- .1 Minimize transmission of fluid pulsations in pipeline between pumping unit and cylinder head with blow-out proof muffler.

## 2.15 Piping

- .1 Provide new piping from machine room to cylinder. Remove existing oil lines.
- .2 Use threaded couplings or mechanical couplings which mechanically prevent separation of adjoining members.
- .3 Welding is permitted providing interior of pipe is thoroughly cleaned after welding or where welding method prohibits introduction of foreign material into interior of pipe.
- .4 Provide sound isolation couplings in pipeline between pump and cylinder.
- .5 Provide two (2) gate valves in the line to facilitate maintenance and adjusting of the elevator, one in the machine and one in the pit.
- .6 Locate piping where it can be serviced. Buried piping is not acceptable.
- .7 Remove all redundant oil from existing piping.
- .8 Provide overspeed valve within 300mm (12") of the hydraulic jack. Activate on pressure drop - not electrical connection. Provide adjustable flow initially set to activate at 125% of contract speed.

## 2.16 Roller Guides

- .1 Equip car with heavy duty roller guides, individually spring loaded, mounted on top and bottom of car. Provide minimum roller diameter of 102mm (4").
- .2 Provide each guide with durable, oil resistant and resilient tired ball bearing rollers to run on the 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 24 hours under average environmental conditions.

### 2.17 Guide rails and Brackets

- .1 Retain and refurbish existing guide rails if compatible with new equipment.
- .2 Examine all rails to be plumb and parallel with a maximum deviation of 1.6 mm. Make any adjustments as required.
- .3 Align and file any joints as needed.
- .4 Tighten any loose rail brackets or rail clips.
- .5 Examine the condition of all fastenings in hoistway.
- .6 Thoroughly clean and remove any rust from rails prior to the installation of the new roller guides. Include for grinding of rails if required to remove grease, dirt and/or rust.
- .7 Paint all non-running surfaces of the rails.

### 2.18 Buffers and Pit Work

- .1 Provide new spring buffers and support steel. New buffers and steel supports must suit the reconfigured pit arrangement.
- .2 Wire brush and thoroughly examine existing rails, fastenings and steel channels. Replace any badly corroded fastenings.
- .3 Paint all pit equipment with rust resistant paint.
- .4 Mount any conduit approximately 300 mm above pit floor. Suitably support all conduit.

- .5 Install data plates on all buffers.

## 2.19 Position Transducer

- .1 Arrange the closed loop feedback power control to continuously monitor the actual elevator speed signal from the velocity transducer and compare it with the intended speed signal to verify proper and safe operation of the elevator.
- .2 Accomplish electrical stepping using solid state devices, pulse generators or magnetic switches. Do not use electro-mechanical stepper switches or tape readers. Design the unit so that parts are accessible for easy adjustment.

## 2.20 Security System Provisions

- .1 Provide a security system interface to provide restrictive operation to the car and hall calls of the elevators with a proximity card reader system. Security system will be supplied and installed by others.
- .2 A labelled security interface system junction box shall be provided on the outside of the controllers and the wires shall be identified for the security system. Provide as a minimum, eight (8) pairs of shielded cables, #18 AWG. Terminate cables in the junction box on terminal strip, clearly designating these cables as for future security system use. Secure other end of cables behind the car operating station to allow for future interconnection with proximity card reader.
- .3 Provide a 240 mm wide x 100 mm high cut out at each car operating panel. Provide space behind cut-out and provided translucent, smoked, plexiglass, 7 mm thick, flush mounted in cut-out opening.

- .4 Isolate all car and hall call circuits to prevent electrical feedback through any inter-connections with proximity card reader controls.
- .5 Run wiring between the elevator machine room and car operating panel without splices, breaks, or joint connections.
- .6 Include for coordinating the installation of the proximity card reader devices as well as coordinating the interfacing and connection requirements to ensure a workable security system.
- .7 Provide ability to restrict calls to specific floors.
- .8 Provide security override for Emergency Service operation.
- .9 Provide keyed manual over-ride of security system, in case of system malfunction. Provide one over-ride per car and one global over-ride. Locate key switches as indicated at time of shop drawing review.

## 2.21 FEO - Phase I Emergency Recall Operation

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- .1 Provide emergency recall service which will be initiated automatically. 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.

2.22 FEO - Phase II  
Emergency In-Car  
Operation

- .1 Provide in-car emergency service for each elevator initiated by a key switch located in the car station. 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.
  - .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.

## 2.23 Independent Service

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- .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. Car position indicator to remain operational.
  - .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 Render the door detector inoperative.

## 2.24 Access to Pit, Hoistway and Top of Car Inspection

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- .1 At all landings, provide a hoistway door unlocking device. Provide a collar for holes in door.
- .2 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: 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 The speed of the elevator shall be not more than 150 fpm and not less than 50 fpm while on inspection mode.
- .3 Working light switches shall be accessible from the hoistway entrances.
  - .4 Provide a car top guard rail on all non-access sides of the elevator car top except where the distance to a wall does not exceed 356 mm.
    - .1 Include for an intermediate rail and toe board.
    - .2 Weigh the elevator before and after installation.
    - .3 On the crosshead data plate, record the pre-alteration weight, weight added to elevator, current weight, installation date, contactor name and alteration type.
    - .4 Provide an alteration data plate on the controller and record work performed in the maintenance log book.
    - .5 Paint the railing and toe board yellow.
    - .6 Provide an outline of the top of car refuge area.

