



Correctional Service
Canada

Service correctionnel
Canada

Request for Tender

465-1803-0

Yard Lighting

Grand Valley Institution for Women

1575 Homer Watson Blvd., Kitchener, ON

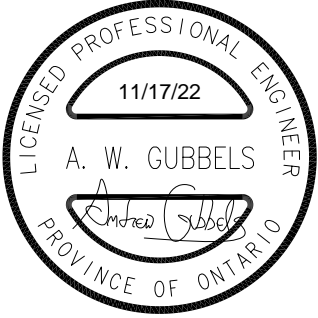
MNE Project No. 18112

October 2022

Prepared by

MNE

E N G I N E E R I N G

DISCIPLINE	SEAL & SIGNATURE
<p>ELECTRICAL</p> <p>This seal governs Division 26</p>	 <p>The seal is circular with the text "LICENSED PROFESSIONAL ENGINEER" around the top and "PROVINCE OF ONTARIO" around the bottom. In the center, it says "11/17/22" and "A. W. GUBBELS". Below the name is a handwritten signature "A. W. Gubbels".</p>

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DRAWING	TITLE
ELECTRICAL E1.1 E2.1 E3.1	Existing Site Lighting Plan Revised Site Lighting Plan Partial Building Plans, Schedule & Legend

The following survey photos are meant to provide bidders with a limited visual of existing conditions. The photos are not meant to outline all details related to the scope of work, and will not form part of the Contract Documents.



Typical Existing Yard Lighting Pole & Luminaire



Typical Existing Yard Lighting Base



Existing Pole Base at Natural Gas Valve

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 any applicable prescribed limit, \$25 when possessed by an inmate, visitor or contractor without prior authorization.
 - . 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 "Project Authority" means, Director, Warden or Superintendent of the Institution as applicable.
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- 1.2 Definitions
(Cont'd)
- .6 "Construction Employees" means persons working for the General Contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.
- .7 "Departmental Representative" means the project manager from Correctional Services 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.
- 1.3 Preliminary Proceedings
- .1 Prior to the commencement of work, the Contractor shall meet with the Project Authority 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 Project Authority a list of the names with date of birth of all Construction Employees to be employed on the construction site.
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- 1.4 Construction Employees
(Cont'd)
- .2 Submit a copy of photo ID for each employee. Employees will not be admitted to the Institution without 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 Project Authority 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 Project Authority 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 Construction Employees are to report to the Principal Entrance building anytime they enter or leave the institution.

 - .5 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.

 - .6 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.

 - .7 Smoking is prohibited anywhere on CSC property.
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- 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 Gas caps on all vehicles and motorized equipment shall be lockable.
- .3 The Project Authority may limit at any time the number and type of vehicles allowed within the institution.
- .4 Drivers of delivery vehicles for material required by the project will not require security clearances but must remain with their vehicle the entire time that the vehicle is in the Institution. The Project Authority will require that these vehicles be escorted by Institutional Staff or Commissionaires while in the Institution.
- .5 If the Project Authority 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 Project Authority. Parking in other location 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.
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- 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 Project Authority is received.
- .2 The Project Authority 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 permitted within the Institution unless approved by the Project Authority. If wireless cellular telephones are permitted, the user will not permit their use by any inmate.
- .4 The use of two way radios are not permitted.
- 1.9 Work Hours .1 Work hours within the Institution are: Monday to Friday, 07:30 hrs to 16:00 hrs.
- .2 Work will not be permitted during weekends and statutory holidays without the permission of the Project Authority. A minimum of seven (7) 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 Project Authority.
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- 1.10 Overtime Work
- .1 No overtime work will be allowed without permission of the Project Authority. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and approved. If overtime work is required because of an emergency such as work to make the construction safe and secure, the Contractor shall advise the Project Authority as soon as this condition is known and follow the directions given by the Project Authority. Costs to the Crown for such events may be attributed to the Contractor.
 - .2 When overtime work, weekend, or statutory holiday work is required and approved by the Project Authority staff members may be posted by the Project Authority or his/her designate, to maintain the security surveillance. The Departmental Representative may post extra staff for inspection of construction activities. The actual cost of this extra staff may be subject to reclamation by the Crown.
- 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 and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.
 - .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.
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- 1.11 Tools and Equipment
(Cont'd)
- .6 All missing or lost tools or equipment shall be reported immediately to the Project Authority.
- .7 The Project Authority 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 cartridges and hacksaw blades are highly controlled items.
The Contractor will be given at the beginning of the day, a quantity that will permit on day's work. Used blades/cartridges will be returned to the Project Authority'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 Keys:
- . 1 The Contractor will use standard construction cylinders for locks for his use during the construction period.
 - . 2 The Contractor will issue instructions to his employees and sub-trades, as necessary to ensure safe custody, of the construction set of keys.
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- 1.12 Keys (Cont'd)
- .1 (Cont'd)
- .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.
 - .3 Arrange for removal and return of the construction cores and install the operational core in all locks.
- .2 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 employees advising them that all security keys shall always remain with the CSC construction escort.
- 1.13 Prescription Drugs
- .1 Employees of the Contractor who are required to take prescription drugs during the workday shall obtain approval of the Project Authority to bring a one day supply only into the Institution.
- 1.14 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 Project Authority.
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- 1.15 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 Project Authority.
 - .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.
- 1.16 Searches
- .1 All vehicles and persons entering Institutional property may be subject to search.
 - .2 When the Project Authority 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.
- 1.17 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 Project Authority.
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1.18 Movement of

- .1 Escorted commercial vehicles will not be Vehicles allowed to enter or leave the Institution after normal working hours, unless approved by the Project Authority.
 - .2 Construction vehicles shall not leave the Institution until an inmate count is completed.
 - .3 The Contractor shall advise the Project Authority twenty four (24) 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 Project Authority.
 - .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 Project Authority, 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 Project authority.
 - .8 With prior approval of the Project authority, 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.
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- 1.18 Movement of Vehicles (Cont'd) .9 With the approval of the Project authority, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The project authority may require that the equipment be secured with a chain and padlock to another solid object.
- 1.19 Movement of Construction Employees on Institutional Property .1 Subject to the requirements of good security, the Project authority will permit the contractor and his/her employees as much freedom of action and movement as is possible.
- .2 However, notwithstanding paragraph above, the
- Project authority may:
- . 1 Prohibit or restrict access to anypart of the Institution.
- . 2 Require that in certain areas of the Institution, either during the entire construction project or at certainintervals, Construction Employees only be allowedaccess 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.
- 1.20 Surveillance 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.
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- 1.21 Stoppage of Work .1 The Project authority 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.
- 1.22 Contact with Inmates .1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk to 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.
- 1.23 Completion of Construction Project .1 Upon completion of the construction project, or when applicable, the takeover of 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 2 - PRODUCTS

- 2.1 Not Used .1 Not used.

