

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 01 - General Requirements</u>		
01 35 13	SPECIAL PROJECT PROCEDURES FOR CORRECTIONAL SERVICE CANADA SECURITY REQUIREMENT	12
01 35 29.06	HEALTH AND SAFETY Sec REQUIREMENTS	7
01 35 43	ENVIRONMENTAL PROCEDURES	4
<u>Division 26 - Electrical</u>		
26 05 00	COMMON WORK RESULTS FOR ELECTRICAL	9
26 05 21	WIRES AND CABLES (0-1000 V)	3
26 05 29	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS	4
26 05 32	OUTLET BOXES, CONDUIT BOXES AND FITTINGS	3
26 05 34	CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS	4
26 09 24	LIGHTING CONTROL DEVICES - LOW VOLTAGE	7
26 27 26	WIRING DEVICES	4
26 50 00	LIGHTING	3

PART 1 - GENERAL

- 1.1 PURPOSE .1 To ensure that both the construction project and the institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.
- 1.2 DEFINITIONS .1 "Contraband" means:
.1 An intoxicant, including alcoholic beverages, drugs and narcotics.
.2 Tobacco or associated tobacco products.
.3 An igniting device, lighter or matches.
.4 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization.
.5 An explosive or a bomb or a component thereof.
.6 Currency over \$25.00 when possessed by a contractor or any agent for this project.
.7 Any item not described in paragraphs 1.2.1.1 to 1.2.1.6 that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.
- .2 "Unauthorized Smoking and related Items" means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.
- .3 "Commercial Vehicle" means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.
- .4 "CSC" means Correctional Service Canada.
- .5 "Director" means Director, Warden or Superintendent of the Institution as applicable.
- .6 "Construction Employees" means persons working for the General Contractor, the
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- 1.2 DEFINITIONS
(Cont'd)
- .6 (Cont'd)
sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
- .7 "Departmental Representative" means the project manager from Correctional Services of Canada.
- .8 "Perimeter" means the fenced or walled area of the Institution that restrains the movement of the inmates.
- .9 "Construction Limits" means the area as shown on the contract drawings that the Contractor will be allowed to work. This area may or may not be isolated from the security area of the Institution.
.1 Construction limits for this project consist of building WA04 - Stores Building.
- 1.3 PRELIMINARY PROCEEDINGS
- .1 Prior to the commencement of work, the Contractor shall meet with the Director or his/her representative to:
.1 Discuss the nature and extent of all activities involved in the Project.
.2 Establish mutually acceptable security procedures in accordance with this instruction and the institution's particular requirements.
- .2 Contractor shall:
.1 Ensure that all Construction Employees are aware of the security requirements.
.2 Ensure that a copy of the security requirements is always prominently on display at the job site.
.3 Co-operate with institutional personnel in ensuring that security requirements are observed by all Construction Employees.
- 1.4 CONSTRUCTION EMPLOYEES
- .1 Submit to the Director a list of the names with date of birth of all Construction Employees to be employed on the construction site and a security clearance form for each employee.
- .2 Allow two (2) weeks for processing of security clearances. Employees will not be
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- 1.4 CONSTRUCTION EMPLOYEES
(Cont'd)
- .2 (Cont'd)
admitted to the Institution without a valid security clearance in place and a recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC Institutions are not valid at this Institution.
- .3 The Director may require that facial photographs may be taken of Construction Employees and these photographs may be displayed at appropriate locations in the Institution or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all Construction Employees. ID cards will then be left at the designated entrance to be picked upon arrival at the institution and shall be displayed prominently on the Construction Employees' clothing at all time while Construction Employees are in the institution.
- .4 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.
- .5 Any person employed on the construction site will be subject to immediate removal from Institutional Property if they:
- .1 Appear to be under the influence of alcohol, drugs or narcotics.
 - .2 Behave in an unusual or disorderly manner.
 - .3 Are in possession of contraband.
- .6 Smoking is prohibited anywhere on CSC property.
- 1.5 VEHICLES
- .1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle.
- .2 The Director may limit at any time the number and type of vehicles allowed within the Institution.
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- 1.5 VEHICLES
(Cont'd)
- .3 Drivers of deliveries will require clearances. Drivers of these deliveries will require an escort while in the institution.
- .4 If the Director permits trailers to be left inside the secure perimeter of the Institution, these trailer doors will be locked at all times. All windows will be securely locked when left unoccupied. All trailer windows shall be covered with expanded metal mesh. All storage trailers inside and outside the perimeter shall be locked when not in use.
- 1.6 PARKING
- .1 Parking area(s) to be used by Construction Employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.
- 1.7 SHIPMENTS
- .1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the Institution's own shipments. The Contractor must have his/her own employees on site to receive any deliveries or shipments. CSC staff will NOT accept receipt of deliveries or shipments of any material, equipment or tools.
- 1.8 TELEPHONES
- .1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the Institution unless prior approval of the Director is received.
- .2 The Director will ensure that approved telephones, facsimile machine and computers with internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an internet connection to unauthorized personnel.
- .3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, BlackBerries, telephone used as 2-way radios, are not
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- 1.8 TELEPHONES .3 (Cont'd)
(Cont'd)
- permitted within the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit their use by any inmate. For this project there will be no use of two way radios and cellular phones will be restricted to one phone per project, the contractor site supervisor only.
- .4 If communication is required it will be through the commissionaire with institution authorized radios.
- 1.9 WORK HOURS .1 Normal work hours within the Institution are: Monday to Friday 08:00 a.m. to 4:00 p.m. Special arrangements with the Institution's CPM (Chief of Plant Maintenance) will be required for overnight work.
- .2 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waived by the Director.
- 1.10 OVERTIME WORK AND OVERNIGHT WORK .1 No overnight or weekend work will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overnight or weekend work on the construction project is necessary and approved.
- .2 When overnight work, weekend, or statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his/her designate, to maintain the security surveillance.
- .3 For overnight work as described in this specification for replacement of circuit breakers, feeders and distribution panels, extra security staff, if required, will be paid for by the Departmental Representative. If circuit breakers, feeders or distribution
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1.10 OVERTIME WORK .3 (Cont'd)
AND OVERNIGHT WORK
(Cont'd)

