SPECIFICATIONS

FOR

Cardigan Elementary School

IT Consolidation

Cardigan, Queens County, PEI

Project 080-16096

Prepared by:

PEI Department of Transportation, Infrastructure and Energy

November, 2016

ELECTRICAL

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APPENDIX A

Government of Prince Edward Island Structured Cabling Standards 06

DRAWINGS

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1. GENERAL

All bidders submitting tenders for this work shall first examine the site and all conditions thereon and/or therein. All tenders shall take into consideration all such conditions as may affect the work under this contract, no claims for extras resulting from conditions existing at the time of tender will be accepted by the Owner.

2. SITE VISIT

There will be a recommended site visit held, 6th December, 2016, at 10:00 a.m.Contractors are asked to meet outside the main entrance of the building.

END

Sealed tenders will be received at the Public Works and Planning Division of the Department of Transportation, Infrastructure and Energy until 2 P.M., Local Time, on December 13th 2016. Tenders are to be clearly marked to indicate the project being tendered on.

Cardigan Elementary School - IT Consolidation, Cardigan, Queens County, PEI

Scope of Work:

.1 This Contractor is the Prime Contractor and is responsible for the following:

- .1 Supply and installation of conduit sleeves and required fire sealing;
- .2 Supply and install new data cabling “J” hooks as indicated on the drawings;
- .3 Supply and install new data cabling and outlets as indicated on the drawings, including the labeling of the cabling at outlet and rack end;
- .4 Supply and install new data cabling patch panels and horizontal wire manager to accommodate new cabling;
- .5 Supply and installation of the surface mounted nonmetallic raceway and outlet boxes, as indicated. One raceway and box for power and one raceway and box for data;
- .6 Supply and install surface mounted receptacles as indicated;
- .7 Testing of data cabling;
- .8 Wireless Access Points are supplied and installed by ITSS;
- .9 This Contractor is financially responsible to obtain a subcontractor for the:
  - .1 Construction of a partition wall to create a chase from the upper level to the lower level;
  - .2 Cleaning, wall repair and painting associated with the installation of the new wall.

Drawings and Specifications may be obtained from the Department of Transportation, Infrastructure and Energy - 3rd Floor Jones Building, 11 Kent Street, Charlottetown, P.E.I., on a cheque deposit of $100.00 (refundable if documents are returned in good condition within 14 days from date of Tender Closing) made out to The Department of Transportation, Infrastructure and Energy.

Drawings and Specifications are available for viewing at the Construction Association offices in Charlottetown, Moncton, Saint John, Fredericton and Halifax.

Refer to Instructions to Bidders for Bid Security and Contract Security requirements.

Tenders will be opened at the above advertised time and place and Bidders are invited to be present at the opening. Lowest or any Tender will not necessarily be accepted.

Any additional information can be obtained by contacting **Regan MacLellan, at 902-368-4831 or fax 902-569-0590.**

END

1. GENERAL

a) The Tender Documents including General conditions of Contract, the Instructions to Tenderers, Specifications, Tender Form and Drawings are all complementary and shall be read together.

b) Each Tenderer shall examine the Tender Documents as soon as possible after receipt thereof and should he or she discover any errors or omissions therein, he or she shall notify the Department as soon as possible and at least seven (7) days prior to the date set for receiving tenders so that further instructions and/or drawings may be issued to all Tenderers before the date set for receiving tenders.

2. ADDENDA

a) Tenders may, during the tendering period, be advised by addenda of required additions to, deletions from, or alterations to the requirements of the tender documents. All such changes shall become an integral part of the Tender Documents and shall be allowed for in arriving at the fixed sum tender figure.

3. BID AND CONTRACT SECURITY

BID SECURITY

a) Each Tender submitted shall be accompanied by the following security:

.1 General Contract Tender less than or equal to Three Million ($3,000,000.00) Dollars, including mechanical and electrical subcontract values:

A Bid Bond equal to at least ten percent (10%) of the Tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount.

OR

A Security Deposit equal to at least ten percent (10%) of the Tender amount.

.2 General Contract Tender more than Three Million ($3,000,000.00) Dollars, including mechanical and electrical subcontract values:

A Bid Bond equal to at least ten percent (10%) of the Tender amount and a Letter of Surety from a bonding company guaranteeing to supply a Performance Bond in the amount of fifty percent (50%) of the total contract amount and a Labour and Material Payment Bond in the amount of fifty percent (50%) of the total contract amount.

b) .1 All Bonds and Letter of Surety, provided by General Contractors, made payable to the Owner.

.2 Bonds and Letters of Surety supplied by the General Contractor to the Owner shall be from a recognized surety company, satisfactory to, and approved by the Owner.

c) .1 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a Credit Union, payable to the Owner.

OR

.2 Bond of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:

(a) Payable to the bearer, or

(b) Accompanied by a duly executed instrument of transfer to the Owner, in the form prescribed by the Domestic Bonds of Canada Regulations, or

(c) Negotiated as to principal or as to principal and interest in the name of the Owner, pursuant to the Domestic Bonds of Canada Regulations.

d) Security deposits submitted through the Bid Depository shall be accompanied by the Bid Security. The subcontractors shall advise General Contractors what form of bid security is being used and what form of contract security will be used.

CONTRACT SECURITY

a) Upon award of a contract the Contractor is to provide the following contract security:

.1 General Contract Tender less than or equal to Three Million ($3,000,000.00) Dollars, including mechanical and electrical subcontract values:

A Performance Bond in the amount of fifty percent (50%) of the contract amount.

OR

A Security Deposit in an amount equal to at least ten percent (10%) of the contract amount.

.2 General Contract Tender more than Three Million ($3,000,000.00) Dollars, including mechanical and electrical subcontract values:

A Performance Bond and a Labour and Materials Payment Bond, each in the amount of fifty percent (50%) of the contract amount.

b) .1 All bonds, provided by General Contractors, are to be made payable to the Owner.

.2 Bonds shall be from a recognized surety company, satisfactory, and approved by the Owner.

.3 If a Performance Bond is utilized, it shall be maintained in force for a period of not less than twelve (12) months after the issuance of the total Performance Certificate.

c) .1 Security Deposits, provided by General Contractors, must be in the form of a Certified Cheque or Bank Draft drawn on a Bank to which the Bank Act applies or a Credit Union, payable to the Owner.