PART 3 - EXECUTION

- 3.1 Not Used .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Reference Division 26 05 05 for practices relating to demolition and disposal.

1.2 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

1.3 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-2008, Stipulated Price Contract.
- .2 Correctional Service of Canada Commissioner's Directive 318 "Environmental Programs" and associated Internal Service Directives

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1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Division 06 05 00
- .2 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative.
- .3 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Include in Environmental Protection Plan:
 - .1 Name of person responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Name and qualifications of person responsible for manifesting hazardous waste to be removed from site.
 - .3 Name and qualifications of person responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control procedures identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
 - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, material storage areas, sanitary facilities, and stockpiles of excess materials including methods to control runoff and to contain materials on site.
 - .7 Traffic Control Plans including measures to reduce erosion by construction traffic, especially

during wet weather.

- .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
- .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
- .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance, including potential leaks from service vehicles.
- .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
- .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
- .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage, handling and disposal of these materials. This also includes determining whether ballasts contain PCBs and disposing of them properly.
- .13 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
- .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
- .15 Pesticide treatment plan to be included and updated, as required.

1.5 FIRES

- .1 Fires and burning of rubbish on site is not permitted.

1.6 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.7 SITE CLEARING AND PLANT PROTECTION

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

1.9 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 Landfilling, disposing of, or allowing the landfill or disposal of wastes or contaminated soils on CSC's sites is prohibited.
- .6 Protect any environmental monitoring wells within the work area from damage.
- .7 No chemicals are to be used for dust control.

1.11 NOTIFICATION

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

PART 3 - EXECUTION

3.1 CLEANING

- .1 Progress Cleaning: clean in accordance with Division 26 05 00 and 06 05 05.
 - .1 Leave Work area clean at end of each day.
- .2 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 Division 26 05 00 and 06 05 05.
- .5 Waste Management: separate waste materials for reuse and recycling in accordance with Division 26 05 00 and 06 05 05
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .6 If any evidence of contamination (odours, staining, sheen on water surface, presence of debris or waste) is identified during trenching, excavating, boring, removal or installation of poles, etc:
 - o CSC- Environment should be notified and consulted,
 - o Any excavated soil with evidence of contamination should be containerized or stockpiled on a lined surface and covered appropriately, and
 - o It is the contractor's responsibility to arrange for sampling and analysis of the suspected contaminated soil to determine its suitability for reuse on-site or for off-site disposal.
- .7 If excavated soil is to be taken off-site, it is the contractor's responsibility to perform sampling and ensure that it is disposed of appropriately following applicable regulations and at a certified location

1. GENERAL

1.1 General Requirements for Electrical

- .1 The Procurement and Contracting Requirements as outlined under Division 00, and the General Requirements as outlined under Division 01, and all addenda thereto shall apply to and govern all portions of the electrical work.
- .2 Points not specifically mentioned shall be in strict accordance with the Ontario Electrical Safety Code (OESC) and regulations of the Electrical Inspection Department from which the permit was obtained. The latest revisions and/or amendments to this Code, with applicable date restrictions, shall also govern work on this contract.
- .3 It is the intent of these specifications to furnish and install all materials and equipment as herein specified, and/or shown on the drawings in such a manner as to leave each of the systems of the electrical trades complete and in satisfactory operating condition. Provide all products and methods specified or shown complete with incidentals necessary for a complete operating installation. The contract documents are not intended to enumerate each and every detail which may be necessary to furnish and install the complete system connected up ready for service operation. The bid shall include all such details, and all associated labour and materials, to provide a complete and working system. The omission of any details in the contract documents shall not be a warrant for the installation of poor workmanship or materials, or the omission of such details. The scope of the work to be performed by the Contractor shall be obtained by a careful examination of these specifications and all electrical drawings.
- .4 These specifications are to be considered as an integral part of the plans which accompany them, neither the plans nor the specifications shall be used alone. Any item or subject omitted from one but which is mentioned or reasonably implied in the other shall be considered as properly and sufficiently specified and must, therefore, be provided by the Contractor. Misinterpretation of either the plans or the specifications shall not relieve the Contractor of responsibility.
- .5 The Contractor shall be held responsible for the satisfactory completion of all work bearing upon his trade.
- .6 The Electrical Trade shall be considered as the Prime, or General Contractor for this project.
- .7 The Contractor must make note of any inaccuracies or inconsistencies in the drawings and/or specifications and bring these to the attention of the Electrical Engineer and/or Project Coordinator prior to the close of bids.
- .8 Within this design, the term 'provide' is understood to mean 'supply and install'.
- .9 Extra charges for premium time labour shall be included in the bid price as required to comply with the owners construction schedule and the restrictions on when work will be permitted. Allow for after hours, weekend and holiday labour requirements.
- .10 Re-mobilization of any resources or sub-trades as required to maintain schedule or construction sequencing shall be included.

