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**Bid Receiving Public Works and Government
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Canada**
John Cabot Building
10 Barters Hill, P.O. Box 4600
St. John's
Newfoundland and Labrador
A1C 5T2
Bid Fax: (709) 772-4603

SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

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

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

Comments - Commentaires

Vendor/Firm Name and Address
**Raison sociale et adresse du
fournisseur/de l'entrepreneur**

Issuing Office - Bureau de distribution
PWGSC/TPSGC-Nfld Region/Real Property
John Cabot Building
10 Barters Hill, P.O. Box 4600
St. John's
Newfoundl
A1C 5T2

Title - Sujet Elevator Rehabilitation - Wabush NL	
Solicitation No. - N° de l'invitation EC015-180164/A	Amendment No. - N° modif. 002
Client Reference No. - N° de référence du client R.076413.001	Date 2017-05-09
GETS Reference No. - N° de référence de SEAG PW-\$PWD-013-6819	
File No. - N° de dossier PWD-7-40017 (013)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2017-05-23	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Howell, Amanda	Buyer Id - Id de l'acheteur pwd013
Telephone No. - N° de téléphone (709) 772-4997 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: Wabush Airport, Wabush, NL	

Instructions: See Herein

Instructions: Voir aux présentes

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

Solicitation No. - N° de l'invitation

Amd. No. - N° de la modif.

Buyer ID - Id de l'acheteur

EC015-180164/A

002

PWD013

Client Ref. No. - N° de réf. du client

File No. - N° du dossier

CCC No./N° CCC - FMS No./N° VME

R.076414.001

PWD-7-40017

SOLICITATION AMENDMENT NO. 002

 THE FOLLOWING AMENDMENT TO THE TENDER DOCUMENTS IS EFFECTIVE IMMEDIATELY. THE
 AMENDMENT SHALL FORM A PART OF THE CONTRACT DOCUMENTS.

SPECIFICATION AND DRAWINGS:

This amendment has been raised to include specifications and a drawing to the solicitation document.

By submission of its tender, the Tenderer confirms that it has read and understands the requirements expressed in all addenda and has included all costs of these requirements in its Total Tender Amount.

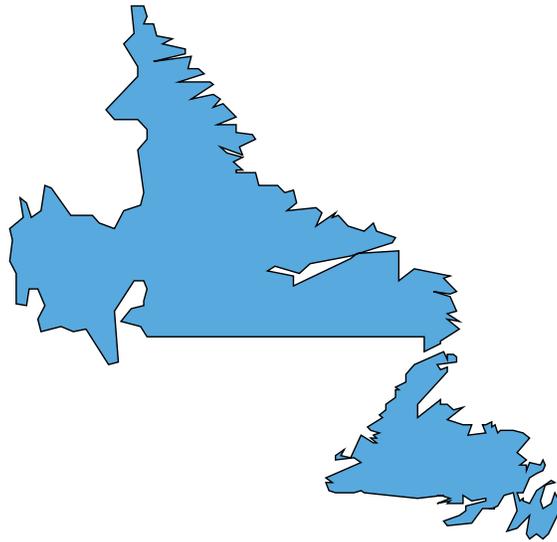
All other terms & conditions remain unchanged.

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA
REAL PROPERTY CONTRACTING
NL DIVISION

SPECIFICATION

**Elevator Rehabilitation
Wabush, NL**

SOLICITATION #: EC015-180164/A



Contracting Officer:

Amanda Howell
Real Property Contracting
10 Barter's Hill, P.O. Box 4600
St. John's, NL A1C 5T2
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Elevator System Repl. Wabush Airport Wabush, NFLD Project No. R.076414.00	APPROVAL SIGNATURES	Section 00 00 01 Page 1 2016-12-15
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REAL PROPERTY SERVICES
PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

<u>DISCIPLINE</u>	<u>SIGNATURE</u>	<u>DATE</u>	<u>STAMP</u>
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Lift (Engineering) Technology
Specifications:


Andrew McGregor



22 Mar 2017

approved

Tender
PWGSC Project Mgr:


2017/03/22
approved

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Project No. R.076414.001		

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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 Protect walls of passenger elevators, to approval of Departmental Representative prior to use. 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,
ADDITIONS OR
REPAIRS TO EXISTING
BUILDING

.1 Execute work with least possible interference or 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 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions to a minimum.
- .3 Provide safe access and egress for personnel and vehicular traffic.

1.6 SPECIAL REQUIREMENTS

- .1 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2 Keep within limits of work and avenues of ingress and egress.
- .3 Ingress and egress of Contractor vehicles at site is limited. To be discussed with the Departmental Representative during pre-construction start-up meeting.
- .4 Deliver materials outside of peak traffic hours.

1.7 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security clearances:
 - .1 Personnel employed on this project may be subject to security check. Obtain clearance, as instructed, for each individual who will require access to the premises.
 - .2 Obtain requisite clearance, as instructed, for each individual required to enter premises.
 - .3 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.
 - .4 Contractor's personnel will require satisfactory security screening in order to complete Work in premises and on site.
- .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 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

.1 Division 14.

1.2 REFERENCES

.1 Canada Labor 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, as requested.

.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 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.
- .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 Labor 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 COORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator 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.

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 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 FIRE DEPARTMENT
BRIEFING

- .1 Departmental Representative will coordinate arrangements for contractor for briefing on Fire Safety at pre-work conference by Fire Chief before work if required.

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 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.

-
- 1.6 SMOKING
PRECAUTIONS
- .1 Observe smoking regulations.
- 1.7 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.
- 1.8 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.

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

1.10 QUESTIONS
AND/OR
CLARIFICATION

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

1.11 FIRE
INSPECTION

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

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

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; unfavorably 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, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.2 Rating System Addenda for New Construction and Major Renovations LEED Canada-NC.

.3 LEED Canada-CI, 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.

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 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .6 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

1.4 FIRES

- .1 Fires and burning of rubbish on site permitted only when approved by Departmental Representative.

1.5 SITE CLEARING
AND PLANT
PROTECTION

- .1 Protect trees and plants on site and adjacent properties as required.
- .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 drip line 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.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 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 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 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.4 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.5 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.6 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.7 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove waste products and debris other than that caused by Owner or other Contractors.
- .5 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.
- .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .7 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.
- .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls and floors.
- .9 Clean lighting reflectors, lenses, and other lighting surfaces.
- .10 Vacuum clean and dust building interiors, behind grilles, louvers and screens.
- .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
- .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .13 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .14 Remove dirt and other disfiguration from exterior surfaces.
- .15 Clean and sweep roofs, gutters, areaways, and sunken wells.
- .16 Sweep and wash clean paved areas.
- .17 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.
- .18 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

<u>1.4 WASTE</u>	.1	Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
MANAGEMENT AND		
<u>DISPOSAL</u>		

PART 2 - PRODUCTS

<u>2.1 NOT USED</u>	.1	Not Used.
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PART 3 - EXECUTION

<u>3.1 NOT USED</u>	.1	Not Used.
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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.

1.4 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Cost/Revenue Analysis Work plan (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-modeling 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 Coordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .15 Waste Reduction Work plan (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).

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- 1.5 DOCUMENTS .1 Maintain at job site, one copy of Waste Audit.
- 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 labeling 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 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 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.

3.2 APPLICATION

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

3.3 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.

3.4 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.

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 Conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
- 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 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 RELATED
REQUIREMENTS

.1 Division 14.

1.2 REFERENCES

.1 CAN CSA B44 2013

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 copy of all documents electronically, including 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, 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 Maintain separate colors 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 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 color 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 color 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 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 color 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 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.
 - .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.

Elevator System Repl.
CSC St. John's Facility
St. John's, NFLD
Project No. R.076414.001

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-
- .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 General requirements relating to commissioning of project's components and systems, specifying general requirements to PV of components, equipment, sub-systems, systems, and integrated systems.
- .2 Related Requirements and industry standards
 - .1 Division 14., CSA Z320 Latest Edition
- .3 Acronyms:
 - .1 CSA - CSA Standard Z320 Building Commissioning, Latest Edition, all applicable requirements and annex related Vertical and Horizontal Transportation Systems.
 - .2 BMM - Building Management Manual.
 - .3 Cx - Commissioning.
 - .4 EMCS - Energy Monitoring and Control Systems.
 - .5 O&M - Operation and Maintenance.
 - .6 PI - Product Information.
 - .7 PV - Performance Verification.
 - .8 TAB - Testing, Adjusting and Balancing.
- .4 Public Works and Government Services (PWGSC) Lift Engineering Representative shall act as the Departmental Representative for all Elevator Upgrade project related Technical Commissioning Activities.

1.2 GENERAL

- .1 Cx is a planned program of tests, procedures and checks carried out as a minimum in accordance to CSA Z320 latest edition, industry best practice standards to ensure that systematically on systems and integrated systems of the finished Project. Cx is performed after systems and integrated systems are completely installed, functional and Contractor's Performance Verification responsibilities have been completed and approved.
Objectives:
 - .1 Verify installed equipment, systems and integrated systems operate in accordance with contract documents and design criteria and intent.
 - .2 Ensure appropriate documentation is compiled into the BMM.

- .3 Develop site specific procedures as directed by PWGSC Lift Engineering Department Representative to effectively train O&M staff.
- .2 Contractor provides all required manpower and support to perform Cx process, operating equipment and systems, troubleshooting and making adjustments as required.
 - .1 Systems to be operated at full capacity under various modes to determine if they function correctly and consistently at peak efficiency. Systems to be interactively with each other as intended in accordance with Contract Documents and design criteria.
 - .2 During these checks, adjustments to be made to enhance performance to meet environmental or user requirements.

1.3 COMMISSIONING OVERVIEW

- .1 Cx to be a line item of Contractor's cost breakdown.
- .2 Cx activities supplement field quality and testing procedures described in relevant technical sections.
- .3 Cx is conducted in concert with activities performed during stage of project delivery. Cx identifies issues in Planning and Design stages which are addressed during Construction and Cx stages to ensure the built facility is constructed and proven to operate satisfactorily under weather, environmental and occupancy conditions to meet functional and operational requirements. Cx activities include transfer of critical knowledge to facility operational personnel.
- .4 The PWGSC Lift Engineering Departmental Representative will issue Interim Acceptance Certificate when:
 - .1 Completed Cx required CSA and other related documentation has been received, reviewed for suitability and approved by Departmental Representative.
 - .2 Equipment, components and systems have been commissioned.
 - .3 O&M training and site specific procedures have been completed to PWGSC satisfaction.