panels need to be replaced, seven days notice of the affected areas will be required.

1.11 TOOLS AND
EQUIPMENT

- .1 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required.
- .2 Throughout the construction project maintain up-to-date the list of tools and equipment specified above.
- .3 Keep all tools and equipment under constant supervision, particularly power-driven tools, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device. There will be no cartridge driven tools or cartridges allowed on the site.
- .4 Store all tools and equipment in approved secure locations.
- .5 Lock all tool boxes when not in use. Keys to remain in the possession of the employees of the Contractor. Scaffolding shall be secured and locked when not erected and when erected, will be secured in a manner agreed upon with the Institutional designate.
- .6 All missing or lost tools or equipment shall be reported immediately to the Director.
- .7 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:
.1 At the beginning and conclusion of every construction project.
.2 Weekly, when the construction project extends longer than a one week period.
.3 The Contractor may be subject to random checks by security staff to ensure proper storage and security of tools throughout the project.
- .8 Certain tools/equipment such as hacksaw blades are highly controlled items. The Contractor will be given at the beginning of
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- 1.11 TOOLS AND EQUIPMENT
(Cont'd)
- .8 (Cont'd)
the day, a quantity that will permit one day's work. Used blades will be returned to the Director's representative at the end of each day.
- .9 If propane or natural gas is used for heating the construction, the Institution will require that an employee of the Contractor supervise the construction site during non-working hours.
- .10 If torches or grinders are required tools to perform Work, Contractor must complete a Hot Work Permit as supplied by CSC. Completed original form(s) are copied and posted on the work site in a conspicuous location. Original documents are to remain with the Institutional Fire Chief.
- 1.12 KEYS
- .1 Security Hardware Keys:
.1 The Contractor shall arrange with the security hardware supplier/installer to have the keys for the security hardware to be delivered directly to Institution, specifically the Security Maintenance Officer (SMO).
.2 The Security Maintenance Officer (SMO) will provide a receipt to the Contractor for security hardware keys.
.3 The Contractor will provide a copy of the above-mentioned receipt to the Departmental Representative.
- .2 Other Keys:
.1 The Contractor will use standard construction cylinders for locks for his/her use during the construction period.
.2 The Contractor will issue instructions to his/her employees and sub-trades, as necessary, to ensure safe custody of the construction set of keys.
.3 Upon completion of each phase of the construction, the CSC representative will, in conjunction with the lock manufacturer:
.1 Prepare an operational keying schedule.
.2 Accept the operational keys and cylinders directly from the lock manufacturer
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- 1.12 KEYS
(Cont'd)
- .2 Other Keys: (Cont'd)
 - .3 (Cont'd)
 - .3 Arrange for removal and return of the construction cores and install the operational core in all locks.
 - .3 Upon putting operational security keys into use, the CSC construction escort shall obtain these keys as they are required from the Security Maintenance Officer (SMO) and open doors as required by the Contractor. The Contractor shall issue instructions to his/her employees advising them that all security keys shall always remain with the CSC construction escort.
- 1.13 SECURITY
HARDWARE
- .1 Turn over all removed security hardware to the Director of the Institution for disposal or for safekeeping until required for re-installation.
- 1.14 PRESCRIPTION
DRUGS
- .1 Employees of the Contractor who are required to take prescription drugs during the workday shall obtain approval of the Director to bring a one day supply only into the Institution.
- 1.15 SMOKING
RESTRICTIONS
- .1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.
 - .2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist, will be directed to leave the institution.
 - .3 Smoking is only permitted outside the perimeter of a correctional facility in an area to be designated by the Director.
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- 1.16 CONTRABAND .1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on Institutional Property.
- .2 Discovery of Contraband on the construction site and the identification of the person(s) responsible for the Contraband shall be reported immediately to the Director.
- .3 Contractors shall be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of Contraband may result in cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.
- .4 Presence of arms and ammunition in vehicles of Contractors, sub-contractors and suppliers or employees of these will result in the immediate cancellation of security clearances for the driver of the vehicle.
- 1.17 SEARCHES .1 All vehicles and persons entering Institutional property may be subject to search.
- .2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of Contraband or unauthorized items, he/she may order that person to be searched.
- .3 All employees entering the Institution may be subject to screening of personal effects for traces of Contraband drug residue.
- 1.18 ACCESS TO AND REMOVAL FROM INSTITUTION PROPERTY .1 Construction personnel and commercial vehicles will not be admitted to the Institution after normal working hours, unless approved by the Director.
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1.19 MOVEMENT OF
VEHICLES