## 2.25 Work

### Light and Receptacles

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

## 2.26 Emergency Lighting

- .1 Include emergency lighting in the cars, with a minimum of two (2) lamps.
- .2 Use battery operated emergency lighting equipment to CSA C22 No. 141-1985, 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.

## 2.27 Car Platform

- .1 Existing car sling, frame and steel platform may be retained if compatible to specified new equipment and refurbished including the correction of all deficiencies such as broken welds.
- .2 Provide rubber isolation of car enclosure to sides of uprights.
- .3 Install a sub floor made of plywood as required for class of loading.
- .4 Ensure clearance between the car and all hall sills is within code requirements. Make all necessary adjustments.

## 2.28 Car Cab Enclosure

- .1 Paint cabs walls, new checker plate floor, cab rails and bumper rails.

- .2 Fabricate front return panel, entrance columns and car doors of matching, integral brushed stainless steel.
- .3 Provide new 3/16" aluminum checker plate flooring, brushed finish. Accommodate weight and space of flooring at sill.
- .4 Provide new two-speed cab fans. Move 25 L/s of air on high speed and approximately half that flow on low speed. Limit total fan noise to 55 dBA, measured on an "S" response scale, measured 0.9 m above floor with fan on high speed.
- .5 Use bolts fitted with washers and lockwashers and fabric separators, if necessary, to assemble and guarantee entire structure to operate entirely free from squeaks and metallic sounds.
- .6 Provide new high efficiency fluorescent light fixtures at recessed into ceiling. Provide new overall energy efficient fluorescent ceiling lighting using electronic ballasts, sound rated "A". Design for light intensity measured 30" above floor of 215 Lx. Provide new caged protection.
- .7 Install new 6.5 mm x 150 mm stainless steel handrails and matching bumper rails on all non-accessible sides. Set at height of 910 mm and 100 mm above floor with 38 mm clearance between wall and handrail. Return ends to walls.
- .8 Sand and paint walls and ceilings with a minimum of two coats of enamel, beige in colour.
- .9 Use bolts fitted with washers and lockwashers and fabric separators, if necessary, to assemble and guarantee entire structure to operate entirely free from squeaks and metallic sounds.
- .10 Provide 96" clear height in cab under ceiling.
- .11 Provide clear car entrance height of 7' 0".
- .12 Provide an emergency exit on top of the car of suitable size, equipped with an electrical device which will prevent operation of the elevator if the exit cover is open more than 50 mm and designed to comply with elevator code.

- .13 Provide stainless steel licence holder in car to suit certificate issued by enforcing authority. Design licence holder with hidden fastening.

## 2.29 Car Gates

- .1 Provide new single-section car freight gates of steel, vertical lift gate, height of 1830 mm.
- .2 Provide minimum #10 gauge round wire mesh on a steel member frame. Provide baked on powder coat finish. Suitably re-enforce frame to provide a stiff and substantial gate, suitable for rigorous freight applications.
- .3 Provide dual, weighted counterbalancing for smooth and quiet gate operation.
- .4 Provide new related systems including operator, limit, chains, contact, shoes, reversing edge, counterweight, counterweight guard and rails.

## 2.30 Landing Door Hardware

- .1 Provide new related systems including operator, limit, chains, contact, shoes, reversing edge, counterweight, counterweight guard and rails.
- .2 Provide positive electric interlocks. Provide new wiring to door locks including green ground wire.

## 2.31 Landing Dual Door Operators

- .1 Provide new heavy duty, dual, freight door operators per entrance as follows:
- .2 Provide dual-drive operators for automatic, sequenced operation of car gates and hall doors.

- .3 Provide smooth and quiet operation of doors and gates.
- .4 Open and close doors in response to appropriate car or hall calls or operation of door control buttons in car or hall.
- .5 Provide momentary-pressure door open and constant-pressure door close for door control buttons.
- .6 Provide automatic door close operation after expiry of adjustable dwell time. Provide audible warning bell and adjust to give suitable warning without excessive noise volume.
- .7 Provide new related systems including door limits, chains, rods, hangerbar extensions, interlocks, guide shoes, retiring cam assembly and door tension latches.
- .8 Include for new Peelle wiring package.
- .9 Open hoistway doors to 2/3 of travel as car gate starts to open and close car gate to 2/3 of travel as hoistway doors start to close.

### 2.32 Car Door Protective Devices

- .1 Provide a solid state, electronically operated door reversal device on the leading edge of the gates. 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.