-
- 1.4 NON-CONFORMANCE TO PERFORMANCE VERIFICATION REQUIREMENTS
- .1 Should equipment, system components, and associated controls be incorrectly installed or malfunction during Cx, correct deficiencies, re-verify equipment and components within the unfunctional system, including related systems as deemed required by the PWGSC Lift Engineering Departmental Representative, to ensure effective performance.
 - .2 Costs for corrective work, additional tests, inspections, to determine acceptability and proper performance of such items to be borne by Contractor. Above costs to be in form of progress payment reductions or hold-back assessments.
- 1.5 PRE-CX REVIEW
- .1 Before Construction:
 - .1 Review contract documents, confirm by writing to the Lift Engineering Departmental Representative.
 - .1 Adequacy of provisions for Cx.
 - .2 Aspects of design and installation pertinent to success of Cx.
 - .2 During Construction:
 - .1 Co-ordinate provision, location and installation of provisions for Cx.
 - .3 Before start of Cx:
 - .1 Have completed Cx Plan up-to-date.
 - .2 Ensure installation of related components, equipment, sub-systems, and systems is complete.
 - .3 Fully understand Cx requirements and procedures.
 - .4 Have Cx documentation shelf-ready.
 - .5 Understand completely design criteria and intent and special features.
 - .6 Submit complete start-up documentation to Departmental Representative.
 - .7 Have Cx schedules up-to-date.
 - .8 Ensure systems have been cleaned thoroughly.
 - .9 Complete TAB procedures on systems, submit TAB reports to the Lift Engineering Departmental Representative for review and approval.
 - .10 Ensure "As-Built" system schematics are available.
 - .4 Inform the PWGSC Lift Engineering Departmental Representative in writing of discrepancies and deficiencies on finished works.

1.6 CONFLICTS

- .1 Report conflicts between requirements of this section and other sections to the PWGSC Lift Engineering Departmental Representative before start-up and obtain clarification.
- .2 Failure to report conflict and obtain clarification will result in application of most stringent requirement.

1.7 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Submit no later than 4 weeks after award of Contract:
 - .1 Name of Contractor's Cx representative.
 - .2 Draft Cx documentation.
 - .3 Preliminary Cx schedule.
- .2 Request in writing to the PWGSC Lift Engineering Departmental Representative for changes to submittals and obtain written approval at least 8 weeks prior to start of Cx.
- .3 Submit proposed Cx procedures to PWGSC Lift Engineering Departmental Representative where not specified and obtain written approval at least 8 weeks prior to start of Cx.
- .4 Provide additional documentation relating to Cx process required by the PWGSC Lift Engineering Departmental Representative.

1.8 COMMISSIONING
DOCUMENTATION

- .1 Refer to Section 01 91 33 - Commissioning (Cx) Forms: Installation Check Lists and Product Information (PI) / Performance Verification (PV) Forms for requirements and instructions for use, and CSA Z320 Latest Edition.
- .2 The PWGSC Lift Engineering Departmental Representative to review and approve all Cx documentation.
- .3 Provide completed and approved Cx documentation to the PWGSC Lift Engineering Departmental Representative.

1.9 COMMISSIONING
SCHEDULE

- .1 Provide adequate time for Cx activities prescribed in technical sections and commissioning sections including:
 - .1 Approval of Cx reports.

- .2 Verification of reported results.
- .3 Repairs, retesting, re-commissioning, re-verification.
- .4 Training.

1.10 COMMISSIONING MEETINGS

- .1 Purpose: to resolve issues, monitor progress, identify deficiencies, relating to Cx.
- .2 If requested by the PWGSC Lift Engineering Department Representative, have Cx meetings on regular basis until commissioning deliverables have been addressed.
- .3 Thereafter Cx meetings to be held until project completion and as required during equipment start-up and functional testing period.
- .4 Meeting will be chaired by the PWGSC Lift Engineering Departmental Representative, who will record and distribute minutes.
- .5 Ensure subcontractors and relevant manufacturer representatives are present at 60% and subsequent Cx meetings and as required.

1.11 STARTING AND TESTING

- .1 Contractor assumes liabilities and costs for inspections. Including disassembly and re-assembly after approval, starting, testing and adjusting, including supply of testing equipment.

1.12 WITNESSING OF STARTING AND TESTING

- .1 Provide 14 days notice prior to commencement.
- .2 The PWGSC Lift Engineering Departmental Representative to witness of start-up and testing.
- .3 Contractor's Cx representative to be present at tests performed and documented by sub-trades, suppliers and equipment manufacturers.

1.13 MANUFACTURER'S
INVOLVEMENT

- .1 Factory testing: manufacturer to:
 - .1 Coordinate time and location of testing.
 - .2 Provide testing documentation for approval by Lift Engineering Departmental Representative
 - .3 Arrange for PWGSC Lift Engineering Departmental Representative to witness tests.
 - .4 Obtain written approval of test results and documentation from the PWGSC Lift Engineering Departmental Representative before delivery to site.
- .2 Obtain manufacturers installation, start-up and operations instructions prior to start-up of components, equipment and systems and review with the PWGSC Lift Engineering Departmental Representative
 - .1 Compare completed installation with manufacturer's published data, record discrepancies, and review with manufacturer.
 - .2 Modify procedures detrimental to equipment performance and review same with manufacturer before start-up.
- .3 Integrity of warranties:
 - .1 Use manufacturers trained start-up personnel where specified elsewhere in other divisions or required to maintain integrity of warranty.
 - .2 Verify with manufacturer that testing as specified will not void warranties.
- .4 Qualifications of manufacturer's personnel:
 - .1 Experienced in design, installation and operation of equipment and systems.
 - .2 Ability to interpret test results accurately.
 - .3 To report results in clear, concise, logical manner.

1.14 PROCEDURES

- .1 Verify that equipment and systems are complete, clean, and operating in normal and safe manner prior to conducting start-up, testing and Cx.
- .2 Conduct start-up and testing in following distinct phases:
 - .1 Included in delivery and installation:
 - .1 Verification of conformity to specification, approved shop drawings and completion of PI report forms.
 - .2 Visual inspection of quality of installation.
 - .2 Start-up: follow accepted start-up

procedures.

.3 Operational testing: document equipment performance.

.4 System PV: include repetition of tests after correcting deficiencies.

.5 Post-substantial performance verification: to include fine-tuning.

.3 Correct deficiencies and obtain approval from the PWGSC Lift Engineering Departmental Representative after distinct phases have been completed and before commencing next phase.

.4 Document require tests on approved PV forms.

.5 Failure to follow accepted start-up procedures will result in re-evaluation of equipment by an independent testing agency selected by the PWGSC Lift Engineering Departmental Representative if results reveal that equipment start-up was not in accordance with requirements, and resulted in damage to equipment, implement following:

.1 Minor equipment/systems: implement corrective measures approved by PWGSC Lift Engineering Departmental Representative

.2 Major equipment/systems: if evaluation report concludes that damage is minor, implement corrective measures approved by the PWGSC Lift Engineering Departmental Representative

.3 If evaluation report concludes that major damage has occurred, the PWGSC Lift Engineering Departmental Representative shall reject equipment.

.1 Rejected equipment to be remove from site and replace with new.

.2 Subject new equipment/systems to specified start-up procedures.

1.15 START-UP
DOCUMENTATION

.1 Assemble start-up documentation and submit to the PWGSC Lift Engineering Departmental Representative for approval before commencement of commissioning.

.2 Start-up documentation to include:

.1 Factory and on-site test certificates for specified equipment.

.2 Pre-start-up inspection reports.

.3 Signed installation/start-up check lists.

.4 Start-up reports,

.5 Step-by-step description of complete start-up procedures, to permit the PWGSC Lift Engineering Departmental Representative to repeat start-up at any time.

-
- 1.16 OPERATION AND MAINTENANCE OF EQUIPMENT AND SYSTEMS
- .1 After start-up, operate and maintain equipment and systems as directed by equipment/system manufacturer.
 - .2 With assistance of manufacturer develop written maintenance program and submit to the Lift Engineering Departmental Representative for approval before implementation.
 - .3 Operate and maintain systems for length of time required for commissioning to be completed.
 - .4 After completion of commissioning, operate and maintain systems until issuance of certificate of interim acceptance.
- 1.17 TEST RESULTS
- .1 If start-up, testing and/or PV produce unacceptable results, repair, replace or repeat specified starting and/or PV procedures until acceptable results are achieved.
 - .2 Provide manpower and materials, assume costs for re-commissioning.
- 1.18 START OF COMMISSIONING
- .1 Notify the PWGSC Lift Engineering Departmental Representative at least 14 days prior to start of Cx.
 - .2 Start Cx after elements of building affecting start-up and performance verification of systems have been completed.
- 1.19 INSTRUMENTS / EQUIPMENT
- .1 Submit to the PWGSC Lift Engineering Departmental Representative for review and approval:
 - .1 Complete list of instruments proposed to be used.
 - .2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy.
 - .2 Provide the following equipment as required:
 - .1 2-way radios.

- .2 Ladders.
- .3 Equipment as required to complete work.

1.20 COMMISSIONING
PERFORMANCE
VERIFICATION

- .1 Carry out Cx:
 - .1 Under actual operating conditions, over entire operating range, in all modes.
 - .2 On independent systems and interacting systems.
- .2 Cx procedures to be repeatable and reported results are to be verifiable.
- .3 Follow equipment manufacturer's operating instructions.
- .4 EMCS trending to be available as supporting documentation for performance verification.

1.21 WITNESSING
COMMISSIONING

- .1 The PWGSC Lift Engineering Departmental Representative to witness activities and verify results.

1.22 AUTHORITIES
HAVING JURISDICTION

- .1 Where specified start-up, testing or commissioning procedures duplicate verification requirements of authority having jurisdiction, arrange for authority to witness procedures so as to avoid duplication of tests and to facilitate expedient acceptance of facility.
- .2 Obtain certificates of approval, acceptance and compliance with rules and regulation of authority having jurisdiction.
- .3 Provide copies to the PWGSC Lift Engineering Departmental Representative within 14 days of test and with Cx report.

1.23 REPEAT
VERIFICATIONS

- .1 Assume costs incurred by the PWGSC Lift Engineering Departmental Representative for third and subsequent verifications where:
 - .1 Verification of reported results fail to

receive Departmental Representative's approval.
.2 Repetition of second verification again fails to receive approval.
.3 The PWGSC Lift Engineering Departmental Representative deems Contractor's request for second verification was premature.

1.24 SUNDRY CHECKS
AND ADJUSTMENTS

- .1 Make adjustments and changes which become apparent as Cx proceeds.
- .2 Perform static and operational checks as applicable and as required.

1.25 DEFICIENCIES,
FAULTS, DEFECTS

- .1 Correct deficiencies found during start-up and Cx to satisfaction of the Lift Engineering Departmental Representative
- .2 Report problems, faults or defects affecting Cx to the PWGSC Lift Engineering Departmental Representative in writing. Stop Cx until problems are rectified. Proceed with written approval from PWGSC Lift Engineering Departmental Representative

1.26 COMPLETION OF
COMMISSIONING

- .1 Upon completion of Cx leave systems in normal operating mode.
- .2 Except for warranty and seasonal verification activities specified in Cx specifications, complete Cx prior to issuance of Interim Certificate of Completion.
- .3 Cx to be considered complete when contract Cx deliverables have been submitted and accepted by the PWGSC Lift Engineering Departmental Representative

1.27 ACTIVITIES
UPON COMPLETION OF
COMMISSIONING

- .1 When changes are made to baseline components or system settings established during Cx process, provide updated Cx form for affected item.

1.28 MAINTENANCE
MATERIALS, SPARE
PARTS, SPECIAL
TOOLS

- .1 Supply, deliver, and document maintenance materials, spare parts, and special tools as specified in contract.

1.29 OCCUPANCY

- .1 Cooperate fully with the PWGSC Lift Engineering Departmental Representative during stages of acceptance and occupancy of facility.