- .1 Escorted commercial vehicles will be allowed to enter or leave the Institution through the vehicle access gate during the following hours:
 - .1 08:00 a.m. to 11:30 a.m.
 - .2 12:30 p.m. to 3:45 p.m.
 - .2 Construction vehicles shall not leave the Institution until an inmate count is completed.
 - .3 The Contractor shall advise the Director forty eight (48) hours in advance to the arrival on the site of heavy equipment such as concrete trucks, cranes, etc.
 - .4 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC Staff or Commissionaires working under the authority of the Director.
 - .5 Commercial Vehicles will only be allowed access to Institutional Property when their contents are certified by the Contractor or his/her representative as being strictly necessary to the execution of the construction project.
 - .6 Vehicles shall be refused access to Institutional Property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution.
 - .7 Private vehicles of Construction Employees will not be allowed within the security wall or fence of medium or maximum security Institutions without the permission of the Director.
 - .8 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.
 - .9 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight. Vehicles will not be permitted to remain on site over the weekend. This equipment must be securely
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1.19 MOVEMENT OF VEHICLES
(Cont'd) .9 (Cont'd)
locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

1.20 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY
PROPERTY .1 Subject to the requirements of good security, the Director will permit the Contractor and his/her employees as much freedom of action and movement as is possible.
.2 However, notwithstanding paragraph above, the Director may:
.1 Prohibit or restrict access to any part of the Institution.
.2 Require that in certain areas of the Institution, either during the entire construction project or at certain intervals, Construction Employees only be allowed access when accompanied by a member of the CSC security staff.
.3 During the lunch and coffee/health breaks, all employees will remain within the construction site. Employees are not permitted to eat in the officer's lounge and dining room. This section is to be strictly enforced to avoid unnecessary foot traffic in the Institution and through the Sally Port.

1.21 SURVEILLANCE AND INSPECTION
AND INSPECTION .1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.
.2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among Construction Employees and maintained throughout the construction project.

- 1.22 STOPPAGE OF WORK
- .1 The Director may request at any time that the Contractor, his/her employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation occurring within the Institution. The Contractor's site supervisor shall note the name of the staff member making the request and the time of the request and obey the order as quickly as possible.
 - .2 The Contractor shall advise the Departmental Representative within 24 hours of this delay to the progress of the work.
- 1.23 CONTACT WITH INMATES
- .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his/her security clearance revoked.
 - .2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this Contract.
- 1.24 COMPLETION OF CONSTRUCTION PROJECT
- .1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 National Building Code 2010 (NBC):
 - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
 - .2 National Fire Code 2010 (NFC):
 - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
 - .3 Province of Ontario:
 - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities.
 - .4 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire Protection Standard April 1, 2010
www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316§ion=text.
 - .5 Fire Commissioner of Canada (FCC):
 - .1 FC-301 Standard for Construction Operations, June 1982.
 - .2 FC-302 Standard for Welding and Cutting, June 1982.

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
4900 Yonge Street 8th Floor
North York, Ontario M2N 6A8

and copies may be obtained from:

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
Ottawa, Ontario K1A 0J2

- 1.2 SUBMITTALS
- .1 Make submittals in accordance with Section 01 33 00.
 - .2 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 operations.
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
 - .4 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Institution's Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Institution's Emergency Procedures and Evacuation Plan. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.
 - .5 Contractor's and Sub-contractors' Safety Communication Plan.
 - .6 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Institution's Emergency Response requirements and procedures provided by Departmental Representative.
 - .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 7 days after receipt of comments from Departmental Representative.
 - .4 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.
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- 1.2 SUBMITTALS
(Cont'd)
- .5 Submit names of personnel and alternates responsible for site safety and health.
 - .6 Within two weeks of commencing work, submit to Departmental Representative proof of appropriate Arc-Flash training for each employee or subcontractor's employee proposed to work at the job site.
 - .7 Submit records of Contractor's Health and Safety meetings when requested.
 - .8 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.
 - .9 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
 - .10 Submit copies of incident and accident reports.
 - .11 Submit Material Safety Data Sheets (MSDS).
 - .12 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.
- 1.3 FILING OF
NOTICE
- .1 File Notice of Project with Provincial authorities prior to commencement of Work.
- 1.4 WORK PERMIT
- .1 Obtain building permits related to project prior to commencement of Work.
 - .2 Obtain Hot Work Permit from Chief Plant Maintenance.
- 1.5 SAFETY
ASSESSMENT
- .1 Perform site specific safety hazard assessment related to project.
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- 1.6 MEETINGS .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- 1.7 REGULATORY REQUIREMENTS .1 Comply with the Acts and regulations of the Province of Ontario.
.2 Comply with specified standards and regulations to ensure safe operations at site.
- 1.8 PROJECT/SITE CONDITIONS .1 Work at site will involve contact with:
.1 Silica in concrete and/or concrete block, concrete brick, stucco, ceramic tile.
.2 Asbestos in pipe covering.
.3 Lead in paint.
.2 Hazardous conditions include working at heights, and working around existing materials and racking.
- 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 either accepting or requesting improvements.
.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.
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- 1.10 COMPLIANCE REQUIREMENTS .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.
- 1.11 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.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.
- 1.12 UNFORSEEN HAZARDS .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.
- 1.13 ARC-FLASH TRAINING .1 All employees of the contractor of their subcontractors who work at the jobsite will be required to have previously successfully completed an Arc-Flash training course. Proof of course completion for each employee will be required.
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1.14 HEALTH AND
SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
- .1 Have working knowledge of occupational safety and health regulations.
 - .2 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.
 - .3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .4 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.15 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 of Ontario, and in consultation with Departmental Representative.
- .1 Contractor's Safety Policy.
 - .2 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
 - .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
 - .7 Address and phone number of nearest Ministry of Labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written Emergency Response Plan.
 - .10 Site Specific Safety Plan.
 - .11 Valid certificate of first aider on duty.
 - .12 WSIB "In Case of Injury At Work" poster.
 - .13 Location of toilet and cleanup facilities.