1.2 Codes, Permits and Submissions

- .1 All work shall comply with the OESC (current edition, including all bulletins and amendments) and all local and municipal codes and Government agencies having jurisdiction.
- .2 It is understood that the Contractor has examined and checked all drawings and specifications with the local authorities and the equipment and materials supplied by the Contractor shall have the approval of CSA, ULC, Factory Mutual (FM) and any other authority having jurisdiction.
- .3 The Contractor shall obtain and pay for all necessary permits and inspection fees as may be required by the public administrative authorities having jurisdiction. Any changes or alterations required by an authorized inspector shall be rectified by the Contractor without charge to the Owner.
- .4 A building permit is not anticipated for this project.
- .5 Plans have not been submitted to the Electrical Safety Authority (ESA) Plans Approval Department. In accordance with the requirements of 2-010 of the OESC, plan submission is not required for this project.
- .6 All new electrical equipment must conform to the regulations of the Ontario Electrical Safety Code (OESC). Anything necessary to make the equipment comply with these requirements shall be provided without additional cost to the Owner.
- .7 Submit all required documentation to the authorities for their approval and comment before starting any work. Provide all additional drawings, details or information as may be required.
- .8 Inform the Consultant in writing if modifications to the work are requested by the authorities.

1.3 Standards of Workmanship and Materials

- .1 All materials supplied by the Contractor shall be new and of the quality specified. All such materials shall be certified by CSA or other organization approved by the ESA. For any material not so certified, this Contractor shall obtain special approval of the local Inspection Authority and shall bear all inspection charges levied and any modification cost required.
- .2 The Contractor shall be Certified, or registered as an apprentice in accordance with the latest Ministry of Labour regulations.

1.4 Quality Assurance & Regulatory Agencies

- .1 All materials, installations supplied and performed by the Contractor shall be new and meet the standards of quality as specified herein:
 - a. Canadian Standards Association - CSA.
 - b. Ontario Regulation 332/12 (Ontario Building Code) - OBC with amendments.
 - c. Local Fire Codes.
 - d. Ontario Ministry of Labour.
 - e. Ministry of the Environment.

- f. Ontario Electrical Safety Code.
- g. Local Electrical Inspection Department.
- h. Correctional Service Canada (CSC).
- i. Canadian General Standards Board (CGSB).

1.5 Contractor's Shop

- .1 The Contractor shall provide his own office, workshop, tools and materials storage as required, and be responsible for any loss or damage thereto.
- .2 Each day, the Contractor shall enter the site through the front entrance/ID building. Vehicles and deliveries may come in through the Sallyport between 7:30am to 11:15am, and from 12:30pm to 4:00pm.
- .3 Coordinate with the project authority for a suitable material storage location outside the fence, in a parking lot.

1.6 Setting Out of the Work

- .1 The electrical trade shall be responsible for correcting all work completed contrary to the intent of the drawings and specifications and shall bear all costs for same. Where the intent of the documents is not clear he shall obtain the clarification of the Engineer before proceeding with the work.
- .2 The electrical trade, in setting out of his work, shall make reference to existing site service and process equipment drawings. He shall coordinate for establishing routes and locations for conduit runs, lighting fixtures, etc. so that conflicts are avoided and symmetrical even spacing is maintained.
- .3 Do not scale drawings for installation purposes. Obtain all dimensions from manufacturers Shop Drawings and onsite inspections.
- .4 Before submitting bid, carefully examine the site of the proposed work so as to ascertain all existing conditions affecting the work. No extras will be allowed for work necessitated by conditions ordinarily evident on the site.

1.7 Preparation

- .1 The Contractor shall be responsible for all cutting, patching and finishing of any construction made necessary by the installation of his work except in such instances as may be otherwise assigned by the specifications or shown on the drawings. All cutting, patching and finishing shall be to the satisfaction of the Consultant.
- .2 In areas otherwise unaffected by the work of this contract, trades that are required to disturb existing finishes shall patch the existing surfaces and provide new finishes to the area of the wall or ceiling surface affected. Paint colour shall be selected to match existing. Repainting of entire walls or surfaces is not required unless a reasonable paint match cannot be obtained.
- .3 Existing ceiling tiles and grids shall be removed and replaced as required to permit the work. Ceiling tiles and grids that are damaged, or left with holes shall be replaced with new to match existing.

- .4 All devices required to be removed in existing walls shall have suitable blank cover plates installed.
- .5 Existing concrete structure may contain concealed conduits. The contractor shall retain the services of a qualified concrete imaging company to scan for existing buried services prior to cutting/coring/drilling.
- .6 The Contractor shall provide all sleeves, inserts, hangers, flashings, back boxes, tubs, junction boxes, etc. required for the completion of his work.
- .7 Structural members shall not be cut without the consent of a Structural Engineer. For all necessary cutting, channelling, core drilling, sleeving etc., the Contractor shall provide his own forces and necessary equipment required to complete the electrical installation.
- .8 All concrete bases shall be provided by a Concrete Contractor at this Contractor's expense. Accurate templates, dimensions, details etc. shall be provided by the Contractor for proper location and size.

1.8 Temporary Construction Service

- .1 Connections to site trailers shall be included in contract.
- .2 Provide ESA inspection of all temporary services.
- .3 Maintain all electrical connections throughout the construction period.
- .4 Remove all electrical services at project completion.

1.9 Continuity of Services

- .1 Service power interruptions shall not be permitted. Distribution system power interruptions shall be kept to an absolute minimum. Power interruptions must be coordinated with the Owner and all other trades by the Contractor. Written application for electrical interruptions must be received from the Contractor indicating the date, time and estimated duration of the interruption. Application for approval of the power interruptions must be submitted to the Owner's and Consultants at least two weeks prior to the requested shutdown date.
- .2 Provide all barricades as required.
- .3 If overtime work or temporary wiring provisions are required to maintain services as required herein such work shall be included in the bid amount.
- .4 Operational luminaires are required for nighttime security. Fixtures need to remain operational daily. The Contractor shall ensure fixtures are operational at the end of each day. If this requirement is unattainable, the Contractor shall provide supplemental lighting to compensate.

1.10 Substitutions

- .1 Substitutions will be allowed only if samples are submitted prior to the close of tenders for the Engineer's review and testing.

- .2 No substitution will be allowed unless written acceptance has been obtained from the Engineer before bid closing.

