

Elevator System Repl.	TABLE OF CONTENTS	Section 00 01 10
CSC St. John's Facility		Page 1
St. John's, NFLD		2016-04-04
Project No. R.061878.001		

## INDEX TO SPECIFICATIONS

<u>Section No.</u>	<u>Title</u>	<u>No. of Pages</u>
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### Division 1 - GENERAL CONDITIONS

00 01 00	Table of Contents	1
01 04 00	Work Restrictions	3
01 35 30	Health and Safety	4
01 35 35	Fire Safety Requirements	4
01 35 43	Environmental Procedures	3
01 74 11	Cleaning	3
01 74 21	Waste Management and Disposal	7
01 77 00	Closeout Procedures	2
01 78 00	Closeout Submittals	9
01 91 13	Technical Commissioning (CX)	12
01 91 33	Commissioning Forms	4

### Division 14 - CONVEYING EQUIPMENT

14 12 60	Elevator	41
14 20 00	Lift	16
14 90 00	Monitoring	6

## DRAWINGS

SK-1 - Plans and Section	1
SK-2 - Work Area Fire Plans	3

## 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.

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| <u>1.10 RESPONSIBILITY</u>                | .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.   |
| <u>1.11 COMPLIANCE REQUIREMENTS</u>       | .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.   |
| <u>1.12 UNFORSEEN HAZARDS</u>             | .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.  |
| <u>1.13 HEALTH AND SAFETY COORDINATOR</u> | .1 | Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must: <ul style="list-style-type: none"> <li>.1 Have site-related working experience.</li> <li>.2 Have working knowledge of occupational safety and health regulations.</li> <li>.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.</li> </ul> |
| <u>1.14 POSTING OF DOCUMENTS</u>          | .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.   |

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| <u>1.15 CORRECTION OF<br/>NON-COMPLIANCE</u> | .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.                             |

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| <u>1.16 POWDER<br/>ACTUATED DEVICES</u> | .1 | Use powder actuated devices only after receipt of written permission from Departmental Representative. |
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|---------------------------|----|---|
| <u>1.17 WORK STOPPAGE</u> | .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

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|---------------------|----|-----------|
| <u>2.1 NOT USED</u> | .1 | Not used. |
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## PART 3 - EXECUTION

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|---------------------|----|-----------|
| <u>3.1 NOT USED</u> | .1 | Not used. |
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PART 1 - GENERAL

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| <u>1.1 FIRE DEPARTMENT BRIEFING</u>                                | .1 | Departmental Representative will coordinate arrangements for contractor for briefing on Fire Safety at pre-work conference by Fire Chief before work if required.  |
| <u>1.2 REPORTING FIRES</u>   | .1 | Know location of nearest fire alarm box and telephone, including emergency phone number.   |
|  | .2 | Report immediately fire incidents to Fire Department as follows:<br>.1 Activate nearest fire alarm box; or<br>.2 Telephone.  |
|  | .3 | When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify location.  |
| <u>1.3 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS</u> | .1 | Fire protection and alarm system will not be:<br>.1 Obstructed;<br>.2 Shut-off; and<br>.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.   |
| <u>1.4 FIRE EXTINGUISHERS</u>                                      | .1 | Supply fire extinguishers, as scaled by Fire Chief, necessary to protect work in progress and contractor's physical plant on site.   |
| <u>1.5 BLOCKAGE OF ROADWAYS</u>                                    | .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

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

<u>3.1 CLEANING</u>	.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 MANAGEMENT AND DISPOSAL</u>	.1	Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
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## 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).

- 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.

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| 1.8 DEMOLITION<br>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<br>ANALYSIS WORKPLAN<br>(CRAW)       | .1 | Prepare CRAW: Schedule D.  |
| 1.10 MATERIALS<br>SOURCE SEPARATION<br>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.<br>.1 Transport to approved and authorized recycling facility.   |
|   | .8 | Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.<br>.1 Ship materials to site operating under Certificate of Approval.<br>.2 Materials must be immediately separated into required categories for reuse or recycling. |

1.11 WASTE  
PROCESSING SITES

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- .1 Contact Province.

1.12 STORAGE,  
HANDLING AND  
PROTECTION

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- .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

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- .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.

- |                                       |    |  |
|---------------------------------------|----|--|
| <u>3.2 APPLICATION</u>                | .1 | Do Work in compliance with WRW.  |
|                                       | .2 | Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.   |
| <br><u>3.3 CLEANING</u>               | .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.   |
| <br><u>3.4 DIVERSION OF MATERIALS</u> | .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.<br>.1 Mark containers or stockpile areas.<br>.2 Provide instruction on disposal practices. |
|                                       | .2 | On-site sale of salvaged, recovered, reusable and or recyclable materials is not permitted.  |

## PART 1 - GENERAL

<u>1.1 RELATED REQUIREMENTS</u>	.1	Division 14.
<u>1.2 REFERENCES</u>	.1	Canadian Environmental Protection Act (CEPA) .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.
<u>1.3 ADMINISTRATIVE REQUIREMENTS</u>	.1	Conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
<u>1.4 FINAL CLEANING</u>	.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

<u>2.1 NOT USED</u>	.1	Not Used.
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Elevator System Repl.	CLOSEOUT PROCEDURES	Section 01 77 00
CSC St. John's Facility		Page 2
St. John's, NFLD		2016-04-04
Project No. R.061878.001		

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

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- .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

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- .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

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- .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.	CLOSEOUT SUBMITTALS	Section 01 78 00
CSC St. John's Facility		Page 9
St. John's, NFLD		2016-04-04
Project No. R.061878.001		

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

## 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 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

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.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.

- |  |    |  |
|--|----|--|
| <u>1.16 OPERATION AND<br/>MAINTENANCE OF<br/>EQUIPMENT AND<br/>SYSTEMS</u> | .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.   |
| <u>1.17 TEST RESULTS</u>   | .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.   |
| <u>1.18 START OF<br/>COMMISSIONING</u>                                     | .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.  |
| <u>1.19 INSTRUMENTS /<br/>EQUIPMENT</u>                                    | .1 | Submit to the PWGSC Lift Engineering Departmental Representative for review and approval:<br>.1 Complete list of instruments proposed to be used.<br>.2 Listed data including, serial number, current calibration certificate, calibration date, calibration expiry date and calibration accuracy. |
|  | .2 | Provide the following equipment as required:<br>.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

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

1.29 OCCUPANCY

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

1.30 INSTALLED  
INSTRUMENTATION

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- .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

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- .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

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- .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.

<u>1.8 LANGUAGE</u>	.1	To suit the language profile of the awarded contract.
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## 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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