- 1.16 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.
- 1.17 BLASTING .1 Blasting or other use of explosives is not
permitted.
- 1.18 POWDER
ACTUATED DEVICES .1 Use powder actuated devices are not
permitted.
- 1.19 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.
- .2 Assign responsibility and obligation to
Health and Safety Coordinator to stop or start
Work when, at Health and Safety Coordinator's
discretion, it is necessary or advisable for
reasons of health or safety. Departmental
Representative may also stop Work for health
and safety considerations.

PART 1 - GENERAL

1.1 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 SUBMITTALS

- .1 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.
 - .2 Address topics at level of detail commensurate with environmental issue and required construction tasks.
 - .3 Environmental protection plan: include:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan which identifies type and location of erosion and
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1.2 SUBMITTALS
(Cont'd)

- .3 Environmental protection plan:(Cont'd)
- .5 (Cont'd)
sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
- .7 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.
- .9 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.
- .12 Contaminant prevention plan that:
identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
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- 1.3 FIRES .1 Fires and burning of rubbish on site not permitted.
- 1.4 DISPOSAL OF WASTES .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
- 1.5 POLLUTION CONTROL .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area, by providing temporary enclosures.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 Spills of deleterious substances:
.1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
.2 Report immediately to Ontario Spills Action Centre: 1-800-268-6060.
.3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.
- 1.6 HALOCARBONS .1 Comply with Federal Halocarbon Regulations 2003 under the Canadian Environmental Protection Act 1999, EPAM and PWGSC Ontario Region Halocarbon Information Sheet dated March 2010.
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1.7 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 1 - GENERAL

1.1 REFERENCE
STANDARDS

- .1 CSA Group
 - .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2 No..
 - .3 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.2 DEFINITIONS

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.3 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for light fixtures and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Shop drawings:
 - .1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .4 If changes are required, notify Departmental Representative of these changes before they are made.
-

1.4 CLOSEOUT SUBMITTALS (Cont'd)

.1 (Cont'd)

.5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

.6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect light fixtures from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.

PART 2 - PRODUCTS

2.1 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

- 2.1 DESIGN REQUIREMENTS (Cont'd) .3 Language operating requirements: provide identification nameplates and labels for control items in English.
- 2.2 MATERIALS AND EQUIPMENT .1 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- 2.3 WARNING SIGNS .1 Warning Signs: in accordance with requirements of authority having jurisdiction inspection authorities Departmental Representative.
- .2 Porcelain enamel decal signs, minimum size 175 x 250 mm.
- 2.4 WIRING TERMINATIONS .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.
- 2.5 EQUIPMENT IDENTIFICATION .1 Identify electrical equipment with nameplates and labels as follows:
- .1 Nameplates: plastic laminate melamine, 3 mm thick plastic engraving sheet melamine, black matt white finish face, black white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
- .2 Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters

2.5 EQUIPMENT IDENTIFICATION (Cont'd)

.1 (Cont'd)

.2 Sizes as follows: (Cont'd)

Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.
- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate and label.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .7 Terminal cabinets and pull boxes: indicate system and voltage.
- .8 Transformers: indicate capacity, primary and secondary voltages.

2.6 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
 - .2 Maintain phase sequence and colour coding throughout.
 - .3 Colour coding: to CSA C22.1.
-

2.6 WIRING IDENTIFICATION
(Cont'd)

.4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.
.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

Type	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
.1 Paint indoor switchgear and distribution enclosures light gray to.