1.30 INSTALLED
INSTRUMENTATION

- .1 Use instruments installed under Contract for TAB and PV if:
 - .1 Accuracy complies with these specifications.
 - .2 Calibration certificates have been deposited with the Lift Engineering Departmental Representative
- .2 Calibrated EMCS sensors may be used to obtain performance data provided that sensor calibration has been completed and accepted.

1.31 PERFORMANCE
VERIFICATION
TOLERANCES

- .1 Application tolerances:
 - .1 Specified range of acceptable deviations of measured values from specified values or specified design criteria. Except for special areas, to be within +/- 10% of specified values.
- .2 Instrument accuracy tolerances:
 - .1 To be of higher order of magnitude than equipment or system being tested.
- .3 Measurement tolerances during verification:
 - .1 Unless otherwise specified actual values to be within +/- 2 % of recorded values.

1.32 OWNER'S
PERFORMANCE TESTING

- .1 Performance testing of equipment or system observed and recorded by the PWGSC Lift Engineering Departmental Representative will not relieve Contractor from compliance with specified start-up and testing procedures.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Commissioning forms approved by the Lift Engineering Department Representative shall be completed and signed by the contractor for equipment, system and integrated system.
- .2 Related Requirements
 - .1 Division 14. And CSA Z320-11,

1.2
INSTALLATION/
START-UP CHECK
LISTS

- .1 Include the following data:
 - .1 Product manufacturer's installation instructions and recommended checks, and recommended CSA Z320 Latest edition verifications and checks as directed by the PWGSC Lift Engineering Department Representative.
 - .2 Special procedures as specified in relevant technical sections and as directed by the Lift Engineering Department Representative.
 - .3 Items considered good installation and engineering industry practices deemed appropriate for proper and efficient operation.
 - .2 Equipment manufacturer's installation/start-up check lists are acceptable for use. Also supplemental CSA Z320 Latest edition checklist will be required as deemed necessary by PWGSC Lift Engineering Department Representative to be filled out and signed by the contractor and possibly additional data lists will be required for specific project conditions.
- .3 Use check lists for equipment installation. Document check list verifying checks have been made, indicate deficiencies and corrective action taken.
 - .4 Installer to sign check lists upon completion, certifying stated checks and inspections have been performed. Return completed check lists to PWGSC Lift Engineering Department Representative. Check lists will be required during Commissioning and will be included in Building Maintenance Manual (BMM) at completion of project.

- .5 Use of check lists will not be considered part of commissioning process but will be stringently used for equipment pre-start and start-up procedures.

1.3 PRODUCT INFORMATION (PI) REPORT FORMS

- .1 Product Information (PI) forms compiles gathered data on items of equipment produced by equipment manufacturer, includes nameplate information, parts list, operating instructions, maintenance guidelines and pertinent technical data and recommended checks that is necessary to prepare for start-up and functional testing and used during operation and maintenance of equipment. This documentation is included in the BMM at completion of work.
- .2 Prior to Performance Verification (PV) of systems complete items on PI forms related to systems and obtain PWGSC Lift Engineering Departmental Representative's approval.

1.4 PERFORMANCE VERIFICATION (PV) FORMS

- .1 PV forms to be used for checks, running dynamic tests and adjustments carried out on equipment and systems to ensure correct operation, efficiently and function independently and interactively with other systems as intended with project requirements.
- .2 PV report forms include those developed by Contractor records measured data and readings taken during functional testing and Performance Verification procedures.
- .3 Prior to PV of integrated system, complete PV forms of related systems and obtain PWGSC Lift Engineering Departmental Representative's approval.

1.5 SAMPLES OF COMMISSIONING FORMS

- .1 PWGSC Lift Engineering Departmental Representative will develop and provide to Contractor required project-specific CSA Z320 Latest Edition related Commissioning forms in electronic format complete with specification data. Contractor to complete and sign forms as directed by PWGSC Lift Engineering Departmental Representative.
- .2 Revise items on Commissioning forms to suit project requirements.

1.6 CHANGES AND
DEVELOPMENT OF NEW
REPORT FORMS

- .1 When additional forms are required, but are not available from Departmental Representative develop appropriate verification forms and submit to PWGSC Lift Engineering Departmental Representative for approval prior to use.
 - .1 Additional commissioning forms to be in same format as provided by PWGSC Lift Engineering Departmental Representative

1.7 COMMISSIONING
FORMS

- .1 Use Commissioning forms to verify installation and record performance when starting equipment and systems.
- .2 Strategy for Use:
 - .1 PWGSC Lift Engineering Departmental Representative provides Contractor project-specific Commissioning forms with Specification data included.
 - .2 Contractor will provide required shop drawings information and verify correct installation and operation of items indicated on these forms.
 - .3 Confirm operation as per design criteria and intent.
 - .4 Identify variances between design and operation and reasons for variances.
 - .5 Verify operation in specified normal and emergency modes and under specified load conditions.
 - .6 Record analytical and substantiating data.
 - .7 Verify reported results.
 - .8 Form to bear signatures of recording contractor's technician and reviewed and signed off by PWGSC Lift Engineering Departmental Representative.
 - .9 Submit immediately after tests are performed.
 - .10 Reported results in true measured SI unit values.
 - .11 Provide PWGSC Lift Engineering Departmental Representative with originals of completed forms.
 - .12 Maintain copy on site during start-up, testing and commissioning period.
 - .13 Forms to be both hard copy and electronic format with typed written results in Building Management Manual.

1.8 LANGUAGE .1 To suit the language profile of the awarded contract.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

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 convert one (1) basement machine, geared, elevator designated on site as Provincial number 677, Passenger Elevator, located at Wabush Airport, 2 Airport Road, Wabush NFLD, to traction MRL. Provide all work required for a completed projected, accepted by the Authority Having Jurisdiction including:
 - .2 New Permanent Magnet AC gearless machine.
 - .3 New, regenerative, motor drive.
 - .4 New non-proprietary, microprocessor-based solid state electrical controller.
 - .5 New over speed and uncontrolled speed protection for car and counterweight.
 - .6 New car door operator, doors, hall entrances, door locks, relating system, door closers and related hardware.
 - .7 New car cab including cab interior.
 - .8 New signals including hall lanterns, hall position indicators in car and at the main floor.
 - .9 New speed governor.
 - .10 Provision of automatic emergency recall and in-car emergency service.
 - .11 Full parts, labour and all associated code required preventive maintenance which shall include all system shut down call backs on all elevator components including all components of the monitoring system listed in Section 14-90-00 for a subsequent twenty-four (24) month period after the final inspection certificate has been signed by PWGSC.
 - .12 Remote monitoring and command system including all interconnections.
 - .13 Provide required demolition and removal of existing elevator system including machine room, hoistway, hall fixtures and entrances.

- .14 Provide required engineering and co-ordination of various elements and suppliers to provide a complete code compliant project and in particular considering the highly custom nature of this project.
- .15 Above is a brief description only. The following specifications detail the Work.

1.2 RELATED WORK -
INCLUDED AS ELEVATOR
CONTRACTOR'S
RESPONSIBILITY

Include subcontracts and all coordination and supervision of related work usually covered off by others trades to accomplish a working elevator system, accepted by provincial authorities and suitable for intended use including:

- .1 Electrical:
 - .1 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.
 - .2 Provide new three-phase disconnect switch to accommodate elevator motor power with properly sized new fusing and including for any required auxiliary contacts.
 - .3 Provide new 120 V 15 amp disconnect switch to accommodate elevator cab lighting.
 - .4 Provide new machine room lighting new lighting in the elevator machine room, operated by existing 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.
 - .5 Provide two (2) new 120 v GFI convenience receptacles in the elevator machine room, one located inside the remote monitoring box, the second device located at a located designated by PWGSC, on receptacle in the overhead and one in the pit.
 - .6 Reconnect the owner's emergency cab communication system to the new telephones provided in the elevator cabs. Include for any required assistance by communications contractor to make system functional.
 - .7 Provide two new Vapour Proof guarded fluorescent lighting in the pit, one fixture halfway

point of the hoist-way and one on top of hoist way. Guard with substantial, rust proof metal cages over polycarbonate lens. Lighting to provide 100 Lux ambient at the pit floor level employing a minimum of dual 24" T8 fluorescent tubes at 4100 lux. Provide instant start, ballast factor greater than 0.9 and 85% reflector. All lighting to be activated by any of the switches to be located also at each of these three locations.

.8 Include electrician subcontract to accomplish all required conductor and conduit runs. Run new grounds as required.

.9 Engage fire alarm subcontractor to disable fire detectors as required during course of work - respecting Owner's fire regulations. Include all associated costs from fire alarm contractor to install new devices, relocated existing devices, and to verify complete system during testing and commissioning sequence. Include all associated costs to certify system at the end of the project.

.10 Provide new switches and conductors for all lighting and new pit stop buttons.

.2 Structural:

.1 Engage engineer registered in the province and specializing in structural engineering to assess adequacy of existing hoistway structure including pit floor and walls. Provide new engineered system complete with stamped drawings of structural bearing including beams, plates and re enforcing masonry to accommodate new elevator reactions.

.2 Include any required scanning of structure to locate hidden steel.

.3 General:

.1 Include complete removal of redundant hydraulic elevator components while working in an occupied building. As a minimum this will require plywood hoarding outside each elevator entrance 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 elevator modernization in an occupied building.

.4 Carry out all potential 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. Acceptable noise levels will be determined by PWGSC.

- .5 Supply any required garbage dumpster. Keep building cleared of rubbish.
- .6 Provide removal of existing elevator 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 Remove and replace divider beams and overhead beams in hoistway as required by new elevator design. Provide any new hoistway beams or steel to accommodate new elevators.
- .8 Provide required cutting, patching and making good of new fixtures.
- .9 Provide new pit ladders, including retractable with electrical switch, if required by new equipment arrangement.
- .10 Provide any required alterations to existing overhead, to accommodate new elevators. Include for required cutting, patching, and reinstallation of roofing supports, engineering and waterproofing.
- .11 Provide any required hoistway repairs including patching of holes, fire stopping and bevelling of ledges or setbacks 100 mm or greater.
- .12 Provide all required supervision, co-ordination, 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.
- .13 Abandoned underground hydraulics, if not removed, to be completely cleaned of oil and properly sealed at level of pit floor.
- .14 Modify elevator machine room door as required to make self-closing and self-locking.
- .15 To accomplish associated Monitoring work (see specification 14 90 00) include all related connections and data sources including conductors, conduit, modems, installation fees, license fees, system activation and other work and services as required or as reasonably directed by the departmental representative to accomplish a working system without any costs extra to those of this division.

1.3 REFERENCE
STANDARDS

- .1 Perform work to the following minimum standards:
 - .1 CAN/CSA-B44-2013 Safety Code for Elevators including updates
 - .2 CSA C22. No.77 Motors with Inherent Overheating Protection.
 - .3 CSA C22.2 No. 141 Unit Equipment for Emergency Lighting.
 - .4 Provincial Elevator Act and Regulations.
 - .5 C22.1 Canadian Electrical Code, particularly Section 38.
 - .6 National Building Code.