OR

.2 Bonds of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:

(a) Payable to the bearer, or

(b) Accompanied by a duly executed instrument of transfer to the Owner, in the form prescribed by the Domestic Bonds of Canada Regulations, or

(c) Negotiated as to principal or as to principal and interest in the name of the Owner pursuant to the Domestic Bonds of Canada Regulations.

(d) Contract security shall be provided at the expense of the Contractor, bonds shall be provided by an established surety company satisfactory to, and approved by the Owner. Certified Cheques or Bank Drafts shall be drawn on an account with a recognized financial institution.

(e) Contract security submitted by subcontractors, to General Contractors, shall be in a form satisfactory to the General Contractor.

4. CONSTRUCTION SCHEDULE

1. Work to begin immediately after tender is awarded.

2. The completion date for this project shall be **February 28, 2016**.

3. Contractor to provide a construction schedule, safety policy and proof of insurance prior to starting work.

4. **The Contractor is expected to work typically between the hours of 7:00 am and 7:00 pm Monday through Friday. Work may also be done during the weekends.**

5. MATERIALS AND EQUALS

1. Materials, plant and equipment are described and named specifically in the Specifications ONLY to describe types and qualities of materials, plant and equipment required.

2. Suppliers or manufacturers wishing to have their material, plant or equipment approved as an equal shall submit complete technical information to the Consultant seven (7) days prior to the receipt of tenders. The Consultant shall review the material submitted and notify all prospective bidders of any materials, plant or equipment that have been accepted as equal.

3. All bidders submitting a tender shall include in their tender amount only materials, plant or equipment as specified or that have been approved as an equal.

6. ALTERNATE PRODUCTS

1. Approval may be given by the Consultant after the award of the Contract, on application in writing from the contractor, for the substitution of a similar material, item or plant or equipment bearing another brand name or of other manufacture, subject to the following:

    a. Any top quality material or item of plant and equipment proposed as a substitute by the Contractor and considered by the Engineer to be of equal quality, value

and price to that specified and suitable for the purpose intended, may be accepted as a substitute.

b. Materials and items of plant and equipment which the Contractor proposes as substitutes and which are considered by the Engineer to be suitable for the purpose intended, but which are in his or her opinion of lesser value, quality and price than those specified will only be accepted as substitutes if reasonable credits are allowed for their use.

c. Requests for alternates must be made by the Contractor well in advance of the time the item is to be ordered. The request shall be accompanied by sufficient information in the form of manufacturer's literature, samples, and other data to permit proper investigation of the substitutes proposed.

2. Bidders are requested to include information on alternates as an appendix to this tender. The information should indicate the proposed credit or extra, to the tender amount, and include sufficient data to allow the Consultant to evaluate the item proposed as an alternate.

7. SUPERVISION AND COORDINATION

1. The Contractor shall be responsible for supervising and coordinating all aspects of the work.

2. The Contractor shall include in his or her quotation all cost relative to supervising sub-contractors, including those submitting tenders directly to the Owner, which form a portion of the complete project and shall be assigned to the successful General Contractor.

8. RESPONSIBILITY

1. The Contractor shall be responsible to be fully familiar with the complete documents and shall include in his or her tender those items which are named, implied, or traditionally a part of the general contract work.

9. DEFINITIONS

In this specification the following terms shall have the definitions noted below:

OWNER: Government of Prince Edward Island
CONSULTANT: EA Engineering Inc.

10. SITE INSPECTOR

1. There will be an Inspector representing the Department of Transportation, Infrastructure and Energy, Province of PEI. No work is to be covered without having received approval from the Inspector. The Inspector will have the authority to cause any part of the work to cease, should, in his or her opinion, there be a cause to do so.

   This work shall be examined by the Department and approval granted to resume when a satisfactory solution has been found.

2. The inspector does not have authority to authorize changes to work. He or she shall confer with the Consultant or Engineer who, if necessary will authorize any change.

3. The fact that the inspector does not reject any work shall not remove the responsibility for completing all work as specified; from the Contractor.

11. OWNERS RIGHT TO TERMINATE CONTRACT

1. The owner reserves the right to remove the contractor from the site if the work is not completed as specified in Paragraph 4. If the contractor is removed, the Owner shall have the work completed and deduct the cost of this work from the amount owing the contractor and his or her bid deposit.

12. SUB-CONTRACTORS

1. The bidder shall include with his or her tender, in the space designated for that purpose, the names of each Sub-Contractor included in his or her tender, reserving however, the right to substitute other Sub-Contractors for any trade in the event that the listed sub-contractor declares bankruptcy after the date of close of the tenders. Any such substitution shall be subject to the approval of the Owner and contingent on evidence of bankruptcy satisfactory to the Owner.

2. “OWN FORCES” is acceptable only where the bidder can demonstrate that he or she has the resources to carry out the work so designated. Bidders are required, if so requested, to provide information relevant to experience and personnel which will demonstrate to the satisfaction of the Owner that a Sub-Contractor is qualified to perform the work of a particular sub-contract.

3. All Sub-Contractors are advised to become familiar with all Specifications and Drawings. The General Contractor shall ensure that all sub-trades understand their entire responsibilities in order to complete the project. Sub-trade work may appear in various sections of Specifications and on various drawings.

13. GUARANTEES

1. The Contractor shall be required to guarantee the work of this Contract for a period of twelve (12) months after the Owner's acceptance of the work, against improper or defective materials and workmanship, and shall repair and make good at his or her own expense any damage to the building and contents through any of the above causes during this period. Any contract omissions and/or deficiencies reported to the Contractor within twelve (12) months after acceptance of the work shall be made good by the Contractor at his or her own expense.

2. Notwithstanding the above, the bidder's attention is directed to the fact that certain individual items on this project may be required to be guaranteed by the manufacturer for periods in excess of twelve (12) months. These specific requirements are to be found in various sections of the Specifications for this project.

14. REJECTION OF TENDERS

The Owner reserves the right to reject any and all tenders.

15. CONSULTANT'S INTERPRETATION

The Consultant's interpretation of plans and specifications shall be final. Should the Contractor have any doubt as to interpretation, he or she shall refer to the Consultant for clarification before submitting his or her tender. No allowances or extras will be made for misinterpretation of plans and specifications by the Contractor.