1.11 Shop Drawings

- .1 The Contractor shall submit Shop Drawings to the Project Manager and/or Engineer for review. They shall show in detail the design, construction and performance of all apparatus.
- .2 Shop Drawings shall be submitted electronically in editable Portable Document Format (.PDF). Hard copy (paper) format Shop Drawings shall not be processed and shall be recycled.
- .3 Submissions shall be made in a timely manner after award of the contract. The first progress draw request may not be approved unless all Shop Drawings have been received.
- .4 The Engineer's and/or Project Manager's review of Shop Drawings and manufacturer's specifications is general and is not intended to serve as the final check. It shall not relieve the Contractor from responsibility for errors.
- .5 Before submission, the Contractor shall check all Shop Drawings for accuracy of details, dimensions etc. Do not proceed with work on any item for which shop drawing review has not been performed by the Engineer.
- .6 Any deviations whatsoever from the materials and methods specified herein must be clearly outlined in writing and such an outline must accompany the Shop Drawings of the proposed deviation.
- .7 All Shop Drawings shall be arranged so that all drawings of a particular system are in one file and are in logical order. Shop Drawings that are submitted individually or are not arranged by system shall be rejected. For example, the lighting system Shop Drawings shall be submitted to include each fixture in order as listed in the "LIGHTING FIXTURE SCHEDULE".
- .8 Any materials that require a colour selection shall have colour samples submitted for Owner/Engineer review and acceptance. Arbitrary colour selection by the supplier is not acceptable. Any item for which a formal colour selection is not submitted and approved will not be permitted on site.
- .9 Shop Drawings outlining all components shall be submitted for the following:
 - a. Lighting fixtures.
 - b. Wiring devices.
 - c. Fire stopping systems.

1.12 Use of Electronic Files

- .1 A waiver must be executed prior to release of any electronic files or digital data.
- .2 Electronic documentation for release may consist of drawing files in formats such as Portable Document Format (.PDF), AutoCAD (.DWG), or Revit (.RVT). Specifications, details, schedules, legends, etc. shall generally not be released.

- .3 Electronic documents shall be used only for the specific use outlined in the waiver. The recipient may use this data for this purpose, at their own risk.
- .4 Copyright and ownership of the data are not transferred to the recipient, nor to any other party. The design professional and/or owner retain all rights to the data.
- .5 Data delivered in electronic form may vary from that contained on copies of previous issues. This information is not guaranteed to be accurate. The method of data transfer cannot be guaranteed to be error free, or compatible with the recipient's hardware, software, or systems. The contractors and any subcontractors are not relieved of their normal responsibilities to independently check, coordinate, and verify information and dimensions, and to familiarize themselves thoroughly with the project. The documents may have been changed or amended by addendums, bulletins, supplemental instructions, shop drawings, other documents, meetings, and understandings not represented on these files.
- .6 The electronic files shall not be used as a substitute for the contract documents. The author offers no warranty or guarantee, express, implied, or statutory as to the accuracy, reliability, suitability, completeness or fitness of this data for a particular purpose. The company in receipt of these files agrees to the fullest extent permitted by law, to defend, indemnify, and hold the author, their directors, officers, partners, employees, harmless from all losses, claims, liabilities, injuries, damages, and expenses, including attorneys' fees and costs of defense, arising out of the use, misuse, misapplication, or misinterpretation of this data.
- .7 The recipient will not distribute the data to any other firm or individual. Redistribution and copying of the digital data without written authorization from the author writing is prohibited.

1.13 As-Built and Record Drawings

- .1 Obtain an extra set of prints, for the job use only, on which to record accurately the location of all outlets and conduit runs etc., and all circuiting of devices, as installed on site. Prior to Substantial Performance, these as-built drawings shall be converted to electronic AutoCAD (release 2006 or later). All associated costs shall be carried in the bid.

1.14 Close-Out Documentation - Maintenance & Instruction Manuals

- .1 Upon project completion, the Contractor shall submit a Maintenance & Instruction Manual as well as as-built drawings. Submit one paper hard copy in a three-ring binder, and one .PDF electronic copy on a suitably sized USB thumb drive. Each manual shall contain the one copy of the following:
 - a. Each Shop Drawing (revised as reviewed by the Engineer).
 - b. Spare Parts Transmittal to the Owners.
 - c. Megger Test Results.
 - d. Each updated panel directory.
 - e. ESA Final Inspection Certificate.
 - f. Written Guarantee (Warranty).
 - g. Sign back of the latest Site Review Report to confirm completion.
- .2 Include for updating the Owner's Continuous Safety Services (CSS) ESA log book for all electrical work.

1.15 Testing

- .1 Provide megger testing as outlined in 26 05 33.
- .2 At or near the completion of the project, the Contractor shall provide acceptance tests to demonstrate that the equipment and systems actually meet the specified requirements. Tests may be conducted as soon as conditions permit. These shall include but shall not be limited to the following:
 - a. Lighting system control.
 - b. Voltage drop measurements.
- .3 Concurrently, written approvals or acceptances by local authorities shall be presented. In testing, vary loads to illustrate start-up, sequence, normal shut down and simulate emergency conditions. Final tests may be conducted in the presence of the Consultant.

1.16 Training

- .1 The Contractor shall arrange for on site instruction and training to the Owners staff on the operation and maintenance of the lighting control system.

1.17 Warranty

- .1 The Contractor shall furnish a written guarantee stating that all work executed under this contract will be free from defects of workmanship and materials for a period of one (1) year from the date of Substantial Performance.
- .2 The period of the guarantee specified above shall in no way supplement any other guarantee of a longer period. Refer to Section 26 50 00 for the lighting material warranty requirements.
- .3 The Contractor will at his own expense, repair and replace all such defective work and other work damaged thereby which fails or becomes defective during the term of the guarantee provided that such failure is not caused by improper use.

1.18 Standards of Materials and Equipment

- .1 Materials and equipment are specifically described and named in this specification and drawings for the purpose of establishing a standard of materials and workmanship to which this Contractor shall adhere and not for the purpose of limiting the selection to those materials and equipment specified.