- .7 CAN/CSA B651 Barrier Free Design.
- .8 CSA Z432-04 Safeguarding of Machinery.
- .9 CAN/CSA Z320 Building Commissioning Standards.
- .10 Addendum to ANSI/ASHRAE/IESNA Standard 90.1-2007, Energy Standard for Buildings Except Low-Rise Residential Buildings (cab lighting systems to have efficacy of not less than 35 lumens per watt, cab ventilation fans shall not consume over .33 watts/cfm at maximum speed and when stopped and unoccupied with doors closed for over 15 minutes, cab interior lighting and ventilation shall be de-energized until required for operation).

- .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 3 phase power supply.
- .3 Provide necessary grounding, shielding, or bonding required to accommodate the new elevator equipment.
- .4 Carry out any electrical modifications outside of the hoistway and machine room by a Licensed Electrician and arrange and pay for inspection by hydro utility as required. Provide a copy of utility permit to Departmental Representative.

1.5 PERMITS AND INSPECTIONS

- .1 Complete 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.

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- 1.6 TAXES .1 Pay all taxes properly levied by law including Federal, Provincial and Municipal. HST to be invoiced as an identified extra.
- 1.7 MEASUREMENTS .1 Before the execution of the work, verify all dimensions with the actual site conditions.
- 1.8 QUALITY OF WORK .1 Perform Work by mechanics skilled in the installation of elevators 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 DRAWINGS, SHOP DRAWINGS AND PRODUCT DATA .1 Before beginning work, prepare all drawings to show the general arrangement of the elevator equipment and other data which is called for and are to be submitted for review. Provide these drawings within two (5) weeks of notification of award of contract. For each day past the five week deadline, \$500 will be deducted from the contract value.
- .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 280mm x 432 mm (11" x 17").
 - .5 Indicate to scale on general arrangement drawings, stamped by a Professional Engineer registered in the province:
 - .1 Plan view of machine, controller, drive and all other components in machine room.
 - .2 Plan view of car, counterweight, sheaves, supporting beams, guide rails, buffers, machine, governor and other components in hoistway.
 - .3 Section view of the hoistway including elevation of each floor served, pit depth and overhead.
 - .4 Location of circuit breaker, switchboard panel or disconnect switch, light switch and feeder extension points in machine room.
 - .5 Location in hoistway or machine room for connection of travelling cables for car light and communication system.
 - .6 Signal and operating fixtures.
 - .7 Locations and size of trap doors and access doors and load on hoist beam and location of trolley beams.
 - .8 Heat dissipation of elevator equipment in machine room.
 - .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 interior drawings.
 - .8 Do not commence manufacture or order materials before shop drawings are approved as well as stamped by a Professional Engineer in the province of work and submitted to the provincial safety authority.
- 1.11 PROJECT RECORD DOCUMENTS
- .1 Before final acceptance of 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 Drawings - machine room plan, hoistway plan and hoistway section. All drawings to be laminated or enclosed in plastic protectors and marked "as-built". Provide all drawings stamped as "as built" by a Professional Engineer registered in the province.
- .2 Provide one soft copy of the above information in AutoCAD format. Insert as-built into building architectural and structural drawings, as provided by PWSGC.
- .3 Mark up all field changes or additions to original wiring diagrams in red.
- .4 Submit drawings and data in accordance with General Requirements specification, if distributed with this tender.
- 1.12 OPERATION AND MAINTENANCE DATA
- .1 Provide three (3) copies of manufacturer's instructions and operation and maintenance manuals.
- .2 Include the following maintenance data:
- .1 Description of elevator system's method of operation and control including motor control system, door operation, emergency recall operation and special or non-standard features provided.
 - .2 Replacement parts list.
 - .3 Include all wiring diagrams for all equipment on controllers.
 - .4 Maintenance: Use clear drawings, diagrams or manufacturers' literature which detail the following:
 - lubrication products and schedules
 - trouble shooting procedures
 - adjustment techniques
 - operational checks.
 - .5 Spare Parts:
 - List recommended spares to be maintained on site to ensure optimum efficiency
 - List all special tools and appropriate unique applications.
 - Detail manufacturer and supplier names and addresses.
- .3 Include in the manuals a copy of the registered design submission and safety authority inspection reports.

- .4 For a fifteen (15) year period following acceptance of Work, provide further information that is required for the safe and efficient maintenance of the elevator equipment, including any solid state equipment or devices supplied under these specifications. Fee for parts, is agreed to be manufacturing cost plus 40%.
- 1.13 MAINTENANCE SERVICE - INTERIM AND WARRANTY
- .1 Include at no extra cost Interim maintenance of 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, Section 8.6 of the ASME 17.1/CSA B44-13 Safety Code for Elevators and Escalators, CSA Standard B44.2-10 Maintenance Requirements and Intervals for Elevators, Escalators, Dumbwaiters and the PWGSC standard Elevating Devices Maintenance Specification distributed with this tender, as a minimum.
- .3 Systematically clean, lubricate and adjust all of the equipment as required.
- .4 Repair or replace electrical and mechanical parts of any equipment as required, whether due to defect or normal wear and tear.
- .5 Use only genuine standard parts of manufacturer of equipment.
- .6 Perform work by competent personnel under supervision and in direct employ of manufacturer, or manufacturer's licensed agent.
- .7 Schedule work during regular Elevator Trade working hours with Departmental Representative.
- .8 Maintain locally an adequate stock of parts for replacement or emergency purposes and have qualified staff available to ensure fulfilment of parts requirements in a timely fashion.
- .9 Include 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. Provide full coverage of monitoring system including modem and internet elements with 48 hour deadline to restore system to full operation.

- .10 Ensure no unit is out of service longer than 12 hours - keep Departmental Representative completely informed of equipment malfunctions on a continuing basis.

1.14 LAYOUT

- .1 Design equipment to suit existing space or space as modified by this division's work, including hoistway cross-sections, overhead, pit depth, machine room dimensions and machine room location.
- .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 with the materials and workmanship that meets Canadian standards for elevating equipment and has indicated under these specifications. Make good any defects, not due to improper use or care, which may develop within two (2) years from the date of acceptance.
- .2 Commence warranty at date of certification of Final Completion, as certified by the Departmental Representative.

1.16 DEPARTMENTAL
REPRESENTATIVE'S
CERTIFICATION OF
PAYMENT

- .1 The Departmental Representative will certify progress payments for work only after it has been installed.

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. Meet requirements of Appendix E of the CAN/CSA-B44 Safety Code for Elevators, including:
- .2 Provide car-riding lanterns with stainless steel faceplates, lexan covers over new LED illuminated

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

- .3 Provide voice annunciation indication of each floor, when served and of car direction. Provide volume control adjustable from behind car station. Provide high- power speakers, minimum of two (2) per car so no distortion is readily noticeable to passengers. Provide sample of annunciations, to be in French and English languages and in a feminine voice, with shop drawings.
- .4 Provide new metal hall braille/tactile plates.

1.18 ELEVATOR
PERFORMANCE

- .1 With equipment adjusted to the required parameters, operate elevator with smooth acceleration and provide a comfortable and agreeable ride to the passengers.
- .2 Meet required parameters in conjunction with dependable, consistent elevator operation and without undue wear or excessive maintenance over the life of the elevator installation.
- .3 Provide brake to brake time required to travel between 5,000 mm floor not to exceed 10 seconds.
- .4 Set 1066 mm wide side opening door to safely close in 3.6 seconds and open in 2.5 seconds.
- .5 Provide adjustable dwell times and independent dwell settings for car and hall calls.
 - .1 Set the dwell times to 2 seconds for car, and 3 seconds for hall initially.
- .6 Maintain floor levelling accuracy of 5 mm or better.
- .7 Set door detector interrupt and nudging time to 20 seconds.
- .8 Limit cab noise levels to 60 dB when moving and 68 dB during a door operation cycle, as measured by a sound meter located in the centre of the 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 0.04 g.
- .12 Limit jerk rate (change in rate of acceleration) to 2.44 m/s².
- .13 Provide car speed to within 5% of contract speed in both directions.

PART 2 - PRODUCTS

2.1 DESCRIPTION OF ELEVATOR

- .1 Modify existing basement mounted geared equipment to permanent magnet AC gearless machine mounted in the same machine room.
- .2 Class: Passenger
- .3 Capacity: 907 Kg (2,000 lbs)
- .4 Speed: 0.76 m/s (150 fpm).
- .5 Control: Simplex Selective Collective Automatic.
- .6 Doors: 914 mm (36") wide, 1 speed side open
- .7 Travel: Per existing site conditions.
- .8 Overhead: Adapt existing site conditions
- .9 Pit Depth: Adapt existing site conditions

Special Features: Independent service operation;
Stainless steel entrances;
FEO operation, phase 1 and phase 2;
Emergency power operation;
Monitoring and command feature at remote computer;
Feedback systems required for controller remote from hoistway - no access opening provided.

Signals: Dupar US 91 buttons
Car position indicator;
Hall position indicator at main landing;
New car riding lanterns with new

electronic chime and LED illumination
Full compliance with Appendix "E" of
CAN/CSA-B44 Safety Code for Elevators
All signals to be LED-illuminated

2.2 COMPONENTS

- .1 Use major elevator components from standard product line of one manufacturer unless otherwise approved in writing or unless product is specifically named in this document.
- .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.
- .7 Use paint with CGSB 1-GP-104Ma, alkyd enamel semi-gloss, for machinery, colour to be selected by Architect.

2.3 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 Provide a communication system junction box on the outside of the controller appropriately identified. Provide shielded wiring from the assistance button in car and the speaker in the car to a junction box located at controller in machine room.
- .4 Provide new wiring and conduit from the main line and car lighting disconnect switches to the terminal blocks in the controllers.
- .5 Provide a separately-identified box for the fire alarm connection.
- .6 Include at least 10% spare conductors in each cable. Tape and legibly identify all spare wires.
- .7 In travelling cable and terminating at controller and car station, include at least six (6) pairs of 18 gage twisted/shielded wires for audio or other electronic equipment. Include one (1) co-ax RG-59 or CAT 5 for video signal.
- .8 Do not parallel conductors to increase current carrying capacity unless individually fused.
- .9 Install a separate green bond wire in all raceway, including EMT and flexible conduit.
- .10 Provide additional disconnect switches and wiring if required by Code, to suit new machine room layout.
- .11 Include wiring, and connections to elevator devices remote from hoistway and between elevator machine rooms.
- .12 Connect all wiring where required to building fire alarm system.
- .13 Limit use of flexible conduit to items that require movement or periodic adjustment.
- .14 Provide insulated wiring having a flame retarding and moisture resisting outer cover. Wiring shall be run in metal conduit, metallic tubing or wire ducts.
- .15 When using conduits or troughs through floor, extend conduit or trough at least 100 mm above floor.
- .16 Do not run conduit or wiring along the pit floor. Install all conduit and wiring a minimum of 150 mm above pit floor.

- .17 Existing trough or conduit may be retained where is serviceable condition.
- .18 Use type ETT travelling cables.
- .19 Suitably suspend the travelling cables to relieve strain in the individual conductors.
- .20 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.
- .21 Protect travelling cables from damage where they make contact with the hoistway, hoistway equipment or trimmer beams.
- .22 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.
- .23 Fabricate wiring that is run in conduit or tubing to Table 6 of CEC Part 1.
- .24 Do not use metal wiring conduit as a grounding conductor.