16. PERMITS, REGULATIONS AND TAXES

1. All permits and fees required for the proper completion and inspection of the work herein specified will be paid for by the Contractor. All applicable taxes shall be included in the tender price, excluding the Harmonized Sales Tax. The Contractor, as per current Provincial Regulations, shall include on all invoices the Harmonized Sales Tax as an additional line item. This would be in addition to the tender amount which does not include HST.

2. The work shall be completed to the satisfaction of the Consultant and local inspecting authorities.

3. In the absence of any provisions contained herein, the applicable Provincial Codes or the National Building Code shall govern in that order.

4. The latest edition of the Canadian Electrical Code shall govern all Electrical work, whether prewired and/or assembled remote from the site or not.

5. All equipment supplied or installed shall be CSA approved for the intended use.

6. All materials, components and equipment as well as construction methods shall comply with the latest edition of the National Building Code and all other applicable codes or regulations.

7. The latest edition of the PEI Occupational Health and Safety Act and Regulations shall govern safe construction practices.

17. EXISTING CONDITIONS

1. Bidders will be held to have examined the Tender Documents, to have visited the site and to have informed themselves as to existing conditions and limitations.

2. If in the performance of the contract, subsurface or latent conditions at the site are found to be materially different from those indicated by the drawings and specifications, or unknown conditions not usually inherent in work of the character shown and specified, the attention of the Consultant shall be called immediately in writing to such conditions before they are disturbed. Upon such notice, or upon his or her own observation of such conditions, the Consultant shall promptly make such changes in the drawings and specifications as he or she finds necessary to conform to the different conditions and any increase or decrease in the cost shall be adjusted as provided under “Changes in the Work”.

18. RECEIPT AND OPENING OF TENDERS

Tenders will be opened at the time and place stated in the tender call. The officer whose duty it is to open them will decide when the specified time has arrived. No responsibility will attach to any officer for the premature opening of a bid not properly addressed and identified.

19. AWARD OF CONTRACT

1. If the tender is accepted the Contract will be awarded as promptly after the opening of bids as is possible. The selection of the tender that is accepted shall be at the sole discretion of the Owner.

2. Each bidder shall be prepared, if so requested by the Owner, to present evidence of his or her experience, qualifications and financial ability to carry out the terms of the contract.

20. TENDER SUBMISSION

1. Tenders must be submitted on the form included with this specification. This form must be completely filled out in ink, or be typewritten with the signature in longhand. The completed forms shall be without interlineation, alteration or erasures.

2. The tender, together with the Tender Security described in this section must be addressed and delivered in a sealed envelope marked "Tender" and bearing the name of the Contractor submitting the tender, together with identification indicating the name of the project.

3. Tenders will be received at the place and time indicated in the tender call. Late tenders will not be accepted and will be returned unopened to the tenderer.

4. Amendments to the submitted offer will be permitted if received in writing prior to Tender closing and if endorsed by the same party or parties who signed and sealed the offer. Amendments submitted by fax will be accepted, if received prior to tender closing. (Fax (902) 569-0590).

5. The receipt of addenda for the project shall be acknowledged by filling in the addendum number and date of issue for each addendum on the appropriate line in the tender form. These lines shall be initialed by the person signing the tender after they have been filled in.

6. Any appendices to the tender form requesting information on suppliers, sub-contractors or alternate prices shall be filled in for the tender to be considered complete.

21. TAXES

All tenders submitted shall EXCLUDE the Harmonized Sales Tax.

22. CONFIDENTIALITY AND FREEDOM OF INFORMATION (Effective November 1, 2002)

1. By submitting your bid, you agree to disclosure of the information supplied, subject to the provisions of the Freedom of Information and Protection of Privacy (FOIPP) Act.

2. Anything submitted in your bid that you consider to be "confidential information" because of its proprietary nature should be marked as "CONFIDENTIAL", and will be subject to appropriate consideration under the *Freedom of Information and Protection of Privacy Act.*

3. During the delivery and installation of goods and/or services, you may have access to confidential or personal information. Should this occur, you must ensure that such information is not released to any third party or unauthorized individual.

4. Any information provided on this contract may be subject to release under the *Freedom of Information and Protection of Privacy Act.* You will be consulted prior to the release of any information.

END

I N D E X

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7. Ownership of Drawings & Model
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38. Damages & Mutual Responsibility
39. Separate Contracts with Other Contractors
40. Assignment
41. Subcontracts
42. Relations of Contractor and Sub-Contractor
43. Arbitration
44. Owner Signing Authority

1. DEFINITIONS

a) The Contract Documents shall include instructions to Tenderers, General conditions, Supplementary General conditions, Specifications, Drawings, Tender Form and the signed agreement.

b) The Owner, the Contractor and the Consultant are those names as such in the Agreement and Specifications.

c) The term 'Subcontractor' includes only a person, firm or corporation having a contract for the execution of a part or parts of the work included in the Contract, and a person, firm or corporation furnishing material called for in the Contract and worked to a special design according to the Drawings or Specifications, but does not include one who merely furnishes material not so worked.

d) The term 'work' includes all labour, materials and services required, as shown or described in the contract, documents, supplied and installed or erected complete at the place of building.

e) The term 'Other Contractor' means any person, firm or corporation employed by or having a contract directly or indirectly with the Owner otherwise than through the Contractor.

f) The place of building is the designated site or location of the completed work.

g) The law of the place of building shall govern the work.

h) For the purpose of contract signing authority, the Director is the Director of the Public Works and Planning Division of the PEI Department of Transportation, Infrastructure and Energy.

2. DOCUMENTS

a) The contract documents shall be signed in duplicate by the Owner and Contractor. The Contract documents are complementary and what is called for by any one shall be as binding as if call for by all. The intention of the documents is to include all labour and materials reasonably necessary for the proper execution of the work. It is not intended however, that materials or work not covered by or properly inferable from any heading, section or trade in the specifications shall be supplied unless shown on the drawings. Descriptions of materials or work in words which so applied have well known technical or trade meanings shall be held to refer to such recognized standards. Should the specification conflict with the drawings, the specifications shall govern. In the case of discrepancies between drawings, those of larger scale, or if the scales are the same, those of later date shall govern.

All drawings and specifications shall be interpreted in conformity with the agreement and these general conditions which shall govern.