1.19 Electrical Equipment Approved Equals

- .1 Unless specifically stated otherwise, this project has been designed based on the first named manufacturer of each section in the "ALTERNATE MANUFACTURERS LIST" or that specifically listed in the schedules. If the Contractor chooses to use a manufacturer other than the first named manufacturer, it will be his responsibility to ensure that the alternate is equal in all respects to that of the first named manufacturer. The Engineer reserves the right to approve or reject any alternate based upon his evaluation of the equipment proposed. If only one manufacturer is listed then only that manufacturer shall be acceptable.

1.20 Alternate Manufacturers List

- .1 Contactors
 - a. Eaton
 - b. Schneider Electric
 - c. Siemens
 - d. Allen Bradley

- .2 Photocells
 - a. Intermatic
 - b. NSI Tork

- .3 Fire Stopping Systems
 - a. 3M
 - b. Hilti
 - c. AD Firebarrier
 - d. STI EZ-Path

- .4 Lighting Fixtures (Refer to 26 50 00, 1.2)
 - a. Refer to "LIGHTING FIXTURE SCHEDULE"
 - b. Lithonia
 - c. Hubbell
 - d. Signify (Cooper/Eaton/Philips)
 - e. Cree Lighting

1.21 Access Doors

- .1 Provide access doors for installation for all concealed electrical equipment requiring accessibility for service and maintenance such as junction boxes, pull boxes, relay enclosures, controls, etc. All doors shall be a minimum size of 8" x 8" (200mm x 200mm) and a minimum size of 24" x 18" (600mm x 450mm) where human access is required unless otherwise noted and shall be complete with positive locking self opening screwdriver lock. The exact size of all access doors shall be as recommended by the manufacturer to suit the application.

- .2 Doors shall be manufactured by Acudor or equivalent.

- .3 Provide non-rated access doors for all non rated surfaces and ULC listed and labeled doors for all fire rated surfaces. Door rating to match rating of surface.

- .4 Where possible, items requiring access shall be grouped, and shall be located in easily accessible areas.

- .5 The final locations of all access doors shall meet the approval of the Owner, and shall be accurately outlined on the as-built Drawings.

1.22 Equipment Supplied By Others

- .1 The Contractor shall ensure that all existing equipment is certified by an agency recognized by ESA (CSA, Entela, etc) prior to energization. If such certification is not present, the Contractor shall arrange for special inspection by ESA, and all costs for this extra work shall be paid by the Owner.

1.23 Special Charges

- .1 Any ESA inspection charges shall be included in the project cost and shall be paid for by the Contractor.

1.24 Substantial Performance Certificate

- .1 Before the Contractor can make application for a Certificate of Substantial Performance the following shall be provided:
 - a. Maintenance and Instruction Manuals as detailed above.
 - b. As-Built drawings as detailed above.
 - c. Testing as detailed above.
 - d. Training as detailed above.

1.25 Contractor's Liability Insurance

- .1 The successful bidder is to maintain adequate insurance as specified by the Owner's Standard Form of Contract. This insurance is to firmly protect both himself and the Owners from public liability claims and property damage, and all claims under the Workman's Compensation Act. Evidence of insurance coverage shall be filed and approved.

1.26 Payment Certification

- .1 Submit monthly draws to the consultant for review and certification. Draws shall provide a complete breakdown of project in a manner acceptable to the consultant. Submit sample progress draw form to consultant within one week of award of contract for review and acceptance.

1.27 Extras and Credits

- .1 Only extras and credits approved by the Engineer or his representative will be allowed and must be submitted for approval before such work commences. They shall be priced individually with a complete breakdown clearly indicating labour costs, material cost, mark-up and taxes. Labour rates and material costs for extras and credits shall be identical. Material shall be valued at current trade prices incorporating all discounts. Only the net difference between an extra and a credit will subject to overhead and profit mark-up.

1.28 Spare Parts

- .1 Provide the following components as spare parts:
 - a. One (1) type XA luminaire.
 - b. One (1) type XB luminaire.
 - c. Two (2) LED boards, one of each voltage.
 - d. Two (2) drivers, one of each voltage.

- .2 All spare parts that are not installed shall be handed over to the Owner upon project completion.
- .3 Obtain sign-off by the Owners representative to confirm receipt of all spare parts, accessories and tools. Sign-off shall consist of printed name and signature.

END OF SECTION

1. DEMOLITION

- .1 Ensure that there is adequate lighting for construction throughout the entire construction process.
- .2 The Contractor shall visit the site and examine the existing conditions, and make necessary allowances in his tender price for removal, rerouting, relocation, and reconnecting of equipment as may be necessary for the execution and completion of this project. Extra charges for premium time shall be included in the bid.
- .3 Wiring, conduits, etc., located in areas being altered or demolished, but feeding outlets or equipment required to remain in service shall be rerouted as required to maintain the continuity of these services, to the satisfaction of the Engineer.
- .4 The Contractor shall provide adequate protection to existing equipment throughout the project and particularly where wiring, piping, equipment, etc., have become exposed to mechanical injury or moisture in the course of alterations of new construction.
- .5 Existing equipment being reused shall be checked for proper operation. Reused equipment shall not have any sign of physical abuse or corrosion. Any knockouts removed in existing equipment being reused shall be plugged.
- .6 All wiring made redundant due to demolition/renovation work shall be disconnected and removed to the nearest distribution point upstream that is not affected by demolition/renovation work. All concealed conduit made redundant due to demolition/renovation work may remain provided it does not adversely affect any new installations, unless it is noted to be removed on the drawings. All exposed conduit in finished areas made redundant due to demolition/renovation work shall be removed and the wall patched.
- .7 Asbestos Containing Material (ACM) is not expected to be disturbed in the execution of this contract. Refer to the Owner's Designated Substances Report. However, should ACM be uncovered during the work, notify the Consultant immediately so that appropriate instruction can be given.
- .8 All existing panel directories, zone legends and distribution equipment identification shall be reworked to reflect any changes made by any demolition/renovation work.
- .9 The Contractor shall be responsible to ensure that all existing communications and surveillance systems are undamaged during the course of demolition & renovations.