PART 3 - EXECUTION

- 3.1 EXAMINATION .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 INSTALLATION .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- 3.3 NAMEPLATES AND LABELS .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.
- 3.4 CONDUIT AND CABLE INSTALLATION .1 Install conduit and sleeves prior to pouring of concrete.
- .1 Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 50 mm.
 - .2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.
- 3.5 LOCATION OF OUTLETS .1 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .2 Locate light switches on latch side of doors.
-

- 3.5 LOCATION OF OUTLETS
(Cont'd)
- .2 (Cont'd)
.1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.
- 3.6 MOUNTING HEIGHTS
HEIGHTS
- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
.1 Local switches: 1000 mm.
.2 Panelboards: as required by Code or as indicated.
- 3.7 FIELD QUALITY CONTROL
CONTROL
- .1 Conduct following tests.
.1 Circuits originating from branch distribution panels.
.2 Lighting and its control.
.3 Insulation resistance testing:
.1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
.2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
.3 Check resistance to ground before energizing.
- .2 Carry out tests in presence of Departmental Representative.
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .4 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
-

3.7 FIELD QUALITY CONTROL (Cont'd) .4 Manufacturer's Field Services:(Cont'd)
.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.8 SYSTEM STARTUP .1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.
.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

3.9 CLEANING .1 Progress Cleaning:
.1 Leave Work area clean at end of each day.
.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
.3 Waste Management: separate waste materials for reuse and recycling.
.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

1.1 PRODUCT DATA .1 Provide product data.

1.2 DELIVERY,
STORAGE AND
HANDLING .1 Packaging Waste Management: remove for reuse
and return by manufacturer of pallets crates
padding and packaging materials.

PART 2 - PRODUCTS

2.1 BUILDING WIRES .1 Conductors: stranded for 10 AWG and larger.
Minimum size: 12 AWG.
.2 Copper conductors: size as indicated, with
600 V insulation of cross-linked thermosetting
polyethylene material rated RW90 XLPE, Non
Jacketted.

2.2 TECK 90 CABLE .1 Cable: in accordance with Section 26 05 00 -
Common Work Results for Electrical.
.2 Conductors:
.1 Grounding conductor: copper as
indicated.
.2 Circuit conductors: copper as indicated,
size as indicated.
.3 Insulation:
.1 Ethylene propylene rubber EP.
.2 Cross-linked polyethylene XLPE.
.3 Rating:, 600 V.
.4 Inner jacket: polyvinyl chloridematerial.
.5 Armour: flat interlocking galvanized steel.
.6 Overall covering: thermoplastic polyvinyl
chloride, compliant to applicable Building
Code classification for this project.
.7 Fastenings:
.1 One hole steel straps to secure surface
cables 50 mm and smaller.

- 2.2 TECK 90 CABLE (Cont'd) .7 Fastenings:(Cont'd)
- .2 Channel type supports for two or more cables at 1000 mm centers.
 - .3 Threaded rods: 6 mm diameter to support suspended channels.
 - .4 Minimum head room height of channels shall be 2.2m.
- .8 Connectors:
- .1 Watertight, approved for TECK cable.
- 2.3 ARMOURED CABLES .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90.
 - .3 Armour: interlocking type fabricated from galvanized steel strip.
 - .4 Connectors: anti short connectors.

PART 3 - EXECUTION

- 3.1 FIELD QUALITY CONTROL .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.
 - .3 Perform tests before energizing electrical system.
- 3.2 GENERAL CABLE INSTALLATION .1 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.
- .2 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
 - .3 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from
-

- 3.2 GENERAL CABLE .3 Wiring in walls:(Cont'd)
INSTALLATION below and horizontal wiring in walls to be
(Cont'd) avoided unless indicated.
- .4 Provide numbered wire collars for control
wiring. Numbers to correspond to control shop
drawing legend. Obtain wiring diagram for
control wiring.
- 3.3 INSTALLATION OF .1 Install wiring as follows:
BUILDING WIRES
- .1 In conduit systems.
- 3.4 INSTALLATION OF .1 Group cables wherever possible on channels.
TECK90 CABLE (0
-1000 V)
- .2 Install cable exposed, securely supported by
staples straps hangers.
- 3.5 INSTALLATION OF .1 Group cables wherever possible on channels.
ARMOURED CABLES

PART 1 - GENERAL

1.1 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for hangers and supports and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.2 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect hangers and supports from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
 - .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan.
-

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS .1 U shape, size 41 x 41 mm, 2.5 mm thick,
surface mounted suspended set in poured

PART 3 - EXECUTION

3.1 EXAMINATION .1 Verification of Conditions: verify that
conditions of substrate previously installed
under other Sections or Contracts are
acceptable for hangers and supports
installation in accordance with manufacturer's
written instructions.
.1 Visually inspect substrate in presence
of Departmental Representative.
.2 Inform Departmental Representative of
unacceptable conditions immediately upon
discovery.
.3 Proceed with installation only after
unacceptable conditions have been remedied and
after receipt of written approval to proceed
from Departmental Representative DCC
Representative Consultant.

3.2 INSTALLATION .1 Secure equipment to hollow solid masonry,
tile and plaster surfaces with nylon shields.
.2 Secure equipment to poured concrete with
expandable inserts.
.3 Secure equipment to hollow masonry walls or
suspended ceilings with toggle bolts.
.4 Secure surface mounted equipment with twist
clip fasteners to inverted T bar ceilings.
Ensure that T bars are adequately supported to
carry weight of equipment specified before
installation.
.5 Support equipment, conduit or cables using
clips, spring loaded bolts, cable clamps
designed as accessories to basic channel
members.

3.2 INSTALLATION
(Cont'd)

- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.

- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm diameter threaded rods and spring clips.
 - .2 Support 2 or more cables or conduits on channels supported by 6 mm diameter threaded rod hangers where direct fastening to building construction is impractical.

- .8 For surface mounting of two or more conduits use channels at 1.5 m on centre spacing.

- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.

- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.

- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.

- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

3.3 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.

 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.
-

3.3 CLEANING
(Cont'd)

- .3 Waste Management: separate waste materials for reuse and recycling.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

- 1.1 REFERENCE STANDARDS
- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-06, Canadian Electrical Code, Part 1, 23rd Edition.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Provide submittals.
- 1.3 DELIVERY, STORAGE AND HANDLING
- .1 Deliver, store and handle materials in accordance with manufacturer's recommendations.
 - .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.

PART 2 - PRODUCTS

- 2.1 OUTLET AND CONDUIT BOXES GENERAL
- .1 Size boxes in accordance with CSA C22.1.
 - .2 102 mm square or larger outlet boxes as required.
 - .3 Gang boxes where wiring devices are grouped.
 - .4 Blank cover plates for boxes without wiring devices.
 - .5 Combination boxes with barriers where outlets for more than one system are grouped.
- 2.2 GALVANIZED STEEL OUTLET BOXES
- .1 One-piece electro-galvanized construction.
 - .2 Single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes
-

- 2.2 GALVANIZED STEEL OUTLET BOXES (Cont'd) .2 (Cont'd)
when more than one conduit enters one side with extension and plaster rings as required.
- .3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
- .4 102 mm square or octagonal outlet boxes for lighting fixture outlets.
- .5 Extension and plaster rings for flush mounting devices in finished plaster tile walls.
- 2.3 MASONRY BOXES .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.
- 2.4 CONCRETE BOXES .1 Electro-galvanized sheet steel concrete type boxes for flush mount in concrete with matching extension and plaster rings as required.
- 2.5 CONDUIT BOXES .1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.
- 2.6 FITTINGS - GENERAL .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 35mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.
-

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

PART 1 - GENERAL

- 1.1 REFERENCE STANDARDS
- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA C22.2 No. 18 -98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45 -M1981(R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83 -M1985(R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
 - .2 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.
- 1.3 WASTE MANAGEMENT AND DISPOSAL
- .1 Separate waste materials for reuse and recycling.
 - .2 Place materials defined as hazardous or toxic waste in designated containers.
 - .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
-

PART 2 - PRODUCTS

2.1 CABLES AND
REELS

- .1 Provide cables on reels or coils.
 - .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- .2 Each coil or reel of cable to contain only one continuous cable without splices.
- .3 Identify cables for exclusively dc applications.
- .4 Reel and mark shielded cables rated 2,001 volts and above.

2.2 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel aluminum threaded.
- .2 Flexible metal conduit: to CSA C22.2 No. 56, liquid-tight flexible metal.

2.3 CONDUIT
FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
 - .1 Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1 m on centre.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT
FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.
 - .2 Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.
-

2.4 CONDUIT .3 Watertight connectors and couplings for EMT.
FITTINGS .1 Set-screws are not acceptable.
(Cont'd)

2.5 FISH CORD .1 Polypropylene.

PART 3 - EXECUTION

3.1 MANUFACTURER'S .1 Compliance: comply with manufacturer's
INSTRUCTIONS written recommendations or specifications,
including product technical bulletins,
handling, storage and installation
instructions, and datasheets.

3.2 INSTALLATION .1 Install conduits to conserve headroom in
exposed locations and cause minimum
interference in spaces through which they
pass.

.2 Surface mount conduits.

.3 Use rigid galvanized steel threaded conduit
except where specified otherwise.

.4 Use flexible metal conduit for connection to
surface LED fixtures.

.5 Minimum conduit size for lighting and power
circuits: 19 mm.

.6 Bend conduit cold:
.1 Replace conduit if kinked or flattened
more than 1/10th of its original diameter.

.7 Mechanically bend steel conduit over 19 mm
diameter.

.8 Field threads on rigid conduit must be of
sufficient length to draw conduits up tight.

.9 Install fish cord in empty conduits.

- 3.2 INSTALLATION
(Cont'd)
- .10 Remove and replace blocked conduit sections.
.1 Do not use liquids to clean out conduits.
- .11 Dry conduits out before installing wire.
- 3.3 SURFACE
CONDUITS
- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on suspended channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.
- 3.4 CONCEALED
CONDUITS
- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.
- 3.5 CLEANING
- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

- 1.1 SUMMARY .1 Section Includes:
.1 Materials and installation for low voltage control system designed to provide remote switching of lighting loads by use of:
.1 Low voltage momentary contact switches.
- 1.2 REFERENCE STANDARDS .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).
- 1.3 ACTION AND INFORMATIONAL SUBMITTALS .1 Product Data:
.1 Submit manufacturer's printed product literature, specifications and datasheets. Include product characteristics, performance criteria, and limitations.
.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS). Indicate VOC content.
- .2 Shop Drawings:
.1 Submit shop drawings.
- .3 Closeout Submittals:
.1 Submit maintenance data.
- .4 Quality assurance submittals: submit following:
.1 Test reports:
.1 Submit certified test reports indicating compliance with specifications for specified performance characteristics and physical properties.
.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
.3 Manufacturer's Instructions: submit manufacturer's installation instructions.
.4 Manufacturer's Field Reports: manufacturer's field reports specified.
-

- 1.4 QUALITY ASSURANCE .1 Health and Safety:
.1 Do construction occupational health and safety.
- 1.5 DELIVERY, STORAGE, AND HANDLING .1 Packing, shipping, handling and unloading:
.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
.2 Waste Management and Disposal:
.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling.