2.4 SOUND ISOLATION

- .1 Include resilient pads to effectively isolate machine from building structure. Design for transmissivity of less than 10% at full speed and full load. Use a minimum of 37 mm thick pads. Do not use built-up pads.
- .2 Prevent lateral displacement of machine.

2.5 CAR AND COUNTERWEIGHT GUIDES

- .1 Equip passenger car and counterweight with roller guides, individually spring loaded, mounted on top and bottom of car and counterweight frames. Provide minimum diameter 100 mm (4") for car, 75 mm (3") for counterweight.
- .2 Provide each guide with durable, oil resistant and resilient tired ball bearing rollers to run on three finished rail surfaces.
- .3 Do not lubricate guide rails. Maintain each roller on its respective guide in uniform contact with rail

surface at all times by means of substantial adjustable springs or by resilient mountings.

- .4 Provide guide operation, which is inaudible to passengers in car or outside hoistway with car operating at rated speed and car fan turned off.
- .5 Use roller tire material which will not develop flat spots after standing idle for 72 hours under average environmental conditions.

2.6 GUIDE RAILS AND BRACKETS

- .1 Prove new T rail for car and counterweight - 15 lbs/ft and counterweight rails of 8 lbs/ft minimum.
- .2 Align and file all joints.
- .3 Erect guide rails plumb and parallel within maximum deviation of 1.6 mm per any 6,000 mm section and 0.1 mm per any 25 mm section.
- .4 Use metal shims only and provide lock washers under nuts and tapped bolts.
- .5 Compensate for expansion and contraction of guide rails.
- .6 Use splice plates and guide rails with contact surfaces accurately machined to form smooth joints.
- .7 Provide planed steel tees, erected plumb and fasten to hoistway by heavy steel brackets.
- .8 Use "T" shape tongue and groove rails, connect with steel splice plates.
- .9 Extend rails to approximately 150 mm from underside of overhead machine beams.
- .10 Bolt or weld brackets directly to steel. Do not use clips.
- .11 In concrete structures, provide inserts in concrete formwork or self-drilling expansion shell bolt anchors for support of brackets. Where Departmental Representative considers any concrete fastener improperly installed either replace fastener or demonstrate stability of fastener by performing on site test under which fastener is subjected to four times manufacturer's safe pull out or working load. Use self-drilling expansion shell bolt.

- .12 Do not burn out fastening holes.
- .13 Where pits are waterproofed, anchor guide rails in pit so as not to reduce effectiveness of waterproofing.
- .14 Include steel reinforcement for car and counterweight guide rails where necessary.

2.7 ROPES - HOIST

- .1 Provide new hoist ropes with steel core from same factory production run in accordance with good practice and the CSA Elevator Code.
- .2 Provide springs on the counterweight end of hoist ropes.
- .3 Use approved type wedge clamp type sockets.
- .4 Secure the returned end of the wire ropes with two retaining clips. Set first clip approximately 50 mm (2") above top of wedge clamp, and second clip 100 mm (4") above first clip. Tape end of the wire rope.
- .5 Provide system engineered for expected hoist rope life of 8 years minimum based on four trips to the lobby per day per building occupant and considering information: car weight, car capacity, car speed, type of car guide, percent counter weight, roping ratio, angle of wrap, drive sheave diameter, undercut profile and angle, deflector sheaves, number of reverse bends, number of ropes, rope diameter, rope grade, lay direction, rope type/construction and bending length. Provide this calculation and the above data with shop drawing submission.

2.8 BUFFERS

- .1 Provide spring buffers. Use non-standard reduced stroke buffers and emergency terminal stopping devices where pit depth or overhead height does not permit installation of normal stroke buffers.
- .2 Include buffer extensions where necessary to suit pit depth.
- .3 Mount any conduit approximately 300 mm (12") above pit floor. Suitably support this conduit.

2.9 COUNTERWEIGHT

- .1 Provide counterweight of structural or formed metal frame type with metal or concrete filler weights equal to mass of complete car plus 40% to 42.5% of rated load. Provide rods through weights and frame.
- .2 Paint in contrasting colour the maximum run-by sign on guard.
- .3 Provide blocking under counterweight, where required.

2.10 SAFETIES AND GOVERNOR

- .1 Provide new type B car safeties.
- .2 Provide new governor, governor rope and governor tension sheaves.

2.11 MACHINE

- .1 Provide new AC Permanent Magnet Gearless machine. Include engineered designed to accomplish proper rope drop to car and counterweight.
- .2 Design brake to be spring applied electromagnetically released and quietly operated by direct current.
- .3 Manufacture traction sheave thick enough to permit at least one re-machining of traction grooves.
- .4 Provide durable heavy-duty design including do not exceed 85% of maximum machine sheave shaft load.

2.12 AC MOTOR

- .1 Include AC reversible type motor designed for elevator service and recommended by manufacturer of drive, as follows:
- .2 Provide Class F or H insulation system.
- .3 Provide 60 minute duty based on 180 stops per hour.
- .4 Provide less than 3% slip at full load.
- .5 Thermally protect motor.
- .6 Provide high tensile, 724 mPa (105,000 psi) or better steel shaft with 32 micro finish or better.
- .7 Impregnate windings with insulation and bake to

prevent absorption of moisture and oil.

- .8 Provide not less than one megohm insulation resistance between motor windings and motor frame.
- .9 Provide sealed bearings. Do not use motor bearings as thrust for worm shaft.
- .10 Provide 28 poles for smooth, quiet operation.
- .11 Design so that surface temperature of machine does not exceed 38 degrees C during heavy operation.

2.13 ASCENDING CAR
OVERSPEED AND
UNINTENDED CAR MOVEMENT
PROTECTION

- .1 Equip elevator with a safety device to provide UP direction car over speed protection.
- .2 Equip elevators with protection against unintended movement outside of door zone.
- .3 Arrange device to be reset from a single button so indicated in the controller.

2.14 MOTOR DRIVE

- .1 Provide regenerative Variable Voltage Variable Frequency AC flux vector drive system. Design equipment to operate unaffected under minor levels of voltage fluctuations and harmonics generated from within and outside the building.
- .2 Make drive system capable of producing full torque at zero speed and utilize a shaft mounted position transducer to accurately monitor the rotating frequency.
- .3 Take power for system from existing building 3 phase power supply.
- .4 Change AC voltage to DC, and a power transistor inverter circuit will change the DC voltage to AC to power the elevator motor.
- .5 Control motor speed and torque by varying the frequency and amplitude of AC voltage.
- .6 Eliminate surges on the AC line which might cause blowing of the DC line fuses or which might cause trouble in other equipment connected to AC line. Filter DC if necessary.
- .7 Modify frequencies emanating from rectifier drive

which are objectionable to personnel or which interact with any building equipment.

- .8 Produce no voltage distortion or notches in excess of the limits suggested in IEEE 519. Limit EMI through the use of shielding, efficient power conductor run and filters.
- .9 Provide stepless acceleration and deceleration and smooth operation at all speeds.
- .10 Limit machine room noise level, with all elevators operating, to 70 dBA as measured from the centre of the machine room on an "S" response.
- .11 Include braking of motor during deceleration by feeding power generated by motor, back to ac power lines. Failure of the drive's system to remove regenerated power shall cause the drive's output to be removed from the hoist motor.
- .12 Provide closed loop tachometer feedback control. Continuously monitor the elevator speed signal from the velocity transducer and compare it with the intended signal to verify proper and safe operation of the elevator and to correct the actual elevator speed to match the intended speed.
- .13 Automatically re-start equipment which has stopped due to ac power failure.
- .14 Limit Voltage Total Harmonic Distortion to 2%, and limit any individual harmonics to 0.5%.
- .15 Limit Current Total Harmonic Distortion to 5%, and limit any individual harmonics to 3%.

2.15 SHEAVES AND SUPPORTING BEAMS

- .1 Provide deflector sheaves, idler sheaves and overhead sheaves, including bearings and beams, necessary for roping arrangement.
- .2 Provide sheaves of cast iron, accurately machined and grooved for the diameter of ropes used.
- .3 Provide all sheaves sufficiently larger than that required by Code, in pitch diameter and thickness, to permit at least one regrooving of sheave.

2.16 Controller and Cabinet

- .1 Provide non-proprietary controller with flux vector drive.

- .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.
 - .1 Provide battery back-up for all circuits containing volatile memory.
- .4 Provide a suitable communication system junction box on the outside of the controller and identify it accordingly. Provide a separate identified box for the fire alarm connection and emergency power signal.
- .5 Cord all field wiring and insulate from metal contact.
- .6 Permanently identify all switches and relays.
- .7 Provide protection against reverse and open phasing of main feeders.
- .8 Include properly sized primary and secondary fuses for each transformer used in the controller. Provide a solid state controller equipped with programmable logic microprocessor controls and self-diagnostic features.
- .9 Provide permanently marked junction studs in a designated area in the controller connecting all field wiring.
- .10 Include properly sized primary and secondary fuses for each transformer used in the controller.
- .11 Govern car motion control by means of real position of car in hoistway. Do not employ stepper relays.
- .12 Provide fully non-proprietary version of all control equipment including:
 - .1 All required diagnostic are "on board".
 - .2 All programming and diagrams required for long-term maintenance are provided. All elements required for unrestricted access to all parameters, levels of adjustment, monitoring and flags necessary for long-term maintenance are provided. This includes suspension belt monitoring devices.
 - .3 The controller will not shut down or alter its functionality in any way after a pre-determined increment of time or use.
 - .4 Parts including circuit boards shall be

available for direct purchase from the factory in quantities and not on an one-for-one "exchange only" basis. Parts to be stocked to allow for overnight shipment.

.5 All circuit boards shall be available for purchase at the published price they sell to their own workforce or local manufacturing representatives as to be demonstrated by a comprehensive parts list supplied with shop drawings.

.6 Manufacturer offers engineering support and technician training directly to the Owner, their Representative and any service contractor at no costs during the installation period and during the warranty period. Manufacturer also offers a support telephone hotline.

.7 Manufacturer will provide factory training to the Owner and their Representative.

.8 Replacement of documentation, manuals, wiring diagrams and any diagnostic elements are available at no costs.

.9 Controller and associated equipment must be approved by the Owner and their Representative.

2.17 CONTROL AND PERFORMANCE

- .1 Provide microprocessor based selective collective automatic operation.
- .2 When lifting rated load, do not permit car speed to vary from rated speed by more than 3%.
- .3 Arrange each car so that momentary pressure of one or more of its car buttons causes car to start.
- .4 Do not start car unless the car door is in the closed position and all hoistway doors are locked in the closed position.
- .5 Programmable options and parameters shall be stored in non-volatile memory. As a minimum, there shall be a 32-character alphanumeric display to be used for programming and diagnostics. The programmable parameters and options shall include, but not be limited to, the following:
 - Number of Stops/Openings Served (Each Car)
 - Programmable Fire Code Options
 - Fire Floors (Main, Alternates)
 - Floor Encoding (Absolute PI)
 - Digital PIs/Single Wire PIs
 - Programmable Door Times
 - Programmable Motor Limit Timer
 - Nudging
 - Emergency Power

Parking Floors
Door Pre-Opening
Hall or Car Gong Selection
Attendant Service
Anti-nuisance - Light Load Weighing and Photo Eye

- .6 The controller shall have field programmable outputs to activate different functions based on customer needs. These functions can be outputs such as those listed below.
- Fire Phase I Return Complete Signal
 - Fire Phase II Output Signal
 - Hall Call Reject Signal
 - Emergency Power Return
- .7 The controller shall have a serial port for communication with any data or computer terminal such as a CRT terminal, modem, etc.
- .8 The controller shall have an RFI Filter to help reduce EMI and RFI noise.