2. DISPOSAL

- .1 The Contractor will be responsible for the complete removal of all electrical equipment and systems to permit alterations, all as shown and noted on the plans. This includes removal of all such equipment from the site.
- .2 All miscellaneous equipment being removed shall become the property of the Owner unless shown otherwise. If the Owner has no use for it, all material shall be responsibly disposed of, in a timely manner, by the Contractor in accordance with all applicable federal, provincial and municipal acts, bylaws and regulations.

- .3 All appropriate measures to the health and safety of employees and Correctional Service Canada personnel shall be observed.

END OF SECTION

1. PRODUCTS

1.1 Wire and Cable

- .1 Unless indicated otherwise all wiring in areas of non-combustible construction to be CSA approved soft copper, type RWU90 unless otherwise required by the Electrical Code for specific areas or environmental conditions.
- .2 Conductor size serving exterior lighting fixtures shall be #8 minimum unless specifically noted otherwise.
- .3 All wire and cable shall have 600V or 1000V insulation rating.
- .4 All conductors shall have minimum 90°C insulation.

1.2 Conduits, Connectors Fittings and Outlet Boxes

- .1 Standard trade conduit connectors and fittings are acceptable unless noted on the drawings.
- .2 EMT shall be steel set screw type and all terminations must have insulated plastic bushings. EMT shall be electro-galvanized with a zinc coating.
- .3 Provide steel connectors/fittings for all EMT applications. The use of cast connectors/fittings is not permitted.
- .4 All conduit to be fastened to structure with two hole straps wherever possible.
- .5 PVC Type 1 Conduit (Rigid) shall be IPEX Scepter or approved alternate. Conduit shall be FT4 rated.
- .6 Rigid Galvanized Steel Conduit (RGS) shall be hot dipped galvanized (zinc coated) steel, produced to ANSI specification C-80.1, ULC listed complete with threaded ends and couplings.
- .7 All outlet boxes shall be metal. The use of non metallic boxes shall not be permitted.
- .8 Cover plates shall be specification grade type 304 brushed stainless steel.

2. EXECUTION

2.1 Wire and Cable

- .1 All wiring installed in a return air plenum, shall be FT6 (or equivalent) rated or shall be totally enclosed in noncombustible conduits.
- .2 Provide megger testing as follows:
 - a. 3000VDC Megger tests on all XLPE insulated conductors, 15s duration.
 - b. 1000VDC Megger tests on all PVC insulated feeders, 15s duration.
- .3 Cable voltage drop shall conform to Section 8 of the Electrical Safety Code.

- .4 Armored cable (BX) may be used in metal stud partition walls, and in concrete block walls. Cable length shall not exceed 1.8m (72") horizontally in accessible ceilings. BX cable shall under no circumstances be run exposed.
- .5 Connections to fixtures shall be flexible and of sufficient length to permit the equipment to be moved for servicing or housekeeping.
- .6 There shall be one neutral conductor for each phase conductor in a branch circuit. Sharing of neutrals shall not be permitted.

2.2 Conduit Raceways and Fittings

- .1 EMT shall be used for interior applications. Surface mounted EMT is only permitted on existing finished walls only in areas where there is existing surface mounted EMT within 24" (600mm). Otherwise, conduit shall be concealed within existing building construction.
- .2 Rigid PVC (IPEX Scepter or approved alternate) raceways shall be used in or below concrete slabs, for direct burial, or exposed exterior surface applications. Conduit shall be FT4 rated.
- .3 EMT conduit shall be permitted above and below surface mounted panels.
- .4 Exposed or concealed conduits above ceilings shall be run in straight lines parallel to building structure. Diagonal runs will not be permitted.
- .5 Provide 9mm (3/8") polypropylene pull rope and pulltape in all empty conduits 53mm (2") and larger.
- .6 Provide nylon pull tape in all empty conduits smaller than 53mm (2").
- .7 Securely fasten pull rope/tape in empty conduits/raceways at each end.
- .8 Pull tape shall be Neptco WP900P, 0.5" (13mm) wide, 900lb (409kg) pull strength, lubricated, with sequential metric distance markings.
- .9 Flexible conduit shall not be run exposed except where required as final connections to equipment.
- .10 Minimum cover for direct buried raceways shall conform to Table 53 of the OESC.
- .11 Conduits and cables shall not enter an exit stair shaft, unless they serve devices/fixtures within the exit stair, i.e., route all conduits and cables around the stair to maintain the integrity of the exit.
- .12 Outlet boxes located in areas normally accessible to building occupants shall have no exposed knockouts. Support all boxes independently of connecting conduits.
- .13 All surface mounted raceways shall be painted by the Contractor to match the colour of the surface upon which it is installed.

2.3 Fire stopping

- .1 Provide fire stop sealant / devices of a type to suit piping, building construction, opening size, etc. Supply and install according to manufacturers detailed installation instructions.

END OF SECTION

1. SITE PREPARATION

1.1 Excavation, Backfilling, etc.

- .1 The Contractor shall be responsible for all trenching pertaining to his work and shall arrange and pay for this trenching.
- .2 After award of contract, the successful contractor shall be provided with a copy of plots outlining of underground piping and electrical.
- .3 Correctional Service Canada will provide access and an escort so that the Contractor may provide all locates inside the property.
- .4 Prior to any excavation, contractor to coordinate with Correctional Service Canada personnel to apply "Paint on the Ground".
- .5 If locates are required outside the property, the Contractor shall be responsible for obtaining all locates from the various utilities to ensure that new installations will not interfere with existing underground services and shall be responsible for any damages thereto.
- .6 The Contractor shall exercise extreme care when installing underground services to minimize damage to landscaped areas and roadways/sidewalks etc. The Contractor shall be fully responsible for the restoration of lawns, sidewalks, roadways, landscaped areas, etc. to the original condition. Report any obvious flaws in existing surfaces prior to excavation.
- .7 A photographic record of existing conditions is recommended, prior to any site work.
- .8 Grassed areas shall be re-sodded, not seeded.
- .9 Provide a 6" (150mm) wide polyethylene yellow warning tape with the message "DANGER - BURIED ELECTRICAL CABLES" at 12" (300mm) below finished grade continuously along all conduits, covering the entire width of the duct bank with max spacing of 24" (600mm) as indicated on the drawings.
- .10 All trenching shall be to the approval of the Consultant. Bottoms of trenches for electrical conduits shall be leveled with a 3", (75mm) sand bed. All trenches shall be backfilled. This backfilling to be compacted to 95% proctor.
- .11 Asphalt patch to consist of 1.5" (40mm) of HL3 surface asphalt over 1.5" (40mm) of HL4 asphalt binder course. The granular's below the asphalt patch within the trenching areas are to consist of 6" (150mm) of granular "A" over 12" (300mm) minimum of granular "B" compacted to 100% proctor. Saw cut the existing asphalt to provide a clean edge for the new asphalt patch.
- .12 Unless noted otherwise, all concrete for the bases shall be 25MPa.