3. DETAIL DRAWINGS & INSTRUCTIONS

The Consultant shall furnish as necessary for the execution of the work, additional instructions, by means of drawings or otherwise. All such additional instructions shall be consistent with the contract documents. The work shall be executed in conformity therewith and the Contractor shall do no work without such additional instructions. In giving such additional instructions, the Consultant shall have authority to make minor changes in the work, not inconsistent with the Contract.

If either the Contractor or the consultant so request, they shall jointly prepare a schedule, subject to change from time to time in accordance with the progress of the work fixing the dates at which the various detail drawings will be required and the consultant shall furnish them in accordance with this schedule, and on like request, a schedule shall be prepared, fixing the dates for the submission of shop drawings, for the beginning of manufacture and installation of materials and for the completion of the various parts of the work.

4. COPIES FURNISHED

The Consultant shall furnish to the Contractor, without charge, as many copies of all Drawings and Specifications as are reasonably necessary for the proper execution of the work.

5. SHOP DRAWINGS

The Contractor shall furnish to the Consultant, at proper times, all shop and setting drawings or diagrams which the Consultant may deem necessary in order to clarify the details of the work. The Contractor shall make any changes in such drawings or diagrams which the Consultant may require consistent with the Contract, and shall submit sufficient copies of the revised prints to the Consultant for approval – all but one of which shall be returned to the Contractor if approved by the Consultant. When submitting such shop and setting drawings, the Contractor shall notify the Consultant in writing of changes made therein from the Consultant's Drawings or Specification. The Consultant's approval of such drawings or of the revised drawings shall not relieve the Contractor from responsibility for errors made by the Contractor therein or for changes made from the Consultant's Drawings or Specifications not covered by the Contractor's written notification to the Consultant.

6. DRAWINGS AND SPECIFICATIONS ON THE WORK

The Contractor shall keep one cope of all Drawings, Specifications and approved shop drawing on the work, in good order, available to the Consultant and to his or her representatives.

7. OWNERSHIP OF DRAWINGS AND MODELS

All drawings, specifications and copies thereof and all models furnished by the Consultant are his or her property. They are not to be used on other work and, with the exception of the signed contract set of the Drawings and Specifications, are to be returned to him or her on request on the completion of the work. Any models furnished by the Contractor or the Owner are the property of the Owner.

8. SAMPLES

The contractor shall furnish for the Consultant's approval such samples as he or she may reasonably require. The work shall be in accordance with approved samples.

9. MATERIAL TESTS AND MIX DESIGNS

The contractor shall furnish for the Consultant's approval such material tests and mix designs as he or she may reasonable require. The cost of providing the foregoing beyond the extent called for in the specification shall be charged to the Owner. The work shall be in accordance with approved material tests and mix designs.

10. CONSULTANT AND CONTRACTOR

The Consultant is, in the first instance, the interpreter of the Contract and the judge of its performance; he or she shall use his or her powers under the Contract to enforce its faithful performance by both parties hereto. The Contractor shall, however, have complete control, subject to Article 12, of his or her organization. In case of the termination of the employment of the Consultant, the Owner shall appoint any Consultant whose status under the Contract shall be that of the former Consultant.

11. THE CONSULTANT'S DECISION

The Consultant shall decide on questions arising under the contract documents, whether as to the performance of the work or the interpretation of the Specifications and drawings, but should the contractor hold such decisions to be at variance with the contract documents or to involve changes in the work already built, fixed, ordered or in hand in excess of the contract, or to be given in error, he or she shall notify the Consultant before proceeding to carry them out. In the event of the Consultant and the Contractor failing to agree as to such excess or error and the consultant deciding to carry out such disputed work, the contractor shall act according to such decision. Any question of excess of cost due to the aforesaid cause may be decided in the manner hereinafter provided in Article 43.

12. SUPERINTENDENCE

The Contractor shall keep on the work, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Consultant. The superintendent shall not be changed except with the consent of the consultant, unless the superintendent proves to be unsatisfactory to the Contractor or ceases to be in his or her employ. The superintendent shall represent the Contractor in his or her absence and directions on minor matters given to him or her shall be held to be given to the contractor. Important directions shall be given in writing to the Contractor. The Contractor shall give efficient supervision to the work using his or her best skill and attention.

13. MATERIALS, APPLIANCES, EMPLOYEES

Unless otherwise stipulated, the contractor shall provide and pay for all materials, labour, water, tools, equipment, light and power necessary for the execution of the work. Unless otherwise specified all materials shall be new. Both workmanship and materials shall be of

the quality specified. The contractor shall not employ on the work any unfit person or anyone not skilled in the work assigned to him or her.

14. INSPECTION OF WORK

The Owner, or the Consultant on his or her behalf, and their representatives shall at all times have access to the work wherever it is in preparation or progress and the Contractor shall provide proper facilities for such access and for inspection. If the specifications, the consultant's instructions, the laws, or the ordinances of any public authority require any work to be specially tested or approved, the Contractor shall give the consultant timely notice of its readiness for inspection, and if the inspection is by an authority other than the consultant, of the date and time fixed for such inspection. Inspections by the Consultant shall be promptly made. If any such work should be covered up without approval or consent of the consultant, it must, if required by the Consultant, be uncovered for examination and made good at the Contractor's expense. Re-examination of questioned work may be ordered by the consultant. If such work be found in accordance with the Contract, the Owner shall pay the cost of re-examination and replacement. If such work be found not in accordance with the contract, through the fault of the contractor, the Contractor shall pay such cost.

15. REJECTED WORK

The Contractor shall promptly remove from the premises any defective work, whether the result of poor workmanship, use of defective materials, damage through carelessness or other act of the Contractor, which has been condemned by the Consultant as failing to conform to the contract documents, whether incorporated in the work or not. The contractor shall promptly replace and re-execute his or her own work in accordance with the contract and without expense to the Owner and shall bear the expense of making good all work of other Contractors destroyed or damaged by such removal or replacement. If the Contractor does not remove such condemned material or work within the time fixed by written notice, the Owner may remove them and may store such materials at the expense of the Contractor. If the contractor does not pay the expense of such removal within Five (5) days thereafter, the Owner may, upon Ten (10) das written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

16. DEDUCTIONS FOR UNCORRECTED WORK

If, in the opinion of the consultant, it is not expedient to correct defective work or work not done in accordance with the contract documents, the Owner may deduct from the contract price the difference in value between the work as done and that called for by the contract, the amount of which shall be determined in the final instance by the Consultant.