### 2.33 Fire Rated Elevator Entrances

- .1 Entrance frames and doors may be retained and refurbished if compatible to specified new equipment and adapted to the standards below, otherwise at all floors provide complete new elevator entrances.
- .2 Construct any new door and frame for ULC rated for minimum 1 ½ fire rating.
- .3 Assume complete and undivided responsibility for entire installation including doors, frames, structural supporting angles, headers, fascias, toeguards, sills and sill support angles. Frames to suit existing thickness.
- .4 Finish new or retained entrances in two coats of enamel to Owner's colour choice at all floors.
- .5 Provide support angles or other hardware required to fasten frames and entrances.
- .6 Provide vertical bi-parting doors of #12 gauge steel or better.
- .7 Provide new 25 mm Neoprene astragals on length of door edge.
- .8 Provide wired, glass vision panel in each upper door section, dimensions approximately 100 mm x 200 mm height.
- .9 Include channel or angle supports at each sill, fasten to building supports with 12 mm bolts, angles to span full width of entrance.
- .10 Include complete power door system inclusive of checkered steel sills, pass doors, two speed heavy-duty door operators, rails, door guides, chains, rods, locks, tension latches, retiring cams and unlocking devices.
- .11 For any retained equipment, examine existing entrances and repair any defects. For stainless steel finishes, include for complete cleaning and polishing.
- .12 Cushion opening doors and closing doors with rubber bumpers.

### 2.34 Flush Type Hoistway Doors

- .1 Install new lower guides on all hoistway doors. Two guides per door panel.
- .2 Adjust all hoistway doors for smooth and quiet operation.
- .3 Adjust all hoistway doors to fully clear the elevator entrance when fully opened.
- .4 Cushion opening doors and closing doors with new rubber astragals.
- .5 Replace all sight guards at all floors with steel-type sight guards. Finish to match hall doors. Provide a resilient gasket between the sight guard and hoistway side of the hall doors. Use self-tapping screws.

### 2.35 Hall Sills

- .1 Retain existing sills. Wire brush and thoroughly clean the full length of all sills.
- .2 Examine existing hall sills and repair defects.

### 2.36 Fascias and Toeguards

- .1 Provide fascia and extended toe-guard to full width of entrance plus overlap.
- .2 Reinforce to walls where necessary to prevent deflection of fascia and securely fasten to entrance arrangement.
- .3 Provide final coat of paint on unfinished steel.
- .4 Be responsible for apron plates and ensure compliance with current Code requirements (size and fastening).

### 2.37 Identification

- .1 Provide 50 mm (2") numerals on all elevator equipment.
- .2 Identify all elevators at recall level. For this and any other identification of cars and floors at entrances that is visible to passengers, 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.
- .3 Provide six (6) keys of each type used with key rings and engraved gravoply discs, identifying use of key.

### 2.38 Lanterns

- .1 Provide translucent, high-impact plastic, flush mounted car riding lanterns in each door jamb (2 per car). Illuminate lantern suitably to indicate direction of car travel to waiting passengers.
- .2 Provide illuminated fixture of diameter not less than 70 mm (2.75") with stainless steel faceplates.
- .3 Sound gong or chime with the illumination of direction arrows, one gong for up and two for down. Chime to be adjustable in volume. Provide clear tone at 30 dBA approximately 8 feet from fixture. Time gong so as to be heard by passengers waiting in the hall.

### 2.39 Hall Button Fixtures

- .1 Provide LED illuminated, stainless steel push buttons (blue illumination). LED's to be rated for 100,000 hours illumination.
- .2 Install at 1066 mm to top of button above floor level.
- .3 Provide flush mounted illuminated type push button on a stainless steel, no. 4 finish faceplate. Illuminate buttons when pressed to indicate a call has been registered and retain illumination until the call has been answered.



- .4 Provide "UP" pushbutton at lowest landing and "DOWN" pushbutton at top floor and "UP and DOWN" buttons at typical floors.
- .5 Provide an Out of Service indicator in each fixture. Whenever service is denied to the elevator for any reason, the "OUT OF SERVICE" sign shall illuminate automatically. This includes top of car inspection operation and an opening in the safety circuit.

#### 2.40 Special Operation Fixtures

- .1 Provide in the ground floor lobby hall station:
  - .1 A three (3) position fire recall switch, OFF - ON - RESET with pilot light.
  - .2 Engrave faceplate "FIREFIGHTERS' EMERGENCY OPERATION" in red lettering 5 mm in height.
  - .3 Provide engraved instructions adjacent to the switch for the operation of the recall switch.
  - .4 Provide an audible and illuminated visual signal adjacent to the main lobby "Fire Recall" switch labelled "ELEVATOR COMMUNICATIONS FAILURE" in red letters a minimum of 5 mm in height. Include a keyswitch to reset the alarm.
- .2 Provide at recall level near elevator hoistway a box conspicuously located and identified containing the emergency recall service keys.

#### 2.41 Position Indicators/ Voice Annunciation

- .1 Provide flush mounted position indicators over top of ground floor entrance and include one (1) additional indicator in the car station. Provide LED-illuminated, segmented, digital-display position indicators with stainless steel faceplate. Vacuum tube fluorescent is an acceptable alternative.
- .2 Use characters at least 38 mm high.

- .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 with shop drawings.