2.18 EMERGENCY POWER OPERATION

- .1 Provide battery system to move car to a floor and release passengers, upon failure of three phase power.
- .2 Provide self-contained emergency power system located in the elevator control room.
- .1 Once activated, disconnect the elevator system from the building power source, power up inverter and provide battery generated three phase power to the elevator controller.
 - .2 Upon activation, the elevator controller to read the load weigh sensor and determine the "overhauling" direction for the elevator: empty car up, fully loaded car down, and if a balanced car is sensed then the direction normally will be down.
- .3 Move elevator to the next available floor at rescue speed (inspection or levelling speed) in the "overhauling" direction with all safety circuits operative. Once level at floor door open for at least 4 seconds. Once doors are closed the door open button in the cab to remain operational.
- .4 At resumption of normal power, restore elevator to normal operation automatically.

2.19 PHASE I EMERGENCY .1
RECALL OPERATION

Provide emergency recall service which will be initiated automatically or manually by any recall switch. When recall has been initiated:

- .1 The elevator controlled by the recall switch and on automatic operation, including independent service operation, shall return directly to the recall level where the doors shall open and remain open. The elevator shall not respond to the landing or car call buttons. Travelling to a terminal landing first and then reversing to travel to the recall level is not acceptable.
- .2 The elevator that is stopped with the doors closed, or is travelling towards the recall level, shall proceed non-stop to the recall level.
- .3 The elevator travelling away from the recall level shall reverse at or before the next available landing without opening its doors.
- .4 A car stopped at a landing shall have its emergency stop switch rendered inoperative as soon as the doors are closed and the car starts to move. A moving car shall have its emergency stop switch rendered inoperative.
- .5 All call registered lights and directional lanterns shall be extinguished and remain inoperative. Position indicators, in the car and at the recall level, should remain in service.
- .6 The car shall be provided with a visual and audible signal system which shall be activated to alert passengers that the car is on the emergency recall operation and at least the visual signal shall remain operative until the car reaches the recall level.
- .7 An elevator stopped at a floor other than the recall level with doors open shall close its doors and proceed non-stop to the recall level.
- .8 Door re-opening devices that may be affected by smoke or hot gases shall be rendered inoperative.
- .9 If the elevator is on inspection operation, a signal shall warn the inspector to return the car to the recall level. The elevator shall remain under the control of the inspector.
- .10 The recall operation shall be terminated when both switches at the main control panel and lobby panel are in the "RESET" or "OFF" position, as is appropriate.

- .11 Include for connecting the fire alarm signal through the recall switch.
- 2.20 PHASE II
EMERGENCY IN-CAR
OPERATION
- .1 Provide in-car emergency service for each elevator initiated by a key switch located in the car. The switch shall be marked "OFF - HOLD - ON" and the key shall be removable in the OFF and HOLD positions. The switch shall become effective in initiating in-car emergency operation when in the "ON" position, provided the emergency recall operation is in effect and the car has returned to the recall level. During emergency in-car operation, the elevator shall operate as follows:
.1 The elevator shall be operable only by a person in the elevator.
- .2 The elevator shall not respond to elevator landing calls.
- .3 The opening of power-operated doors shall be controlled only by continuous pressure on the "DOOR OPEN" button. If the "DOOR OPEN" button is released during the "OPEN" motion, the door shall reclose immediately. When doors are fully open, they shall remain open until closed.
- .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.

2.21 INDEPENDENT
SERVICE

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

2.22 LOAD WEIGHING

- .1 Provide load weighing with means to measure the load in the car within 5% of the elevator capacity.
- .2 Adjust the load weighing device to ensure that it will operate over the required range of settings.
- .3 Verify that the load weighing device has a long term stability such that the settings do not require re-adjustment more frequently than every two years.
- .4 Use load weighing to pre-torque elevator and prevent movement in reverse direction when leaving a floor.

2.23 ACCESS TO PIT,
HOISTWAY AND TOP OF
CAR INSPECTION

- .1 At the top landings, provide keyed-access to car top.
 - .1 Provide between car crosshead and hoistway door, a single operating fixture containing the following: 120 volt GFI Fixture, an emergency stop switch, continuous pressure buttons for operating the car and a switch for making the buttons on top of the car operable. Operation from top of the car shall be obtained by simultaneous, continuous pressure of the appropriate direction button and a safety operating button after these buttons have been made effective.
 - .2 Prevent operation from top of the car unless

all electric door contacts are closed.

.3 Means shall also be provided so that when the car is to be operated from the top of the car, automatic levelling, power door operation and the normal operating devices car and landing are made ineffective.

.4 Arrange circuits to prevent car moving away, when on top of car operation, by any other means.

.5 Limit the speed of the elevator shall be not more than .76 m/s and not less than 0.25 m/s.

.2 At all landings provide a hoistway door unlocking device. Provide a stainless steel collar for holes.

.3 Provide a car top railings on all non-access sides of the elevator car top except where the distance to a rear wall does not exceed 356 mm. Include for an intermediate rail and toe board. Paint the railing yellow.

2.24 WORK LIGHTS AND RECEPTACLES

.1 Provide suitable protected light fixtures.

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

2.25 EMERGENCY LIGHTING

.1 Include emergency lighting in the car, with a minimum of two (2) fixtures.

.2 Use battery operated emergency lighting equipment to CSA C22.2 No. 141, to provide general illumination and 10 Lx minimum illumination at car operating panel.

.3 Include means for convenient manual operation and testing of the unit from within car. Testing means to be spring loaded or self-centring key switch.

.4 Design battery unit of sufficient strength to support 90 KG person without causing malfunction or damage.

.5 Include means of containing any leakage or spillage of electrolyte.

.6 Arrange battery unit as a source of power for alarm bell during power failure.

2.26 CAR PLATFORM AND

.1 Provide nickel-silver threshold to accept ceramic

FRAME

flooring thickness chosen by Departmental Representative.

- .2 Provide a steel isolation frame all around platform.
- .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 Provide bolted steel car frame.
- .7 Provide reinforcement to relieve car enclosure of undue stress.

2.27 CAR INTERIOR

- .1 Fabricate ceiling with sheet steel, minimum of 12 gauge, smooth and free from defects. Emergency exit to be of same fabrication and finish.
- .2 Ventilate by an exhaust air handling unit through roof and through concealed perforations at base. Limit total fan noise to 55 dBA, measured on an "S" response scale, measured 0.9 m above floor with fan on high speed. Include two speed operation of ventilation system.
- .3 Use bolts fitted with washers and lock washers and fabric separators, as is necessary, for cab structure to operate free from squeaks or other objectionable sounds.
- .4 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.
- .5 Provide led lighting set in a stainless steel suspended pan. Design for light intensity at car sill of 200 lux.
- .6 Provide flush mounted, hands-free, auto-dial telephone. Program telephone to number provided by owner.

- .7 Skin entire cab fronts in brushed stainless steel including returns, headers and jambs. Provide cab doors finished in matching stainless steel. Finish all cab reveals in brushed stainless steel.
- .8 Provide raised plastic laminate applied panels on non-access walls to architect's choice of color from Formica standard range. Provide flat-bar handrails on all non-access walls.
- .9 Provide ceramic flooring from manufacturer's standard range.
- .10 Provide flat-bar handrails on all non-access walls - 1/4" thick and 4" high stainless steel.
- .11 Provide car-cab interior dimensions to attached concept layout.
- .12 Provide new stainless steel licence holders in cabs sized to fit standard Provincial licenses as issued at time of project completion.

2.28 CAR DOORS

- .1 Provide flush, steel clad in stainless steel, horizontal-slide, doors.
- .2 Provide two (2) steel pins per 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.

2.29 HOISTWAY DOOR HANGERS, LOCKS, TRACKS AND CLOSING DEVICES

- .1 Use self-lubricating ball or roller bearings sealed to retain grease lubrication and wipers to maintain rollers and track in clean condition.
- .2 Include two-point suspension door hangers for each door panel using rollers with resilient sound absorbing wearing surfaces and replaceable hanger tracks.
- .3 Absorb upthrust with adjustable eccentric rollers equipped with ball or roller bearings.
- .4 Design for replacement of gibs without removing door from hanger tracks.
- .5 Provide spring-type, sill-mounted closing devices or alternatively spirator devices.
- .6 Provide positive electric interlocks and door

closing devices. Provide new wiring to door locks including a separate green ground wire back to controller.

- .7 Provide door safety retainers to prevent door panel displacement should the replaceable primary guiding means fail.

2.30 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. Use only G.A.L. MOVFR or approved equal. Provide door open speed of at least 0.61 m/s .
- .2 Operate the car door and hoistway doors simultaneously.
- .3 Provide electrical cushioning at each end of travel.
- .4 Provide two (2) gate switches per center parting car door opening, operated by a roller attached to the door panel.

2.31 CAR DOOR PROTECTIVE DEVICES

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

over the full travel of the doors;

.3 After elapse of the normal door open dwell time, provide a limited door reversal operation. Arrange the operation so that the door retracts sufficiently to permit only the immediate entering passenger to pass. Continue closing of the door after the passenger leaves detection zone.

2.32 FIRE RATED
ELEVATOR ENTRANCES

- .1 At all floors provide complete new entrances including header, struts, sills, sill support doors and frame. Finish in brushed stainless steel doors and brushed stainless steel frames.
- .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 Cushion opening doors and closing doors with rubber bumpers.
- .4 Assume complete and undivided responsibility for entire installation including doors, frames, structural supporting angles, headers, fascias or toe guards, hangers, sills and sill support angles. Frames to suit existing wall thickness.
- .5 Include struts, fastened to supports with 12 mm bolts.
- .6 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 1500 mm above finished floor.

2.33 FLUSH TYPE
HOISTWAY DOORS

- .1 Include steel sight guards, finished to match hall door finish, at all floors.
- .2 Construct hoistway doors of two-panel sheet steel, hollow center with internal re- enforcement.
- .3 Reinforce doors to withstand strains due to power operation.

2.34 HALL SILLS

- .1 Include extruded aluminum sills with anti-slip wearing surfaces to ASTM B221-74 alloy 6351-T6.
- .2 Include channel or angle supports at each sill,

fasten to building supports with 12 mm bolts, angles to span full width of entrance.

2.35 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. Paint floor characters 100 mm on fascias approximately 150 mm below landing sill.

2.36 IDENTIFICATION

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

2.37 CAR DIRECTION SIGNAL

- .1 Provide new car direction lanterns.
- .2 Provide lexan diffusers and LED illuminated bulbs.
- .3 Provide new electronic chimes to sound with the illumination of direction arrows. Chime to sound once to indicate UP direction and twice for DOWN. Provide clear tone at 30 dBA approximately 8 feet from fixture. Chime volume to be adjustable.
- .4 Provide new green illumination for up and red for down by LED.
- .5 Provide new faceplates in stainless steel to match

adjacent finishes.