17. CORRECTION AFTER COMPLETION

Subject to any special provisions in the contract documents, the contractor shall remedy any defects due to faulty materials or workmanship appearing within a period of one year from the date of substantial completion of the work and shall pay for any damage to other work resulting therefrom which appears within such period and neither the final certificate nor payment thereunder shall relieve the Contractor from responsibility hereunder. The Owner

shall give notice of observed defects promptly. Questions arising under this Article may be decided as provided in Article 43.

18. EMERGENCIES

The Consultant has authority in an emergency to stop the progress of the work whenever, in his or her opinion, such stoppage may be necessary to ensure the safety of life, or of the structure, or neighboring property. This includes authority to make such changes and to order, access and award the cost of such work extra to the Contract or otherwise as may in his or her opinion be necessary.

19. PROTECTION OF WORK AND PROPERTY

The Contractor shall maintain continuously adequate protection of all his or her work from damage and shall take reasonable precautions to protect the Owner's property from all injury arising in connection with this Contract. He or she shall make good any damage or injury to his or her work and shall make good any damage or injury to the property of the Owner resulting from the lack of reasonable protective precautions. He or she shall not be responsible, however, for any damage or injury to his or her work and to the property of the Owner which may be directly due to errors in the contract documents or caused by the Owner, his or her agents, or employees, or from any work or risk which the Owner has agreed to insure, provided the Contractor has taken reasonable protective precautions. He or she shall adequately protect adjacent property as required by law and the contract documents.

20. CONTRACTORS' INSURANCE

a) INDEMNITY/HOLD HARMLESS

.1 The Contractor shall be liable for all injuries to persons and for damage to property caused by his or her operations, and those of his or her sub-contractors, and his or her and their employees, engaged on all operations in connection with the contract both on and off the site, and he or she shall indemnify and save harmless the Owner from all suits, claims, expenses, costs, demands, losses, and damages to which the Owner may be put by reason of injury, including death, to persons, and damage to property of the Owner and others, resulting from; negligence, carelessness and any other cause whatsoever in the performance of the work.

.2 The Contractor shall, until the date of issue of the final Certificate of Approval of the work by the Consultant, Indemnify and Save Harmless the Owner, and protect his or her own interests against:

(a) Theft, burglary or robbery of, and loss or damage to, all materials and equipment brought to the site for use in the work, whether or not such materials and equipment are incorporated in the work at the time that any such theft, burglary, robbery, loss or damage occurs.

(b) Theft or burglary of, and loss or damage to, any of his or her own plant and equipment being used on the Project and/or stored on the site.

b) BUILDERS RISK, ALL RISK PROPERTY INSURANCE

.1 The contractor shall, without limiting its obligations or liabilities herein and at its own expense, provide and maintain the following insurances with Insurers and in forms and amounts acceptable to Government:

(a) The Contractor shall have Commercial General Liability coverage in an amount not less than Two Million ($2,000,000.00) dollars inclusive per occurrence against bodily injury and property damage. The government of Prince Edward Island is to be added as an additional insured under this policy. Such insurance shall include, but not be limited to:

i) Blanket Written Contractual Liability;
ii) Personal Injury Liability;
iii) Non-owned Automobile Liability;
iv) Cross Liability;
v) Operation of Attached Machinery

Commercial General Liability insurance shall be endorsed to provide the Owner with thirty (30) day advance written notice of cancellation or material change and fifteen (15) days' notice in the event of non-payment.

(b) Automotive liability coverage (Standard Automobile Policy) on all vehicles, the subject of this Agreement, owned, leased, operated or licensed in the name of the Contractor, in an amount not less than Two Million ($2,000,000.00) dollars

(c) If the work involves new construction or reconstruction of a property being repaired or maintained, the contractor shall provide and maintain All Risk Course of Construction (Builder's Risk) to the full value of the work in the amount of the Contract Price. The policy will permit partial or complete use or occupancy by the Owner during the term of this insurance.

All the foregoing insurance shall be primary and not require the sharing of any loss by any insurer of the Government nor by any other form of recovery available such as the Provincial Self Insurance and Risk management Fund.

.2 Proof of Insurance

A Certificate(s) of Insurance and any renewals thereof, shall be furnished to the Government prior to commencement of work by the Contractor and must be updated as required during the Term.

The policies required by this Agreement shall be in a form and with insurers satisfactory to the Government. Default of deliver or receipt by the government shall not be construed as acknowledgement or concurrence that there has been compliance with the terms of this Agreement.

.3 Indemnification

The Contractor shall indemnify and hold harmless the Government, its agents, representatives and employees from and against all claims, demands, losses, costs, damages, actions, suits or proceedings of every nature and kind whatsoever arising out of or resulting from the performance of work (herein called the "claims"), provided that any such claim is caused in whole or in part of any act, error or omission, including but not limited to those of negligence of the Contractor, or anyone directly or indirectly employed by the Contractor anyone for whom the Contractor may be liable.

21. PERFORMANCE BOND

The Owner shall have the right to require the Contractor to furnish a bond covering the faithful performance of the Contract – including the corrections after completion provided for in Article 17 – and the payment of all obligations arising under the contract, in such form as the Consultant may prescribe and with such sureties as he or she may approve. If such bond is required by written instructions given previous to the receipt of bids, the premium shall be paid by the contractor, if subsequent thereto, it shall be paid by the Owner.

22. CASH ALLOWANCES

The Contractor shall include in the contract sum all cash allowances mentioned in the Specifications, which allowances shall be expended in whole or in part as the consultant shall direct and the amount of the contract sum being adjusted in conformity therewith. The Contract sum includes such sums for expenses and profit on account of such cash allowances as the Contractor required excepting those allowances included for contingency purposes.

23. SUBSURFACE CONDITIONS

In the event that during the execution of the work, subsurface conditions at the site are found to differ materially from those indicated in the contract documents and soil reports, or otherwise represented by the Owner or Consultant to the contractor, then the contractor shall promptly notify the Consultant in writing of such conditions, the Consultant shall promptly investigate such conditions and if he or she finds that they differ materially and will result in an increase or decrease in the cost of,. Or time required for performance of this Contact, an equitable adjustment shall be made between the parties and the contract modified in writing accordingly. If the parties fail to agree upon the adjustment to be made, the dispute may be determined as provided for in Article 43.