#### 2.42 Car Operating Station

- .1 Provide one (1) car operating station in each car.
- .2 Provide one (1) service cabinet per car located in the auxiliary station. In cabinet, provide key-operated switches for lighting, emergency light test, 2-speed fan, independent service and out of service. Provide one spare key switch. Provide proper labeling of all switches including the spare key switch. Provide a dimmer switch for control of lighting and a 110 volt, 15 amp duplex receptacle. Provide a lockable flush-mounted door.
- .3 Use brush stainless steel cover.
- .4 Engrave all wording required on car front - do not use surface mounted plates. Engrave all characters in cover 0.8 mm deep and filled with enamel.
- .5 Use Dupar US91 or equivalent LED-illuminated stainless steel floor buttons, one for each floor served. Provide flush mounted tactile identification at side of each button. Include momentary audible signal to indicate call has been registered.
- .6 Provide a key operated stop switch and door open and close buttons.
- .7 Provide a separate lockable "Firefighters' Operation" cabinet located at the top of the car operating panel (no higher than 1800 mm from finished cab floor) housing the Fire Operation key switch, Call Cancel button, STOP switch, DOOR OPEN and DOOR CLOSE buttons, additional indicator light and operating instructions.
- .8 Engrave identification in upper or lower case, Helvetica medium, at least 9 mm, filled with red or black enamel, as required.

- .9 Engrave the car number, government installation number and maximum capacity in kilograms and lbs. and number of persons on each car station. Use wording "MAXIMUM CAPACITY".
- .10 Use international symbols wherever possible.
- .11 Provide a speaker and grille with assistance button identified on the car operating panel. Include autodialler and all wiring required to be connected to the Owner's telephone line. Install a metal guard behind the speaker to eliminate interference from car operating panel controls.
  - .1 Provide an international telephone symbol to identify the assistance button with engraved bilingual signage "HELP".
  - .2 Provide an LED visual indicator on the car operating station faceplate to indicate the call for assistance has been acknowledged. Locate button 1220 mm from finished cab floor.
  - .3 The hands free emergency communications device shall contain an internal speaker and microphone to enable two-way communication with elevator passengers.
  - .4 The device shall be activated by pressing the assistance button located on the car operating station faceplate and shall automatically dial a telephone number of the Owner's choice.
  - .5 The device shall contain a ring sensor which shall allow the initiation of a call to the elevator.
- .12 Include uninterrupted telephone wiring within elevator hoistway, from car cab to a box located on the outside of controller.

## 2.43 Terminal Stopping Devices

- .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.

#### 2.44 Signal Illumination

- .1 Illuminate signal fixtures with intensity which produces distinct and well defined indications. All signals to be LED illuminated.

#### 2.45 Fixture Fastening

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

#### 2.46 Markings

- .1 Engrave identification and instructions at least 0.8 mm deep on operating panels and on all signal equipment in English only except where design is such that inference is obvious and readily understood. Submit markings and designs for approval.

#### 2.47 Non-standard Pit and Overhead

- .1 Include for working platforms and buffer extensions if required.

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## PART 3 - EXECUTION

### 3.1 Removal of Equipment

- .1 Remove and dispose of all redundant elevator equipment from the site. Engage a licensed handler of hazardous materials to remove and dispose of power unit oil.
- .2 Include removal of the existing cylinder and improvements to hole including width and depth to accommodate new PVC- encased cylinder. Include related work such as chipping, pressurized water, vacuum truck and waste water disposal. Provide water tight repair of pit floor and cylinder head at conclusion of work.

### 3.2 Arrangement of Equipment

- .1 Arrange equipment in machine room so that equipment can be removed for repairs or replacement without dismantling or removing other equipment components.
- .2 Arrange equipment for clear passage to machine room door.
- .3 Accommodate equipment in existing spaces including machine room, pit, overhead and hoistway width and depth.

### 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 W47-92.
- .2 Identify field welds with welder's identification stamp.

### 3.4 Storage

- .1 Co-ordinate delivery and storage of materials with the Owner.

### 3.5 Field Quality Control

- .1 Perform and meet tests required by CAN/CSA-B44 Safety Code for Elevators. Supply instruments and carry out these and other tests specified herein.
- .2 Provide 2 days written notice to Consultant of date and time of tests.
- .3 Have a copy of the Specifications on site and available to the installation mechanic.
- .4 Provide Consultant with copy of all speeds and current readings taken at the time of the Provincial regulatory agency inspection.

### 3.6 Cleaning

- .1 Completely remove protective coverings from finished surfaces and components.
- .2 Maintain clean work areas and running equipment through the duration of the project.
- .3 Provide a complete final cleaning of all equipment and work areas prior to turnover of the elevator.

### 3.7 Painting

- .1 Paint the machine room walls and floor.
- .2 Paint the following equipment in the hoistway:
  - .1 Car tops and crossheads.
  - .2 Rails and strut angles and fascia plates.
  - .3 Outline of refuge space on the car top.
  - .4 Pit equipment, including pit floor and 3 feet high on the pit wall.
- .3 Use paint materials listed on the CGSB qualified products list and to IOS standards only.

- .4 Paint materials for each coating formulae to be products of a single manufacturer.
- .5 Prepare masonry, stucco and concrete surfaces to CGSB 85-GP-31M.
- .6 Prepare concrete floors to CGSB 85-GP-32M.
- .7 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.
- .8 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.

### 3.8 Burning Torches

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

### 3.9 Technical Presentation

- .1 Provide the services of a mechanic or adjustor who has worked on the project and is thoroughly familiar with the elevator control system and its operation to provide technical training to designated building authorities.
- .2 Allow at least 1 day for this training. Training session to cover but not be limited to the following features:
  - .1 Emergency power operation and emergency recall operation Phase I and Phase II including duplicate switches.
  - .2 Independent service operation.
  - .3 Voice communication system operation.
  - .4 Any special features provided on the elevators.