1.2 Flush In-Grade Boxes

- .1 Channell BULK4 24x36x30" box with ribbed body and composite anti-slip, bolt down cover suitable for 150kN.
 - a. TIER 22 load rating suitable for driveway, parking lot applications.

1.3 Bollards

- .1 Bollards shall be 150mm (6") diameter schedule 40 steel pipe, 2400mm (96") long painted with yellow rust inhibiting paint. Install with 20MPA concrete base to a depth of 1200mm (48"). Fill with 20MPA concrete and provide a rounded top. Bollards required where indicated on the drawings.
- .2 Provide polyethylene bollard cover, Sureguard or equal, colour by Owner. Coordinate exact location of bollards with Owner/Engineer prior to installation and adjust to suit.

END OF SECTION

1. GENERAL

- .1 All equipment/circuits/devices that reference room names or numbers shall be modified as required to reflect the finalized Owner designated room names/numbers. Do not duplicate the room numbers indicated on the drawings.
- .2 Provide all nameplates for devices such as contactors, HOA switches, etc.
- .3 Nameplates shall be a stock white lamacoid , with black lettering and with beveled edges.
- .4 Nameplates shall be mechanically fastened with tamperproof screws. Nameplates that are fastened with adhesives only shall not be acceptable.
- .5 Provide all warning signs and labels as required by the ESA.
- .6 Provide typed directory cards in all new and revised distribution panels. Hand written directory cards are not acceptable.
- .7 All junction boxes shall be identified with black indelible marker showing the systems with which they are associated. Where boxes are exposed, identification shall be on the inside of the cover.

END OF SECTION

1. PRODUCTS

1.1 Photocells

- .1 Intermatic EK4236S.
 - a. Stem mount with swivel.
 - b. Voltage: 105-305 VAC, 50/60Hz.
 - c. Current Rating: 6 Amps.
 - d. Operating ambient temperature range: -40°F to 158°F (-40°C to 70°C).
 - e. Instant turn ON light level 1.5fc (16.15 lux).
 - f. OFF light level: 2.25fc (24.22 lux).

END OF SECTION

1. PRODUCTS

1.1 General

- .1 The Contractor shall provide the distribution equipment required for the complete installation.
- .2 All distribution equipment shall have tested and approved series ratings for fault currents and shall have identifying labels.
- .3 All distribution equipment shall have lugs with termination temperatures rated at 75 deg C minimum.

1.2 Breakers

- .1 Unless indicated otherwise, breakers shall be moulded case type, thermal-magnetic, ambient temperature compensated, of the frame size and with trip settings as indicated on the drawings. Breakers mounted in panels shall be bolt-on type.
- .2 All breakers shall be fully rated for the existing fault current levels. Alternatively all breakers shall have tested and approved series ratings for the existing fault current levels and shall have identifying labels.
- .3 New breakers in panel 'DP1' shall have an interrupting rating of 22kA at 240V.

1.3 Contactors

- .1 Lighting contactors shall be Eaton C30CN series with coil voltage, contact rating and number of poles to suit.

1.4 Grounding & Bonding

- .1 Include grounding and bonding as required by Electrical Safety Authority Inspection Department.

END OF SECTION

1. PRODUCTS

1.1 General

- .1 Supply and install lighting with all accessories and lamps as shown in "LIGHTING FIXTURE SCHEDULE," and as described.
- .2 Submit Shop Drawings containing the following information:
 - a. picture of fixture, fixture model number, fixture colour.
 - b. lens data, mounting details, photometric data.
 - c. fixture manufacturer (include address and telephone number).
 - d. Pole manufacturer, pole dimensions, colour, finish, EPA ratings, max loading etc.
- .3 No allowance or change in fixture type will be permitted for the failure of the Contractor to allow sufficient time for the delivery of the fixtures when required to the site. Should the approved fixtures not arrive on time, the Contractor shall supply and install temporary fixtures at no cost to the Owner and shall replace same with the approved fixtures when they arrive and make good all surfaces disturbed by this operation.

1.2 Alternative Fixtures

- .1 Any alternative fixtures proposed shall be demonstrated to provide an acceptable level of performance, construction and appearance to that of the units specified.
- .2 Post tender award, lighting simulations shall be prepared by the alternative manufacturer at their expense and submitted to the Engineer for review. After evaluation, if the alternate is deemed by the Engineer to be unacceptable, the alternative fixtures will be rejected and the equipment specified is to be provided.

1.3 Solid State (LED) Lighting

- .1 Warranty
 - a. Luminaires shall be provided with a ten (10) year warranty covering all components including LEDs, drivers, paint and mechanical components. Provide an extended warranty as required to meet this duration.
- .2 Quality Assurance
 - a. Luminaires shall be of uniform quality and appearance.
 - b. Manufacturers of LED luminaires shall demonstrate a suitable testing program incorporating high heat, high humidity and thermal shock test regimens to ensure system reliability and to substantiate lifetime claims.
 - c. The LED fixture assembly/manufacturing facility shall be ISO 9001 certified and produce product in compliance to RoHS.
 - d. At time of manufacture, electrical and light technical properties shall be recorded for each luminaire. At a minimum, this should include lumen output, CCT, and CRI. Each luminaire shall utilize a unique serial numbering scheme. Technical properties must be made available for a minimum of 7 years after the date of manufacture.

- e. A Lighting Facts label, as established by the United States Department of Energy, is required for all products.