24. CHANGES IN THE WORK

The Owner or the Consultant, without invalidating the contract, may make changes by altering, adding to, or deducting from the work, the contracts sum being adjusted accordingly. All such work shall be executed under the conditions of the Contract except that any claim for extension or reduction of time caused thereby shall be adjusted at the time of

ordering such change. Except as provided in Article 18, no change shall be made unless in pursuance of a written order from the consultant and no claim for an addition to or deduction from the contract um shall be valid unless so ordered and at the same time valued, r agreed to be valued, as provided in Article 25.

25. VALUATION OF CHANGES

Change Orders calling for normal changes or additions to the work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs (including Employment Insurance, Worker's Compensation, holiday pay) and actual equipment rental. To these prices the Contractor will add:

.1 For work less than $2,500 involving the General Contractor only, the General contractor adds 20% to his or her costs.

.2 For work over $2,500 involving the General Contractor only, the General Contractor adds 15% to his or her costs.

.3 For work less than $2.500 involving a Sub-Contractor only, the Sub-Contractor adds 20% to his or her costs, submits this price to the General Contractor who adds 10%.

.4 For work over $2.500 involving a Sub-Contractor only, the Sub-Contractor adds 15% to his or her cost, submits this price to the General Contractor who adds 5%.

.5 (a) For work less than $2,500 involving the General Contractor and Sub-Contractor, the Sub-Contractor adds 20% to his or her costs, submits his or her price to the General Contractor who adds 10%; to this amount the General Contractor adds the cost of his or her own work plus 20% of the cost of his or her own work only.

(b) The General Contractor does not add a further 10% to the cost of his or her own work.

.6 (a) For work over $2,500 involving the General Contractor and a Sub-Contractor, the Sub-Contractor adds 15% to his or her cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his or her own work plus 15% of the cost of his or her own work only.

(b) The General Contractor does not add a further 5% to the cost of his or her own work.

.7 Deletions to Contract: A mark-up shall **not** be charged nor credited on a credit portion of a Change Order.

.8 Supervision related to Change Orders shall be considered as included in the allowable mark-up and shall **not** be included in the labour charges for a Change Order.

26. APPLICATION FOR PAYMENTS

The Contractor shall – before the first application for payment – submit to the Consultant a schedule of values of the various parts of the work aggregating to the total sum of the

contract, divided so as to facilitate payments, made out in such form, and supported by such evidence as to its correctness as the Consultant may direct. This schedule, when approved by the Consultant, shall be used as a basis for applications of payment, unless it can be found to be in error.

The Contractor, as per current Provincial regulation, shall include on all invoices the Goods and Services Tax as an additional line item. This amount would be in addition to the tender amount which does not include HST. See article 28 of this Section.

27. CERTIFICATES AND PAYMENTS

a) Partial payments will be made monthly and within thirty (30) days after approval by the Owner and on the basis of a duly certified and approved estimate of work performed during the preceding period. In preparing estimates, the material delivered on the site and preparatory work done shall be taken into consideration.

b) In making such partial payments, there shall be retained a hold back in the amount of fifteen percent (15%) of the estimated amount on each partial payment estimate, less any holdback release which may have been made to specific sub-contractors under any progressive release of holdback provisions in Provincial Legislation.

c) All materials and work covered by partial payments made shall thereupon become the sole property of the Owner, but this shall not be construed as relieving the Contractor from the sole responsibility for the safety and preservation of all materials and work upon which payments have been made and restoration of any damaged work or as a waiver of the right of the Owner to require the fulfillment of all the terms of the contract. Nor shall Consultant's Certification of Partial Payment for any work be construed as his or her final or irrevocable acceptance of that work.

d) Document of Completion: Upon completion and acceptance of all work whatsoever required and the release of all claims against the Owner as specified, the Consultant shall file a written document with the Owner and with the Contractor as to the entire amount of work performed and compensation earned by the contractor – including the extra work and compensation therefore.

e) Final Payment: Within sixty (60) days after the filing of such document of completion and minimum one (1_ day after the lien period, and upon receipt from the General contractor of declarations signed by each of his sub-contractors that the sub-contractor has been paid up to, and including the past previous partial payment, the Owner will pay the Contractor the amount stated therein less all deductions authorized by the terms of this contract and previous payments and advances whatsoever to or for the account of the Contractor. All previous estimates and payments, including those relating to extra work, shall be subject to correction at the time of this payment which is, throughout this contact, called Final Payment. Final Payment shall be subject to inspection and acceptance by the Owner or duly authorized representatives of the Owner and by representatives of all agencies having direct interest in the project.

Submittals to include:

- Certificate or letter of clearance from the Provincial Worker's Compensation Board

- Certificate or letter of clearance from the Provincial Treasury

f) With the second and all subsequent applications for payment, the Contractor shall include a statutory declaration form CCDC 9B, or other similar acceptable form to the Owner, declaring that all labour and materials entering into the work, including Sub-Contractors, covered by the previous application, have been paid. With application for release of lien holdback, the Contractor shall include a statutory declaration form CCDC 9A, or other similar form acceptable to the Owner.

g) With application for release of lien holdback, the Contractor shall include certificates issued by the Worker's Compensation Board, indicating that Worker's Compensation premiums in relation to the project have been paid in full.

28. TAXES

Unless otherwise provided herein, the contractor shall pay all government sales or excise taxes in force at the date of the Agreement, provided that any increase or decrease in such taxes shall increase or decrease the contract sum accordingly.

29. PERMITS, NOTICES, LAWS AND RULES

The Contractor shall apply and pay for all necessary permits or licenses required for the execution of the work (but this shall not include the obtaining of the Building Permit or permanent easement or right of servitude). The Contractor shall give all necessary notices and pay all fees required by law and comply with all laws, ordinances, rules and regulations relating to the work and to the preservation of the public's health. The Contractor shall be responsible for the safety of all workmen and equipment on the project in accordance with all applicable safety legislation passed by federal, provincial and local authorities governing construction safety.

If the contract documents are at variance therewith, any resulting additional expense incurred by the Contractor shall constitute an addition to the contract price.