PART 2 - PRODUCTS

- 2.1 MATERIALS .1 Control system: by one manufacturer and assembled from compatible components.
- 2.2 REMOTE CONTROL SWITCHES .1 Single pole, double throw, momentary contact, heavy duty, rated 20 A, 25 V, double push-button action with pilot lights.
- 2.3 LOW VOLTAGE RELAYS .1 Electrically operated by momentary impulse, mechanically latched until activated.
.2 Two coil solenoid type with one coil to close relay contacts and one coil to open relay contacts.
.3 Operating voltage: 24 V, AC.
.4 Load contacts: 20 A, 120 V, AC.
.5 Auxiliary contacts for pilot light.
.6 Coloured pre-stripped leads.
-

- 2.4 CONTROL TRANSFORMER .1 Low voltage power Class 2, input 120 V, AC, 60 Hz, output 20 VA at 24 V.
- 2.5 RECTIFIER .1 Selenium type: 24 V, AC, 60 Hz input, 0.36 A continuous duty output.
- .2 Silicon type: 24 V, AC, 60 Hz input, 7.5 A continuous duty 20 A intermittent duty output.
- 2.6 MANUAL CONTROL .1 Provide individual remote control switches as indicated.
- 2.7 OCCUPANCY SENSORS .1 Provide occupancy sensors as shown on the plans and specified herein. The sensors shall sense human activity in the space and provide on/off or dimming control based on occupancy.
- .2 The occupancy sensing technologies shall not emit radiation that can interfere with the operation of any electronic devices.
- .3 The sensors shall have two methods of programming. Each sensor shall provide access to configure all the basic parameters without any other tools. Also, it shall be possible to read and write all programmed configurations by use of an infra-red hand held unit so that once the sensor has been installed, it is not necessary to remove any cover plates to change or read configuration properties.
- .4 It shall be possible to manually set the time delay and sensitivity levels to match specific requirements, or, alternatively, the sensor can be set to an automatic mode which will activate the self adapting algorithm to maximize energy savings based on occupancy tendencies.
- .5 The installing contractor shall adhere to the manufacturer's recommendations for sensor location and adjust the Time Delay and Sensitivity as per the owner's instructions. The contractor shall be responsible for adhering to all applicable codes and for providing a completely functional system.
-

2.7 OCCUPANCY
SENSORS
(Cont'd)

- .6 The control system is to be by one manufacturer and assembled from compatible components.

2.8 WALL SWITCH
SENSOR - LINE
VOLTAGE SERIES

- .1 Sensors shall mount in a standard Decora style switch plate and shall mount recessed into a standard gang box.
- .2 Sensor shall have a 180 degree coverage pattern.
- .3 Provide an adjustable time out period between 30 seconds and 30 minutes.
- .4 There shall be no leakage current to the load when the sensor is in the off position.
- .5 Photocell feature shall be provided so that when occupancy is detected, the sensor will only allow the load to be switched on if the light level is below the level set by the user.
- .6 A manual over-ride switch is to be provided on the sensor to allow the sensor to switch loads ON by the switch and OFF by the sensor.
- .7 If required by the plans, provide a vacancy detector. This detector shall not be reconfigurable to be an occupancy sensor by the user.
- .8 Where two level switching is required, provide optional two pole sensors. The sensors must be able to be set to activate alternating poles to provide even lamp wear.

2.9 CEILING SENSOR
-LOW VOLTAGE

- .1 Ceiling sensors shall mount recessed into the ceiling space.
 - .2 Sensors shall have a 360 degree coverage pattern with an adjustable swivel head to maximize coverage area when mounted on sloped ceilings.
 - .3 Provide an adjustable time out period between 30 seconds and 30 minutes.
-

2.9 CEILING SENSOR .4
-LOW VOLTAGE
(Cont'd)

Sensors shall operate with the Power Pack using diode pulse technology.

- .5 Photocell feature shall be provided so that when occupancy is detected, the sensor will only allow the load to be switch on if the light level is below the level set by the user.
- .6 A manual over-ride switch is to be provided on the sensor to allow the load to be manually switched on and off for the purpose of testing during installation.
- .7 Where two level switching is required, provide optional two pole sensors. The sensors must be able to be set to activate alternating poles to provide even lamp wear.
- .8 Provide as required on the plans, options that are available from the following list:
 - .1 Configurable high and low light level set points so that the sensor can toggle between light levels upon occupancy.
 - .2 Auxiliary relay, for signalling other systems, which can be configured so that it synchronizes with the on/off status of the load or the status of occupancy/vacancy.

2.10 POWER PACKS AND .1
SLAVE POWER PACKS

Where indicated on the plans, provide Power Packs capable of powering multiple sensors. The Power Pack shall be controlled by a diode pulse provided by a switch or occupancy sensor.

- .2 Power Packs shall provide up to a maximum of 150 mA at 24VAC to the low voltage occupancy sensors.
-

PART 3 - EXECUTION

3.1 MANUFACTURER'S
INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Locate and install equipment in accordance with manufacturer's recommendations and as indicated.
- . 2 Occupancy Sensors:
 - .1 Locate sensors so there are no objects blocking the infrared sensor from viewing all of the coverage area. Keep away from HVAC vents, direct sunlight and direct light from fixtures.
- .2 Power Packs:
 - .1 Mount Power Packs to a four inch junction box through a 1/2 inch conduit opening.