- .3 Provide when requested by the Engineer a hard copy of a condensed version of the elevator operational features.
- .4 The Elevator Contractor is to provide all information to the Engineer that is required for the safe and efficient maintenance of the elevator equipment, including any solid state equipment or devices supplied under these specifications. The supplier is not to refuse any information, or the supply of parts, at fair market value, that is required for elevator maintenance.

### 3.10 Field Testing and Commissioning

- .1 Furnish competent personnel to assist the Engineer during the inspection and testing of the systems should they be required.
- .2 The inspections shall be carried out to ensure document compliance.
- .3 Prior to Engineer's testing, the Elevator Contractor shall test all systems to ensure proper operation.
- .4 Upon completion of each elevator provide all personnel and necessary testing equipment to perform the following:
  - .1 Test operating times to verify performance requirements.
  - .2 Test door operating equipment to verify performance requirements.
  - .3 Test the ride to verify performance requirements.
  - .4 Test the equipment under full load and no load to verify speed variation performance requirements.
  - .5 Perform all electrical readings and complete technical data forms required by the specifications.
  - .6 Test stop ring and hydraulic system by operating elevator with rated load in UP direction against stop ring at inspection speed.



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- .5 Upon completion of the group of elevators, furnish technicians, adjusters or engineers fully trained in the equipment installed to test all operating systems included but not limited to, emergency power operation, special emergency service and operation of the group control system to verify the specification requirements.
  - .6 Attend at job site meetings pertaining to the Work.
  - .7 Have a copy of the Specifications available on site.
  - .8 After Provincial inspection of each elevator and before turn-over for customer use, test each elevator in simulated automatic operation without passenger access.
    - .1 Test for three (3) consecutive hours operating from floor to floor with door operation. Provide barricades and signage to indicate that an elevator test is in progress.
  - .9 Before turn-over for customer use, test elevators as following:
    - .1 Working pressure in up direction with 100% car load.
    - .2 Door timings and dwell settings.
    - .3 Operating speed, full load, up.
    - .4 Operating speed, empty car, down.
    - .5 Door detector interrupt setting.
    - .6 Relief pressure setting - through pushing elevator on to stop ring.
    - .7 Testing of the integrity of the PVC.
  - .10 During warranty maintenance period closely monitor equipment for malfunctions and track reliability. Achieve a reliability rate of less than 0.6 malfunctions 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.

### 3.11 Elevator Consultant

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- .1 Consultant has general supervision and direction of the elevator work. He may be authorized by the Owner to stop the work whenever the stoppage is necessary to ensure the proper execution of the contract.
- .2 Furnish competent and co-operative mechanics for inspections and acceptance tests as the Consultant requires. Expect to have work interrupted during progress inspections by the Consultant.
- .3 Consultant will carry out one (1) Final Inspection and one (1) Re-inspection. Other inspections required due to the Elevator Contractor's failure to completely correct deficiencies previously listed may be deducted from the contract value by the Owner.
- .4 Complete deficiencies identified by Consultant promptly. Complete deficiencies identified on Consultant's final inspection report within 30 days of receipt, or alternatively provide written notice of any disputed items within 10 days of receipt. Pre-agreed compensation to the Owner shall be the extension by the same period completion of deficiencies is delayed beyond 30 days.

### 3.12 Notification to Consultant

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- .1 Notify the Consultant at the following project milestones:
  - .1 Two weeks prior to commencement of work.
  - .2 When new pumping unit is operational.
  - .3 On completion of car buttons and door operator.
  - .4 On booking of Regulating Authority inspection.
  - .5 On completion of any deficiencies

**Table D - Commissioning Data to Be Submitted by Contractor for Each Elevator**

<b>PARAMETER</b>	<b>MEASURED</b>
Car speed UP (fpm)	
Car speed DOWN (fpm)	
Start to stop UP (sec)	
Start to stop DOWN (sec)	
Operating pressure UP (psi)	
Door timeout (sec)	

PART 1 - GENERAL

1.1 SCOPE OF WORK

- .1 The Work described herein includes for all labour and material, including overtime required to meet the project schedule, to modernize one (1) handicapped lift. Provide all work required for a completed project, accepted by the Authority Having Jurisdiction including:
- .2 New cantilevered hydraulic system mounted in hoistway.
- .3 New, power unit with motor, pump and valve.
- .4 New non-proprietary, microprocessor-based solid state electrical controller.
- .5 New doors, door locks and all related hardware.
- .6 New car cab including cab interior.
- .7 New signals including position indicators in cab.
- .8 New rails.
- .9 Full parts and labour preventive maintenance on finished elevator for a subsequent three (3) month period.
- .10 Provide required demolition and removal of existing system including hoistway, fixtures, hydraulic oil and entrances.
- .11 Provide required engineering and coordination of various elements and suppliers to provide a complete code compliant project considering the custom nature of this project.
- .12 Above is a brief description only. The following specifications detail the Work.

1.2 EXTRA WORK

**Extra Work - To Be Completed or Sub Contracted By Elevator trade**

- .1 Electrical:

- .1 Provide new 120 v GFI convenience receptacles in machine room and pit.