30. PATENT FEES

The Contractor shall pay all royalties and license fees and shall save the Owner harmless from loss on account of suits or claims for infringement of patents in the doing of the work.

31. USE OF PREMISES

The Contractor shall confine his or her apparatus, the storage of materials and the operations of his or her workmen to limits indicated by laws, ordinances, permits or by direction of the Consultant and shall not unreasonable encumber the premises with his or her materials. The Contractor shall not load – or permit to be loaded – any part of the work with a weight that will endanger its safety. The Contractor shall enforce the Consultant's instructions regarding signs, advertisements, fires and smoking.

32. CLEANING UP

The Contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by his or her employees or work and, at the completion of the work, he or she shall remove all his or her rubbish and all tolls, equipment and surplus materials from and about the work and shall leave the work “broom clean” or its equivalent, unless more exactly specified. In case of dispute, the Owner may remove the rubbish and charge the cost as the Consultant shall determine to be just.

33. CUTTING, PATCHING AND DIGGING

The Contractor shall do all cutting, fitting or patching of his or her work that may be required to make its several parts come together properly and fit it to receive or be received by work of Other Contractors shown upon, or reasonable implied by, the contract documents.

Any cost caused by ill-times work shall be borne by the party responsible therefore.

The Contractor shall not endanger any existing work by cutting, digging or otherwise and shall not cut or alter the work of any other contractor save with the consent of the Consultant.

34. DELAYS

If the Contractor is delayed in the completion of the work by any act or neglect of the Owner, Consultant or any Other Contractor or any employee of any one of them or by changes ordered in the work, then the time of completion shall be extended for such reasonable time as the Consultant may decide. If the Contractor is delayed in completion of the work by labour disputes, strikes, lock-outs (including lock-outs decreed or recommended by a recognized contractors’ association for its members of which the Contractor is a member), fire, unusual delay by common carriers or unavoidable casualties or without limit to any of the foregoing by any cause of any kind whatsoever beyond the Contractor’s control, then the time of completion shall be extended for a period of time equal to the time lost due to such delays. I addition and without limit to the foregoing, the time of completion shall be extended because of any cause whatsoever within the Contractor’s control which the Consultant shall decide as justifying a delay for such reasonable time as the Consultant may decide.

No such extension shall be made for delay unless written notice of claim is given to the Consultant within seven (7) days of its commencement provided, however, that in the case of a continuing cause of delay only one claim shall be necessary.

If no schedule is made under Article 3, no claim for delay shall be allowed on account of failure to furnish drawings until two (2) weeks after demand for such drawings and not then unless such claim be reasonable.

The Consultant shall not, except by written notice to the Contractor, or as provided in Article 18, stop or delay any part of the work pending decisions or proposed changes either by him or herself or by the Owner.

35. OWNER'S RIGHT TO DO WORK

If the Contractor should neglect to execute the work properly or fail to perform any provision of this Contract, the Owner, after five (5) days written notice to the Contractor, may without prejudice to any other right or remedy he or she may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor; provided however, that the Consultant shall approve both such actions and the amount charged to the Contractor.

36. OWNER'S RIGHT TO TERMINATE CONTRACT

If the Contractor should be adjusted as bankrupt, or if he or she should make a general assignment for the benefit of his or her creditors, or if a receiver should be appointed on account of his or her insolvency or if he or she should – except in case of recited in Article 35 – refuse or fail to supply enough properly skilled workmen or proper materials after having received seven (7) days' notice in writing from the Consultant to supply additional workmen or materials, or if he or she should fail to make prompt payment to Sub-Contractors or for material or labour, or persistently disregard laws, ordinances or the instruction of the Consultant, or otherwise be guilty of a substantial violation of the provisions of the Contract, then the Owner, upon the certificate of the Consultant that sufficient cause exists to justify such action , may, without prejudice to any right or remedy he or she may have, by giving the Contractor written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools and appliances thereon and finish the work by whatever method he or she may deem expedient, but without undue delay or expense. In such case, the Contractor shall not be entitled to receive the expense of finishing the work, including compensation to the Consultant for his or her additional services; such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, shall be certified by the Consultant.

37. CONTRACTOR'S RIGHT TO SUSPEND WORK OR TERMINATE CONTRACT

If the work should be stopped under an order of any court or other public authority through no act or fault of the Contractor or of anyone employed by him or her, or if the Consultant fails to issue a certificate in accordance with Article 27, or if the Owner should fail to pay to the Contractor within seven (7) days of its maturing and presentation, any sum certified by the Consultant or awarded by arbitrators, then the Contractor may, upon five (5) days written notice to the Owner and the Consultant, stop work and/or terminate this Contract without prejudice to any other right or remedy he or she may have and recover from the Owner payment for all work executed and any loss sustained upon the plant or material with reasonable profit and damages.

38. DAMAGES AND MUTUAL RESPONSIBILITY

If either party to this Contract should suffer damage in any manner because of any wrongful act or neglect of the other party or of anyone employed by him or her then he or she shall be reimbursed by the other party for such damage. Claims under this paragraph shall be made in writing to the party liable within a reasonable time after the first observance of such damage and not later than the time of final certificate, except as expressly stipulated

otherwise in the case of faulty work or materials, and may be adjusted by agreement or in the manner set out in Article 43 and the party reimbursing the other party as aforesaid shall thereupon be subrogated to the rights of the other party in respect of such wrongful act or neglect if it be that of a third party. Should the Contractor cause damage to any other contractor on the work the Contractor agrees – upon due notice – to settle with such other contractor by agreement or arbitration, if he or she will so settle. If such other contractor sues the Owner on account of any damage alleged to have been so sustained, the Owner shall notify the Contractor who shall defend such proceedings at the Owner's expense and if any final order or judgment against the Owner arises therefrom the Contractor shall pay or satisfy it and pay all costs incurred by the Owner provided that if the Contractor becomes liable to pay or satisfy any final order or judgment against the Owner, then the Contractor shall have the right upon undertaking to indemnify the Owner against any and all liability for sots to appeal, in the name of the Owner, such final order or judgment to any and all courts or competent jurisdiction.