3.3 FIELD QUALITY
CONTROL

- .1 Site Tests:
 - .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
 - .2 Actuate control units in presence of Departmental Representative to demonstrate lighting circuits are controlled as designated.
 - .3 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
-

- 3.3 FIELD QUALITY CONTROL (Cont'd) .3 Manufacturer's Field Services:(Cont'd)
.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.
- .4 Verification requirements include:
.1 Materials and resources.
.2 Storage and collection of recyclables.
.3 Construction waste management.
.4 Resource reuse.
.5 Recycled content.
.6 Local/regional materials.
.7 Low-emitting materials.
- 3.4 CLEANING .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 REFERENCE
STANDARDS

- .1 CSA International
 - .1 CAN/CSA C22.2 No.42.1-00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .2 CSA C22.2 No.55-M1986(R2008), Special Use Switches.
 - .3 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national standard, with UL 20).

1.2 ACTION AND
INFORMATIONAL
SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wiring devices and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
 - .1 Submit drawings.
- .3 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan Waste Reduction Workplan highlighting recycling and salvage requirements.

1.3 CLOSEOUT
SUBMITTALS

- .1 Operation and Maintenance Data: submit operation and maintenance data for wiring devices for incorporation into manual.

1.4 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
-

- 1.4 DELIVERY,
STORAGE AND
HANDLING
(Cont'd)
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wiring devices from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
 - .4 Develop Construction Waste Management Plan related to Work of this Section.
 - .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan Waste Reduction Workplan.

PART 2 - PRODUCTS

- 2.1 SWITCHES
- .1 20 A, 120 V, single pole, double pole, three-way, four-way switches to: CSA C22.2 No.55 and CSA C22.2 No.111.
 - .2 Manually-operated general purpose AC switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine moulding for parts subject to carbon tracking.
 - .4 Suitable for back and side wiring.
 - .5 Ivory toggle.
 - .3 Toggle operatedlocking fully rated for LED fixtures.
 - .4 Switches of one manufacturer throughout project.
- 2.2 COVER PLATES
- .1 Cover plates for wiring devices to: CSA C22.2 No.42.1.
 - .2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.

- 2.2 COVER PLATES (Cont'd)
- .3 Stainless steel, vertically brushed, 1 mm thick cover plates for wiring devices mounted in flush-mounted outlet box.
 - .4 Sheet metalCast cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
 - .5 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.
 - .6 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.
- 2.3 SOURCE QUALITY CONTROL
- .1 Cover plates from one manufacturer throughout project.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative DCC of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 INSTALLATION
- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
-

PART 1 - GENERAL

- 1.1 REFERENCE STANDARDS
- .1 American National Standards Institute (ANSI)
 - .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
 - .3 ASTM International Inc.
 - .1 ASTM F 1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
 - .4 Canadian Standards Association (CSA International)
 - .5 ICES-005-07, Radio Frequency Lighting Devices.
 - .6 Underwriters' Laboratories of Canada (ULC)
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.
 - .3 Photometric data to include: VCP Table where applicable spacing criterion.
 - .2 Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and
-

1.3 DELIVERY,
STORAGE AND
HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates padding and packaging materials.
- .4 Divert unused metal materials from landfill to metal recycling facility.
- .5 Disposal and recycling of fluorescent lamps as per local regulations. Provide a manifest from an approved disposal facility.
- .6 Disposal of old PCB filled ballasts. Provide a manifest from an approved disposal facility.

PART 2 - PRODUCTS

2.1 FIXTURES

- .1 LED as per fixture schedule.

2.2 FINISHES

- .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

2.3 OPTICAL CONTROL
DEVICES

- .1 As indicated in luminaire schedule.

2.4 LUMINAIRES

- .1 As indicated in luminaire schedule.
 - .2 Must comply with CSA-C22.2 No. 250.13-12.
 - .3 Must comply with IESNA LM-79-08.
 - .4 Must comply with IESNA - LM-80-08.
 - .5 Be 50,000 hours rated or higher.
-

- 2.4 LUMINAIRES
(Cont'd)
- .6 Have at least 80 CRI colour rendering.
 - .7 THD: 20% or less.
 - .8 Have a power factor of 0.9 or greater.
 - .9 Have a valid IES photometric data file.
 - .10 Be cULus listed.
 - .11 All of the luminaire parts shall be warrantied for at least 5 years.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Locate and install luminaires as indicated.
 - .2 Provide adequate support to suit ceiling system.

- 3.2 WIRING
- .1 Connect luminaires to lighting circuits:
 - .1 Install flexible or rigid conduit for luminaires as indicated.

- 3.3 LUMINAIRE SUPPORTS
- .1 For suspended ceiling installations support luminaires independently of ceiling support luminaires from ceiling grid in accordance with local inspection requirements.

- 3.4 LUMINAIRE ALIGNMENT
- .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
 - .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

- 3.5 CLEANING
- .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
 - .2 Waste Management: separate waste materials for reuse and recycling.