.2 Structural:

- .1 As required engage engineer registered in the province and specializing in structural engineering to assess adequacy of existing hoistway structure including pit floor and walls.
- .2 Include any required scanning of structure to locate hidden steel.

.3 General:

- .1 Include complete removal of redundant hydraulic components while working in an occupied building. As a minimum this will require plywood to provide a working area while keeping the adjacent corridor free for tenant movement.
- .2 Include for exterior storage container - site storage is limited.
- .3 Include for required protection of work area - signage, dust control and barricades - to accomplish work in an occupied building.
- .4 Carry out all noisy and disruptive work after hours (after 6 PM and before 7 AM) including any work audible at more than 30 dB over ambient measured 1 meter on the tenant's side of barricades.
- .5 Supply any required garbage dumpster. Keep building cleared of rubbish.
- .6 Provide removal of existing lift doors and re grouting of new entrances once reinstalled. Refinish entrance interfaces with wall finishes to make good and aesthetically blend in new entrances.
- .7 Provide required cutting, patching and making good of new fixtures.

- .8 Provide any required hoistway repairs including patching of holes, fire stopping and beveling of ledges or setbacks.
- .9 Provide all required supervision, coordination, safety meeting as required by multiple trades on site. The Division 14 contract will be the General Contractor. Include for required municipal and provincial work permits.

### 1.3 REFERENCE

#### STANDARDS\_\_\_\_\_

- .1 Perform work to the following standards:
  - .1 CAN/CSA-B355-09 Lifts for Persons with Physical Disabilities.
  - .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 Barrier Free Design
  - .8 CAN/CSA Z320 Building Commissioning Standards.
- .2 In case of discrepancy, the above standards take precedence over details elsewhere in this specification.

#### 1.4 Power Supply\_\_\_\_\_

- .1 Make all necessary modifications to the electrical services relating to the elevator such as supplementary disconnect devices and connections to the controller.
- .2 Design equipment to operate using the existing 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 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 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 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 extra.

1.7 MEASUREMENTS

- .1 Before execution of work, verify all dimensions with actual site conditions.

1.8 QUALITY OF WORK

- .1 Perform Work by mechanics skilled in the installation of elevators/lifts and with a minimum of five (5) years documented experience in installing the control system to be used.
- .2 Comply with all applicable provisions of all federal, provincial and local labour laws.

1.9 SAMPLES

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

1.10 General Arrangement,  
Shop Drawings & Product  
Data

- .1 Before beginning work, prepare all drawings to show the general arrangement of the equipment 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, stamped by a Professional Engineer registered in the province experience and knowledgeable and experienced in elevator/lift engineering and design:
  - .1 Plan view of driving machine, controller, car, supporting beams, guide rails, buffers and other components in hoistway.
  - .2 Section view of the hoistway including elevation of each floor served, pit depth and overhead.



- .3 Plan view of machine room locating disconnects, oil line, controller and power unit.
- .4 Location in hoistway or machine room for connection of travelling cables.
- .5 Signal and operating fixtures.
- .6 Indicate on shop drawings:
  - .1 Detailed drawing showing all fixtures, position indicators, push buttons, car operating stations, corridor control panels, and any other special fixtures pertaining to the project.
  - .2 Include catalogue illustrations of operating and signal fixtures.
- .7 Provide detailed elevator cab drawings.
- .8 Do not commence manufacture or order materials before shop drawings are approved as well as stamped by a stamped by a Professional Engineer registered in the province and knowledgeable and experienced in elevator engineering and design and submitted to the provincial safety authority.

1.11 PROJECT RECORD  
DOCUMENTS

- .1 Before final acceptance 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. 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 and knowledgeable and experienced in elevator engineering and design.
- .2 Provide one soft copy of the above information in AUTOCAD format.
- .3 Mark up all field changes or additions to original wiring diagrams in red.

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- .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.
- .2 Include the following maintenance data:
- .1 Description of system's method of operation and control including motor control system.
  - .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.
- 1.13 MAINTENANCE SERVICE - INTERIM AND WARRANTY
- .1 Include at no extra cost maintenance of existing equipment covered under this project from the day of contract award and continue maintenance for an additional period of twelve (12) months from the date of the Final Certificate of Completion of the project.

- .2 Carry out maintenance inspections and tests in accordance with provincial regulations, and the PWGSC standard Elevating Devices Maintenance Specification.
- .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 Departmental Representative.
- .8 Maintain locally an adequate stock of parts for replacement or emergency purposes and have qualified staff available to ensure fulfillment of parts requirements in a timely fashion.
- .9 Include 24 hour call-back service required by equipment stoppage or malfunction at all times at no additional cost. Provide staffing to ensure 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 daily.

1.14 LAYOUT

- .1 Design equipment to suit existing space including hoistway cross-sections, overhead and pit depth.
- .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 are first-class 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\* (\*to be interpreted within the context of this document the PWGSC Lift Engineering Technical Departmental Representative).

1.16 DEPARTMENTAL REPRESENTATIVE'S CERTIFICATION OF PAYMENT

(refer to front end documents)

1.17 USE OF ELEVATOR BY PERSONS WITH PHYSICAL DISABILITIES

- .1 Arrange all controls and fixtures to be easily reached and operated by disabled persons.

1.18 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 Maintain floor levelling accuracy of 5 mm or better.
- .4 Provide car speed to within 10% of contract speed in both directions.