2.38 HALL BUTTON
FIXTURES

- .1 Provide new risers of BLUE LED illuminated stainless steel buttons and faceplates at all landings. Faceplate size and finish to match existing. LED's to be rated for 100,000 hours illumination. Use DUPAR US 91 buttons or equivalent.
- .2 Illuminate each button in the hall fixture when pressed to indicate a call has been registered and maintain illumination until the call has been answered.
- .3 Provide at height compliant with Appendix E of CSA B44.
- .4 Provide new faceplates as stainless steel to match adjacent finishes. Faceplate to completely cover existing cut-out. Flush mounted fixtures are preferred.
- .5 Include for any cutting, patching and re-finishing of walls to pre-mod condition.
- .6 Provide "UP" pushbuttons at lowest landing and "DOWN" pushbutton at top floor and "UP and DOWN" buttons at typical floors.
- .7 Provide out of service indication integrated into each hall station, when elevator is not available for automatic operation.

2.39 POSITION
INDICATORS AND VOICE
ANNUNCIATION

- .1 Install a new digital display position indicator in car. Locate at existing faceplates - over car entrance.
- .2 Use characters at least 40 mm high. Provide LED illumination.
- .3 Provide a matching new digital display hall position indicators at main floor.
 - .1 Locate new position indicators in location approved by Departmental Representative.
- .4 Provide voice annunciation indication of each

floor, when served and of car direction. Provide volume control adjustable from behind car station. Provide high- power speakers, minimum of two (2) per car so no distortion is readily noticeable to passengers. Provide sample of annunciations, to be in English, and French with shop drawings.

2.40 CAR OPERATING STATION

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

mounted junction box. Program the telephone to dial the number provided by the Departmental Representative.

2.41 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.

2.42 SIGNAL ILLUMINATION

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

2.43 FIXTURE FASTENING

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

2.44 BILINGUAL MARKINGS

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

2.45 OCCUPATIONAL HEALTH AND SAFETY ACT

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

PART 3 - EXECUTION

3.1 PROCEDURE

- .1 Obtain Departmental Representative's approval before removing an elevator from automatic operation.

3.2 INSPECTION

- .1 Before ordering 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 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 mounting of machine.
- .2 Arrange equipment in control 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 lock washers 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.
- .1 Erect hoarding at each floor where there is an unlocked elevator hoistway door. Install plywood hoarding at landing entranceways from

floor to ceiling. Plywood to be a minimum of 13 mm thick. Hoarded work space to be at least as wide as the elevator entrance opening and should create a work space inside hoardings of at least 1220 mm deep. Securely fasten hoarding to wall.

.2 Upon removal of hoardings and partition make good all damage to surfaces of walls, floors and ceilings.

.3 Use hoarded entranceways, and not the in-service elevator, for movement of equipment or garbage.

.4 Protect existing floors by covering with 13 mm plywood and tarpaulins as a minimum, when removing or delivering materials.

.5 Do not remove partition or hoarding until Work is complete and approval is given by the Departmental Representative.

.6 Confirm that any existing structural beams are safe and suitable before lifting loads.

3.7 FIELD QUALITY CONTROL

- .1 Perform and meet tests required by CAN/CSA-B44-13 Safety Code for Elevators Section 8.10.2.2 providing a check-off list with name of qualified inspector and date completed for each applicable item. Supply instruments and carry out these and other tests specified herein.
- .2 Supply instruments and carry out full load and balance loads tests.
- .3 Before final adjusting commences, statically balance the car so that, at the centre of the hoistway, the car hangs in the centre of the rails with the top roller guides removed.
 - .1 Carry out this test with the car doors closed and an empty car.
 - .2 Use steel weights mounted in steel frame under car to properly balance car.
- .4 Provide 2 days written notice to Owner of date and time of tests.
- .5 Have a copy of the Specifications and approval drawings on site and available to the installation mechanic.
- .6 Provide Owner with copy of all speeds and current readings taken at the time of the provincially-mandated inspection.
- .7 Provide a copy of any Provincial Electrical Safety Authority inspection reports.

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.
- .4 Remove and dispose of all redundant elevator equipment including electrical controllers, selectors and generators. Removal to be coordinated with Engineer to ensure that no service disruptions to the daily operation of the building. Equipment removal may be required during silent hours.
- .5 Remove all redundant wiring in elevator hoistway and machine room completely back to its source.
- .6 Adequately protect interior of elevator when moving equipment.
- .7 Any oil to be removed and disposed of by a licensed handler of hazardous materials. Arrange for site generator number and pay for application cost.

3.9 PAINTING

- .1 Thoroughly clean and paint the following equipment:
 - .1 Car tops and crossheads.
 - .2 Rails and strut angles and fascia plates.
 - .3 Machine room floors and walls.
 - .4 Pit floor and walls to the level of the lowest entrance sill.
- .2 Use paint materials listed on the CGSB qualified products list only.
- .3 Paint materials for each coating formulae to be products of a single manufacturer.
- .4 Prepare masonry, stucco and concrete surfaces to CGSB 85-GP-31M.
- .5 Prepare concrete floors to CGSB 85-GP-32M.
- .6 For concrete block and poured concrete walls and ceilings apply:
 - .1 One coat primer-sealer CGSB 1-GP-119M-Amdt-Sep-80.

-
- .2 Two coats semi-gloss enamel CGSB 1-GP-57M.
- .7 For concrete floors apply:
- .1 One coat enamel CGSB 1-GP-66M reduced by addition of 1 part CGSB 1- GP-70M thinner to eight parts enamel.
- .2 One coat enamel CGSB 1-GP-66M.
- 3.10 HOISTWAY PROJECTIONS AND FASCIA
- .1 Provide bevelling for projections or recesses in hoistway.
- .2 Provide required fascia above and below passed floors or alternatively car door interlock to the requirements of the Provincial Authority having jurisdiction.
- 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 licensed elevator contractor for inspections and acceptance tests as the Consultant reasonably requires. Allow up to 8 hours of on-site assistance. Expect to have work briefly interrupted during progress inspections by the Consultant.
- .3 The Consultant is retained for the convenience of the Owner and/or the Architect and the work of the Consultant shall not relieve the Contractor of any of his duties or responsibilities.
- 3.13 NOTIFICATION TO DEPARTMENTAL REPRESENTATIVE
- Notify the Departmental Representative as follows:
- .1 One week prior to commencement of work.
- .2 On delivery of materials to site.
- .3 On placing of machine and controllers.

-
- .4 On establishment of a moving platform.
 - .5 On booking of each Provincial inspection.
 - .6 On completion of all deficiencies.
- 3.14 DEMONSTRATION OF OPERATION
- .1 In the presence of the Departmental Representative, during silent hours of the building, prepare site specific procedures to properly demonstrate and train site O&M personnel and PWGSC departmental personnel:
 - .1 Independent Service Operation.
 - .2 Emergency power operation;
 - .3 Emergency recall and in-car emergency service;
 - .4 Audio Equipment;
 - .5 Dispatching features.
 - .6 Monitoring and Control features.
 - .2 Train Owner's forces on operation of system in two (2) half-day sessions, conducted by a trainer himself/herself fully trained in all user interfaces to the elevator system.
- 3.15 COMMISSIONING
- .1 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 CSA Z320-11, Building Commissioning Standards, as a minimum. Prepare, fill out all required commissioning related checklists as directed by PWGSC Departmental Representative. Provide documentation to Departmental Representative when requested.
 - .3 After Provincial inspection of each elevator and before turn-over for customer use, test elevators in continuous simulated automatic operation without passenger access.
 - .1 Test for at least (1) hour with no load operating from floor to floor, with or without door operation.
 - .2 Test for at least (1) hour with 100% load operating from floor to floor, with or without door operation.
 - .3 Test for two (2) consecutive hours operating from floor to floor with door operation. Provide barricades and signage to indicate that an elevator

test is in progress.

- .4 Before turn-over for customer use, test elevators as following:
 - .1 Running current in up direction with 42% car load.
 - .2 Running current in down direction with 42% car load.
 - .3 Governor over speed setting.
 - .4 Safety trip setting.
 - .5 Door timings and dwell settings.
 - .6 Operating speed up.
 - .7 Operating speed down.
 - .8 Door close force.
 - .9 Door time-out.

- .5 Carry all costs including expenses to have controller manufacturer's technical representative On site for two (2) full days before elevator turnover. Undertake commissioning to CSA Z320-11, Building Commissioning Standards, as a minimum. Prepare, fill out all required commissioning related checklists as directed by the Owner and their Representative. Provide documentation to the Owner and their Representative when requested.

Table 1 - Commissioning Data to Be Submitted by Contractor

PARAMETER	Elev. 1
Car speed UP 125% load (fpm)	
Car speed DOWN empty (fpm)	
Brake to Brake UP (sec)	
Brake to Brake DOWN (sec)	
Running current UP 42% car load (amps)	
Running current DOWN 42% car load (amps)	
Door open (sec)	
Door close (sec)	
Car call dwell (sec)	
Hall call dwell (sec)	
Governor pull through (pounds)	
Governor overspeed switch, electrical (fpm)	
Safety trip speed (fpm)	
Door stall force (pounds)	
Door timeout (sec)	

PART 1 - GENERAL

1.1 SCOPE OF WORK

The work described herein includes for all labor and material, including all overtime required to meet the Project Schedule, to provide a non-proprietary elevator monitoring system 100% fully compatible with existing Intergraded Display Systems PWGSC monitoring system. PWGSC to monitor and control the new/modernized elevator. Work shall include but not be limited to.

- .1 Controller interface with all necessary input/output devices to connect elevator. Also provide all hoist-way and controller wiring to accommodate monitoring of top of car inspection controls, pit stop switch, and man in machine room activation switch.
- .2 Prior to installation, provide schematic wiring diagram layout to interconnect all elements of system.
- .3 Provide a master monitoring display within the elevator controller or alternatively at a PC mounted adjacent to the elevator controller. All PCs and monitors to be provided with suitable protection to the environment.
- .4 Provide addressable device so that the master station can be monitored remotely by Internet Protocol. This function will allow monitoring and report functions but not control functions. Carry allowance of \$ 3,000 to supply Ultra book computer fully loaded with required software to connect to elevator monitoring screen over any internet connection, either by web site or through software resident on the remote computer. Ultra book computer type, model, make, and associated software to be pre-approved by the PWGSC Lift Engineering Technical Representative prior to purchasing.
- .5 Provide antivirus tool, ensure usage of approved firewall, and ensure restriction of transferring any data from this PC to any PWGSC network device.
- .6 Provide paging function using e-mails sent by system to programmable e-mail addresses for various events.

- .7 Ensure internet upgrade software downloads does not shut down systems.
- .8 All interconnecting wiring and in conduit between elevator controllers in accordance with monitoring system manufacturer's requirements.
- .9 All network engineering including system final site testing and system final commissioning and client training by monitoring system's technical personnel.
- .10 Initial job survey at the job site, not remotely of two days and additional on-site training of PWGSC staff of an additional three days by monitoring system's manufacturer's technical personnel.
- .11 Include two (2) year full maintenance and repair (Parts and Labour) warranty with maximum response time of 48 hours call back to the site to perform repairs of the equipment.