.3 Material and specifications for each luminaire are as follows:

- a. Each Luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete Luminaire shall consist of a housing, LED array, and electronic driver (power supply).
- b. Each Luminaire shall be rated for a minimum operational life of 60,000 hours of operations at an average operating time of 10.5 hours.
- c. The rated operating temperature range shall be -40°C to +50°C.
- d. Photometry must be compliant with IESNA LM-79-08 and shall be conducted at 25°C ambient temperature.
- e. Each Luminaire shall meet all parameters of this specification throughout the minimum operational life when operated at the average nighttime temperature.
- f. The individual LEDs shall be constructed such that a catastrophic loss or the failure of one LED will not result in the loss of the entire Luminaire.
- g. Luminaire shall be constructed such that LED modules may be replaced or repaired without replacement of whole Luminaire.
- h. Each Luminaire shall be listed with CSA or cUL under UL1598 for luminaires.

.4 Electrical Requirements

- a. Maximum power consumption allowed for the Luminaire shall be determined by application. The Luminaire shall not consume power in the off state.
- b. The Luminaire shall operate from a 60 HZ \pm 3 HZ AC line over a voltage ranging from 108 VAC to 350 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output.
- c. The Luminaire shall have a power factor of 0.90 or greater.
- d. Total harmonic distortion (current and voltage) induced into an AC power line by a Luminaire shall not exceed 20 percent.
- e. The Luminaire on-board circuitry shall include surge protection devices (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference.
- f. The LED circuitry shall prevent visible flicker to the unaided eye over the voltage range specified above.
- g. LED Drivers must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.
- h. Drivers shall have a Class A sound rating.
- i. Provide single integral fuses for all 120V or 347V exterior lighting fixtures.
- j. LED fixtures operating at 347V shall include a 347V driver. Provision of a step-down transformer within the fixture is not acceptable.

.5 Photometric Requirements

- a. Optical assemblies shall have a minimum efficiency of 85% regardless of distribution type. All optical assemblies will be mounted parallel to the ground, aimed in the same direction and shall provide the same optical pattern such that catastrophic failures of individual LEDs will not constitute a loss in the distribution pattern.

- b. All photometric data will be measured by the IESNA LM-79-08 standard and formatted per IESNA LM-63-02 as an electronic .ies file.
- c. The illuminance shall not decrease by more than 30% over the expected operating life. The measurements shall be calibrated to standard photopic calibrations.
- d. The luminaire shall have a correlated colour temperature (CCT) range of 4,000K to 4,500K. The colour rendition index (CRI) shall be 80 or greater.
- e. Exterior luminaires shall not allow more than 10 percent of the rated lumens to project above 80 degrees from vertical. The Luminaire shall not allow more than 2.5 percent of the rated lumens to project above 90 degrees from vertical. Backlight and Glare ratings as per calculated per IESNA TM-15.
- f. All exterior fixtures shall conform to the IESNA definition for full cutoff optics. Fixtures shall have no uplight and shall have reduced high angle brightness.

.6 Thermal Management

- a. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the Luminaire over the expected useful life.
- b. The LED manufacturer's maximum thermal pad temperature for the expected life shall not be exceeded.
- c. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.
- d. The Luminaire shall have a minimum heat sink surface such that LED manufacturer's maximum junction temperature is not exceeded at maximum rated ambient temperature of 40 degrees Celsius (supply Heat test).
- e. The heat sink material shall be aluminum.

.7 Physical and Mechanical Requirements

- a. The Luminaire shall be a single, self-contained device, not requiring on-site assembly for installation. The power supply for the Luminaire shall be integral to the unit.
- b. The assembly and manufacturing process for the LED Luminaire shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.
- c. The optical assembly of the exterior luminaire shall be protected against dust and moisture intrusion per the requirements of IP-66 (minimum) to protect all optical components.
- d. The electronics/power supply enclosure shall be protected against dust and moisture intrusion per the requirements of IP-65 (minimum).

.8 Materials for Exterior Fixtures:

- a. Housings shall be fabricated from materials that are designed to withstand a 2000 hour salt spray test as specified in ASTM Designation.
- b. Each refractor or lens shall be made from UV inhibited high impact plastic such as acrylic and be resistant to scratching.

1.4 Poles

- .1 All poles shall be straight, round steel (SRS).

- .2 The interior and exterior surfaces of the poles shall be hot dipped galvanized in accordance with ASTM A123, latest edition.
- .3 Provide powder coat paint over hot-dipped galvanized steel. Colour to match fixture.
- .4 Length as indicated on the drawings.
- .5 Provide pole base cover.
- .6 Pole finish shall be guaranteed against corrosion by the manufacturer for a period of not less than ten years.
- .7 Provide hot dipped galvanized anchor bolts and hardware accessories.
- .8 Poles shall have the following characteristics:
 - a. EPA rating exceeding that of the fixtures installed with a 50% minimum safety factor.
 - b. Wind rating of 80mph sustained wind force with a 30% gust factor.
 - c. Capable of holding the weight of the luminaries with a factor of safety of 1.5 and shall have a minimum rating of 125 lbs (57kg).

2. EXECUTION

2.1 Lighting

- .1 Provide all fastenings, supports etc. to install in an appropriate and approved manner.
- .2 The location of fixtures as shown on the drawings are approximately correct, but the Consultant reserves the right to alter the location of any number of them up to 10'-0", (3.0m) without incurring extra costs, provided the request is made before the fixture is installed.
- .3 Pole mounted fixtures shall have concrete bases that extends a minimum of 1.5m below grade. Bases shall be installed in undisturbed native ground with holes augured to match the width of the base. Where undisturbed native ground is not present, the area within 24" (610mm) around the exterior of the base must be excavated and backfilled with stone dust material, compacted to 98% proctor in 6" (150mm) lifts. Pole bases shall have 2" (50mm) wide by 1" (25mm) deep drainage groove across the top face for drainage. Top edge shall have 1" (25mm) chamfer.
- .4 Refer to specification Section 26 05 00 for provision of spare parts.

END OF SECTION