PART 2 - PRODUCTS

2.1 DESCRIPTION OF LIFT

- .1 Cantilevered hydraulic.
- .2 Class: handicapped lift - vertical platform.
- .3 Capacity: 1,200 pounds.
- .4 Speed: 30 fpm.
- .5 Control: constant pressure
- .6 Doors: 36" wide  
Manual swing
- .7 Travel: Per existing site conditions.
- .8 Overhead: Per existing site conditions
- .9 Pit Depth: Per existing site conditions.
- .10 Signals: Dupar US 91 buttons  
Car position indicator;  
All signals to be LED-illuminated

2.2 ELECTRICAL COMPONENTS

- .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 Include at least 10% spare conductors in each cable. Tape and legibly identify all spare wires.
- .4 Do not parallel conductors to increase current carrying capacity unless individually fused.
- .5 Install a separate green bond wire in all raceway, including EMT and flexible conduit.
- .6 Limit use of flexible conduit on car top to items that require movement or periodic adjustment.

- .7 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Wiring shall be run in metal conduit, metallic tubing or wire ducts.
- .8 When using conduits or troughs through floor, extend conduit or trough at least 100 mm above floor.
- .9 Do not run conduit or wiring along pit floor. Install all conduit and wiring a minimum of 150 mm above pit floor.
- .10 Use type ETT travelling cable.
- .11 Suitably suspend the travelling cables to relieve strain in the individual conductors.
- .12 Fabricate wiring that is run in conduit or tubing to Table 6 of CEC Part 1.

2.3 SOUND INSULATION

- .1 Include resilient pads to effectively isolate power unit from machine room floor.
- .2 Prevent lateral displacement of power unit.

2.4 GUIDES

- .1 Provide guide operation, which is inaudible to passengers in car or outside hoistway.

2.5 GUIDE RAILS AND BRACKETS

- .1 Provide new 'T' shape tongue and groove rails, connect with steel splice plates.
- .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 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.

2.6 ROPES

- .1 Provide new hoist ropes with steel core from same factory production run in accordance with good practice and the CSA Elevator Code.
- .2 Use approved type wedge clamp type sockets.

2.7 CYLINDER AND PLUNGER

- .1 At top of cylinder include stuffing box and packing gland with seal or self-adjusting packing which does not require external adjustment.
- .2 Design and install cylinder and plunger plumb. Operate with minimum friction.
- .3 Construct plunger of selected steel tubing machined true and finished to surface finish of 0.0008 mm roughness height rating or better.
- .4 Utilize a minimum of two (2) 9.5 mm cables at top of piston to accomplish 2:1 ratio.

2.8 MOTOR

- .1 Design motor for minimum 60 starts per hour.
- .2 Do not exceed EEMAC Design B locked rotor current.
- .3 Provide data plate on motor showing motor connections.
- .4 Include class B motor insulation.

2.9 PUMP UNIT

- .1 Design pumping unit as an integral unit combining motor, pump, valve and reservoir in one enclosure.
- .2 Prevent lateral displacement of pumping unit.
- .3 Use positive displacement screw type pump, with direct connection to drive motor and pump through flexible coupling, specially designed for quiet service.

- .4 Where necessary, install oil tight drip pan beneath unit to retain leakage of hydraulic fluid.
- .5 Provide an oil level indicator to show minimum permissible oil level. Size oil reservoir for full elevator travel plus a reserve of 50% of tank volume.
- .6 Provide a removable filter to remove damaging particles from suction line, upstream of pump.

2.10 CONTROLLER AND CABINET

- .1 Provide non-proprietary controller.
- .2 Enclose the controller in enamelled, ventilated, sheet steel cabinet, with swing-type doors at front.
- .3 Provide relays and contactors particularly designed for elevator duty.
- .4 Provide battery back-up for all circuits containing volatile memory.
- .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 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 - and no single board is to cost more than \$2,000 based on 2012 pricing (to be inflated with CPI).

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

2.11 CONTROL AND PERFORMANCE

- .1 Provide constant pressure operation.
- .2 Provide one (1) car operating panel in the car with brushed stainless steel faceplate containing flush mounted LED illuminated type stainless steel push buttons to correspond with landings served.
- .3 When lifting rated load, do not permit car speed to vary from rated speed by more than 10%.
- .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 The opening of the emergency stop switch shall interrupt the passage of oil into the cylinder independently of the regular operating device. Opening the emergency stop switch shall not cancel registered calls and after the switch is closed the car shall continue to answer calls in the normal manner.
- .6 Provide valve, pump and motor operation to accomplish smooth starting, acceleration and stopping of cab.

2.12 EMERGENCY POWER OPERATION

- .1 Provide separate battery based, self-contained emergency power system located in the elevator machine room.
- .2 Once activated, lift will allow constant pressure lowering to any lower landing.

- .3 At resumption of normal power, restore elevator to normal operation automatically.

2.13 HOISTWAY ACCESS

- .1 At landing doors provide special-key access.

2.14 EMERGENCY LIGHTING

- .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-centering key switch.
- .4 Arrange battery unit as a source of power for alarm bell during power failure.