1.2 RELATED WORK TO BE PERFORMED BY CONTRACTOR

- .1 Provide all inter-connecting wiring in conduit raceway system.
- .2 Provide data jacks with all inter-connecting wiring to and from internet supplier connecting point. Make all arrangement and pay all services fees with internet Supply Company. Supply all wiring cables from internet up to and including in the machine rooms as required.

1.3 CONTROLLER PROVISIONS

- .1 Provide a monitoring system interface per controller or elevator group to provide the required input/output devices.
- .2 The elevator controller interface shall utilize serial link communications to indicate the following as a minimum:
 - .1 Operation normal
 - .2 Fire Service Main
 - .3 Fire Service Alternate
 - .4 Fire Service Phase 2
 - .5 Main Power Lost
 - .6 Running on Emergency Power
 - .7 Fault - shut down
 - .8 Top of car inspection controls
 - .9 Pit Stop Switch
 - .10 Man in machine room activating switch inside controller.
 - .11 Independent service

- .12 Governor activation
- .13 Up direction indication
- .14 Down direction indication
- .15 One contact for each position in the hoist way (PI)
- .16 Front Door Open
- .17 Front Door Closed
- .18 Rear Door Open (where available)
- .19 Rear Door Closed (where available)
- .20 One contact for each car call (On when registered)
- .21 One contact for each hall call (On when registered) (note, most floors will have both UP and Down call capability)

.3 The Contractor shall be responsible for coordinating the installation of the monitoring system as well as coordinating the interfacing and connection requirements to ensure a workable system.

1.4 MONITORING SYSTEM GENERAL REQUIREMENTS

- .1 The monitoring system shall be an interactive Microsoft Windows based software system that runs on an IBM compatible Personal Computer (PC). Software includes a "un-install" utility and is certified 100% Windows compatible. Software installation includes:
- .2 Provide all documentation, manuals, system set-up and start-up. Include training as specified.
- .3 While connected to the elevator system, the Elevator Management Control System downloads and collects available data, which is organized in a database. This software provides easy-to-use pull-down menus, using the Microsoft Windows based operating system, allowing the user to monitor and review the elevator performance database in different formats.
- .4 Provide all software licenses to a minimum of 10 years.
- .5 Provide Remote Equipment Management Assembly LN-Q1620 metal enclosure from Integrated Display Systems Incorporated to include small form industrial computer programmed with the necessary VTMS software, as determined by the

- VTMS manufacturer and PWGSC Departmental Representative. The following items shall also be incorporated within the LN-Q1620 enclosure;
- .6 Any converters, internet connection device or electrical interface devices required for supplying internet and serial data connections.
 - .7 Any required power supplies & connectors for the computer and interface devices
 - .8 A flat panel LED monitor & keyboard with integrated mouse.
 - .9 An un-interruptible Power Supply (UPS) & power conditioner of suitable size.
 - .10 All the VTMS related equipment shall be located in a suitable wall-mounted NEMA steel enclosure designed for the purpose. Room shall be allowed in the VTMS enclosure to accommodate the DSL or Cable modem provided by the owner for internet access.
 - .11 An operational VTMS is an integral part of this project. The installation shall not be considered complete until the VTMS cabinet is mounted, tested, commissioned, and the elevator equipment is satisfactorily communicating with the owner's remote VTMS installation(s).
 - .12 Communication between the elevator and the VTMS equipment shall occur via serial data communication. This serial data connection shall consist of some suitable physical media (Ethernet, RS485 Twisted Pair, etc.), communicating Status, Fault, and other data tables, as specified by the owner and agreed to by the elevator equipment and VTMS manufacturers.
 - .13 Enclosure kit shall be wall mounted in an approved located as determined by PWGSC Departmental Representative.

1.5 MONITORING AND
DIAGNOSTIC CONTROL
SYSTEM

- .1 Modify elevator control systems system for monitoring, diagnostics and control. Equip controllers with necessary interface software logic program to monitor elevator functions and record events to storage.
- .2 Use menu driven system with password protection. Connect all wiring to terminal blocks mounted on the panel
- .3 The system will be capable of displaying reports by keyboard entries including all statistics of the preceding one-hundred eighty (180) days, as

a minimum. All car and hall register times and all fault reports are to be displayed. Provide a means, and any software required, to copy this data to an output file.

- .4 Supply and run all necessary interconnecting wiring between elevator controllers. Tape and legibly identify all wires and terminal boxes.

1.6 EVENT DISPLAY AND RECORDING

- .1 Provide computers, loaded with licensed software, with the following capabilities.
- .2 Real-time display screens.
- .3 Online Help to provide a complete content-sensitive help program shall be provided to give the users hints and explanations of the current task.
- .4 Summary to give a brief description of the system, including the job number, job name, number of cars, number of landings, number of openings per landing for each car, car labels, and landing labels.
- .5 Individual Flags - This screen shall display a list of the selected elevator's internally generated computer flags for diagnostics.
- .6 Graphic Hoistway Display - The Central Monitoring System shall display the elevator system hoistway. That is, users shall be able to view a graphical representation of the elevator hoistway. Including : Simulated Hoistway and Car Configuration
 - a. Individual Elevator Position
 - b. Individual Elevator Car Calls
 - c. Individual Elevator Direction
 - d. Individual Elevator Door Position
 - e. Individual Elevator Status of Operation (Emergency
 - f. Recall, Emergency Power, Independent Service etc.)
 - g. Individual Elevator Communication Status
 - h. Registered Up and Down Hall Calls
 - i. Controller Real-Time Clock Date and Time
- .7 Emergency Notification - in case of unit shutdown, the system shall have the ability to page designated personnel to notify them of an emergency event.
- .8 Reporting ability including malfunction events, Average Wait Time for elevators and total availability time for all units.
- .9 The system shall provide a multiple level of password protection for the usage of the system.

- .10 Monitor system parameters including calls per floor, calls per elevator, average waiting time and % calls answered in 30, 60, 90 and 120 seconds. Allow for graphical analysis of any parameter for any chosen time interval from the previous 180 day period.

1.7 ARRANGEMENT OF EQUIPMENT

- .1 Arrange equipment in machine room for clear passage to machine room door.
- .2 Do not locate monitoring PC's near hoist motors, transformers or any sources of high EMF.
- .3 Include 120volt power outlet installed inside Lift Net Control Panel to accommodate equipment connections.

1.8 REMOTE ACCESS

- .1 All required functions of the controller/machine room mounted system will be available remotely by internet protocol with appropriate password and login.
- .2 Include set up of any required software on laptop supplied by PWGSC Departmental Representative.

1.10 FACTORY REPRESENTATION

- .1 Provide the services of an on-site specialised technical factory representative to perform the initial project survey including a minimum of eight (8) hours **on site**.
- .2 Provide the services of a specialised technical lift monitoring system manufacturer's factory representative trained in presentation skills to perform training for PWGSC. Include and pay for this specialised service for a minimum of twelve (12) hours on site, and an additional (24) hours off site technical support work. Written confirmation must be provided at the end of the project that the off-site work had been paid to the system supplier.
- .3 Provide when requested by the Departmental Representative a hard copy of a condensed version of the elevator monitoring operational features.
- .4 The Elevator Contractor is to provide all information to the Departmental Representative 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

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parts, at fair market value, that is required
by the Owner's Maintenance Contractor.

-END-

CONCEPT DRAWINGS TO
 ASSIST IN CONTRACTOR
 PRICING. NOT TO BE USED
 FOR ORDERING MATERIALS
 OR FOR CONSTRUCTION.
 CONTRACTOR TO VERIFY ALL
 DATA TO MATCHING SITE
 CONDITIONS

TECHNICAL INFORMATION:
 CAPACITY: 807KG (2000.LBS)
 SPEED: 0.75m/s (150FFPM)

ELEVATOR UPGRADE
 WABUSH AIRPORT
 WABUSH, N.L.

PLANS AND SECTION

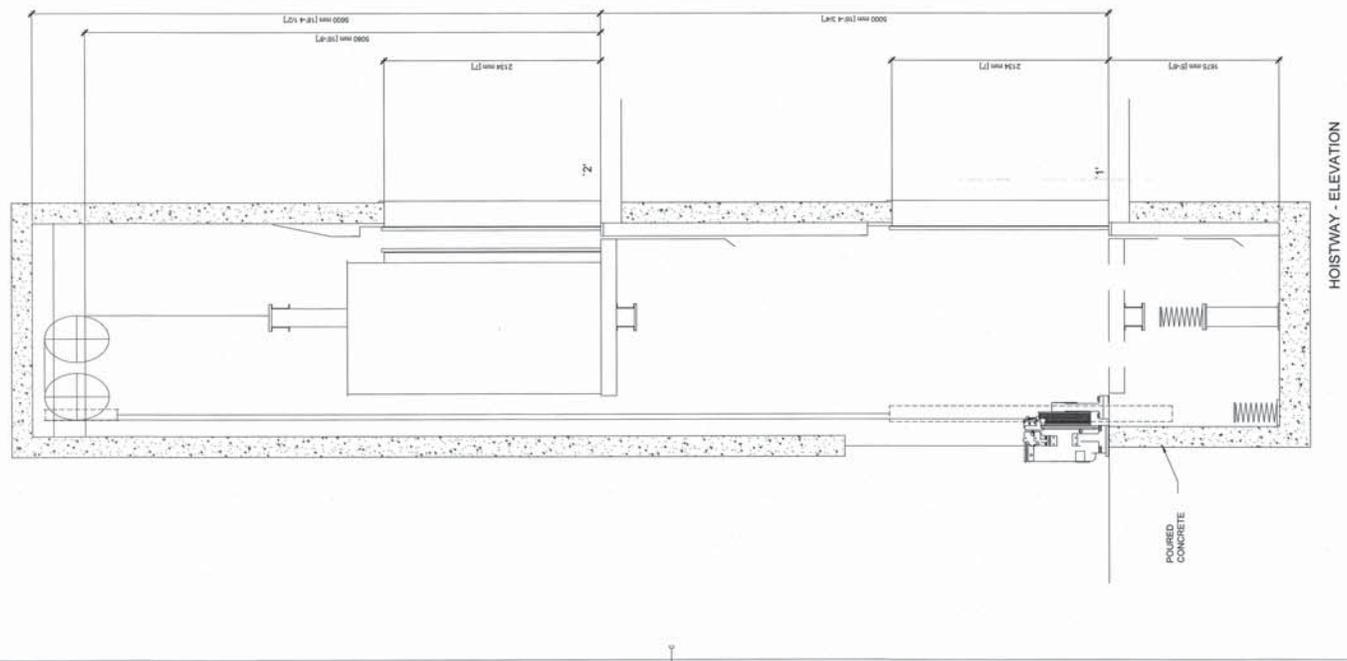
R.076414.001
 SK-1



Project	ELEVATOR UPGRADE
Location	WABUSH AIRPORT
City	WABUSH, N.L.
Client	
Architect	
Engineer	
Scale	1:20
Date	2015-05-29
Sheet No.	SK-1



HOISTWAY & MACHINE ROOM - PLAN VIEW



HOISTWAY - ELEVATION