2.15 CAR INTERIOR

- .1 Fabricate car enclosure on non-access sides of steel, painted to RPSS's selected custom colour.
- .2 Include a minimum of two (2) fluorescent, halogen or incandescent pot lighting fixtures set in a white-finished ceiling. Design for light intensity measured at car sill of 120 Lx minimum. Arrange lights to automatically turn on/off when car is active/inactive. Parallel wiring so that failure of one fixture leaves the other fixture operative.
- .3 Provide non-skid rubber sheet floor to choice of colour, flush with sill, with securely held front edge.
- .4 Use bolts fitted with washers and lockwashers and fabric separators, if necessary, to assemble and guarantee entire structure to operate entirely free from squeaks and metallic sounds.

- .5 Provide stainless steel licence holder in car to suit certificate issued by enforcing authority. Design licence holder with hidden fastening.
- .6 Provide car cab clear-inside dimensions no smaller than existing.
- .7 Provide a stainless steel handrail on the control-panel wall.

2.16 LOCKS

- .1 Provide a ULC and CSA rated interlock.
- .2 Provide a low profile lock not readily accessibly to unauthorized persons.

2.17 ENTRANCES

- .1 At all floors provide entrances finished in steel painted to RPSS's selected custom colour.
- .2 Construct doors and frames to ULC 1 ½ hours fire rating. Test to CAN 4-S104 sandwich panel construction 25 mm thick minimum.
- .3 Assume complete and undivided responsibility for entire installation including doors, frames, structural supporting angles, headers, fascias and sill support angles.
- .4 Provide 100 mm wide x 600 mm high vision panel.

2.18 FASCIAS AND TOEGUARDS\_

- .1 Provide fascia and extended toe-guard to full width of entrance plus overlap.
- .2 Reinforce to walls where necessary to prevent deflection of fascia and securely fasten to entrance arrangement.
- .3 Provide final coat of paint on unfinished steel.

2.19 HALL FIXTURES\_\_

- .1 Provide new DUPAR US 91 buttons including providing LED illumination.
- .2 Provide new faceplates as stainless steel.

2.20 POSITION INDICATOR

- .1 Install a new digital display position indicator in car.
- .2 Use characters at least 40 mm high. Provide LED illumination.

2.21 CAR OPERATING STATION\_

- .1 Provide one (1) car operating station with brushed stainless steel cover.
- .2 Engrave all characters in cover 0.30 mm deep and filled with enamel.
- .3 Use LED illuminated stainless steel floor buttons, one for each floor served. Provide flush mounted tactile identification at side of each button.
- .4 Engrave the maximum capacity in kilograms and the Provincial installation number.
- .5 Provide constant pressure illuminated buttons. Provide an emergency stop switch, alarm button, and an ON/OFF key switch mounted on a removable stainless steel panel (type 304 #4 stainless steel finish). The key shall only be removable when the key is in the OFF position.

2.22 SAFETY DEVICES

- .1 In addition to code mandated safety elements, include as follows:
- .2 Provide a negative pressure switch which will check the flow of oil and prevent the car from descending when a negative line pressure condition is sensed.
- .3 Provide anti-creep, run time or equipment protection and slack rope safety device.

- .4 Provide a relief valve sealed to 24% above line pressure.
- .5 Provide low oil control feature to automatically cause up-travelling car to descend to main landing if reservoir oil level is insufficient.

2.23 SIGNAL ILLUMINATION

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

2.24 FIXTURE FASTENING

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

2.25 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.

PART 3 - EXECUTION

- 3.1 PROCEDURE
- .1 Obtain Departmental Representative's approval before removing existing device from group operation.
- 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 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.
- 3.4 INSTALLATION
- .1 Provide all necessary fastenings, bearing plates and transfer arrangement to accomplish appropriate tie-down of machines to the machine room layout.
  - .2 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.
  - .3 Erect guide rails using metal shims with lockwashers under nuts and threaded bolts. Compensate for expansion and contraction of guide rails.
  - .4 Use splice plates and guide rails with contact surfaces accurately machined to form smooth joints.

- .5 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.
- .6 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.
- .7 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.

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, odour or obstruction as determined by Departmental Representative is unavoidable, undertake that portion of the Work after hours and at a time coordinated with the Departmental Representative.
- .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.
  - .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-B355 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.

3.9 PAINTING

- .1 Paint all bare steel.
- .2 Prepare masonry, stucco and concrete surfaces to CGSB 85-GP-31M.
- .3 Prepare concrete floors to CGSB 85-GP-32M.
- .4 For concrete block and poured concrete walls and ceilings apply:
  - .1 One coat primer-sealer.
  - .2 Two coats semi-gloss

3.10 HOISTWAY PROJECTION AND FASCIA

- .1 Provide beveling 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.

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 4 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 power unit.
- .4 On establishment of a moving platform.
- .5 On booking of 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 Basic operation and battery lowering.

3.15 COMMISSIONING

- .1 Designate one staff person as Contractor's commissioning manager for the project. Manager to be of Adjuster, Supervisor or Manager level or higher. Attend at job site meetings pertaining to the Work.
- .2 Undertake commissioning to CAN/CSA Z320 Building Commissioning Standards and related sections of Section 01 91 as a minimum and provide documentation to Departmental representative.
- .3 Before turn-over for customer use, test elevators as following:

- .1 Running current with 100% car load.
  
- .4 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.

- End -