39. SEPARATE CONTRACTS WITH OTHER CONTRACTORS

The Owner reserves the right to let separate contracts in connection with the undertaking of which the work is a part and the Contractor shall connect properly and coordinate this work with that of other contractors. If any part of the Contractor's work depends – for its proper execution or results – upon the work of any other contractor, the Contractor shall inspect the work prior to proceeding with his or her work as required by the Contract. Should the Contractor fail so to inspect and report, he or she shall have no claim against the Owner by reason of the defective or unfinished work of any other contractor except as to latent defects not reasonable noticeable at the time of the commencement of the contractor's work. In letting separate contracts, the Owner shall be responsible for the coordination of fire and other insurance coverages and shall take all precautions reasonable possible to avoid possible occurrence of a labour dispute or disputes on the work.

40. ASSIGNMENT

Neither party to the Contract shall assign the Contract without the written consent of the other.

41. SUB-CONTRACTS

The Contractor agrees that the list of names of sub-contractors supplied prior to the signing of the Contract is the list of Sub-Contractors proposed to be used to carry out those parts of the work noted thereon and he or she shall not employ any to whom the Consultant may reasonable object.

If the change of any name on such list is required by the Consultant and the work has to be awarded to a higher bidder, the contract price shall be increased by the difference between the two bids.

The Consultant shall, on request, furnish to any Sub-Contractor wherever practicable, evidence of the amounts certified to on his or her account.

The Contractor shall be held as fully responsible to the Owner for the acts and omissions of his or her sub-contractors and of persons directly or indirectly employed by them, as for the acts and omissions of persons directly employed by him or her. In view of this responsibility, the Contractor shall not be obliged to employ as a sub-contractor or supplier any person or firm to whim he or she may reasonable object.

Nothing contained in the contract documents shall create any contractual relation between any sub-contractor and the Owner.

42. RELATIONS OF CONTRACTOR AND SUB-CONTRACTOR

The Contractor agrees to bind every sub-contractor by the terms of the contract documents, as far as applicable to his or her work.

43. ARBITRATION

In the case of any dispute arising between the Owner (or the Consultant acting on his or her behalf) and the Contractor as to their respective rights and obligations under the Contract, either party hereto shall be entitled to give to the other notice of such dispute and to request arbitration thereof; and the parties may, with respect to the particular matters then in dispute, agree to submit the same to arbitration in accordance with the applicable law of the place of building.

Arbitration proceedings shall not take place until after the completion or alleged completion of the work except (a) on a question of certificate for payment, or (b) in a case where either party can show that the matter in dispute is of such nature as to require immediate consideration while evidence is available.

44. OWNER SIGNING AUTHORITY

Mr. Alan Maynard, P. Eng. is designated as the Director for the purposes of this agreement, the Director shall represent Government in all matters pertaining to the construction Project being provided pursuant to this agreement, and will administer said agreement, and shall complete necessary approvals of all plans and specifications provided for under this agreement on behalf of Government, provided however, that the Director shall not be authorized to amend the terms of the agreement.

Government may replace the Director by providing written notice, in accordance with the notice requirements of this agreement.

END

PROJECT: **Cardigan Elementary School – IT Consolidation**

1. GENERAL

The undersigned tenderer (hereinafter called the "Contractor") hereby offers to the Minister of Transportation, Infrastructure and Energy (hereinafter called the "Owner") to furnish all necessary tools, plant, services, materials and labour to execute and complete in a careful and workmanlike manner the work set out under the **Project # 080-16096** herein, which is more particularly described in the Plans and Specifications titled **Cardigan Elementary School IT Consolidation** and **dated NOVEMBER, 2016** for the lump sum as set out in Clause 3.

The Contractor agrees:

.1 To complete the work by the date indicated on the Instructions to Bidders.

.2 That this Form of Agreement supersedes and cancels all communication, negotiations and agreements relating to the work other than contained in the completed tender.

.3 To use all suppliers and sub-contractors indicated on his or her tender unless prior approval is received from the Engineer to make a change.

2. ADDENDA

a) The following addenda are included in this contract:

_____

_____

_____

_____

3. CONTRACT PRICE

a) The Contract Price (*the lump sum referred to in Clause 1*:) which excludes value added taxes is:

_____

_____

_____

b) Value added (HST)(of _____%) payable by the Owner to the Contractor are:

_____

_____

_____

c) Total amount payable by the Owner to the Contractor for the construction of the work is:

_____

_____

4. CORRESPONDENCE

The Owner, Engineer, Consultant, and Contractor may be contacted in writing at the addresses below:

Owner, Engineer, & Consultant

PEI Department of Transportation, Infrastructure and Energy
PO Box 2000
Charlottetown, PE
C1A 7N8

Contractor

_____
_____
_____
_____

5. CONTRACTOR'S ACCEPTANCE

Accepted and executed on behalf of the Contractor this _____ day of _____, 20___, in the presence of _____.

_____	_____
Witness	Signature & Corporate Seal

6. OWNER'S ACCEPTANCE

Accepted and executed on behalf of the Owner this _____ day of _____, 20___, in the presence of _____.

_____	_____
Witness	Signature & Seal

END

TENDER

SUBMITTED BY: _____

ADDRESS: _____

_____

_____

PHONE: _____ FAX: _____

DATE: _____

FOR: Cardigan Elementary School IT Consolidation
1614 North Royalty Road
Cardigan, PEI
C0A-1G0

TO: Minister of Transportation, Infrastructure and Energy
11 Kent Street
PO Box 2000
Charlottetown, PE
C1A 7N8

HAVING examined the drawings and specifications for this project as well as any addenda issued, we hereby offer to furnish all materials, plant and labour necessary for the full and proper completion of:

"Cardigan Elementary School – IT Consolidation"

INCLUDING all prime cost allowances, or other taxes in force at this date and **excluding HST**; but not including any additional or deductible allowance or taxes which may be applicable subsequent to this date, and which shall be payable by or to the Owner, in accordance with the above mentioned documents, for the sum of:

_____ Dollars ($_____)

in lawful money of Canada.

In submitting this tender we recognize the necessity to complete the information requested on any appendices, as well as the right of the Owner to accept any tender at the price submitted on the condition that revised tenders will not be called for if minor changes are made.

In the event of this tender being accepted within thirty (30) days of the time stated for the closing of tenders, and our failing or declining to enter into a contract, then our bid deposit shall be forfeited to the Owner in lieu of any damages which he or she may suffer by reason of our failure or refusal to enter into such contract.

In the event of our tender not being accepted within thirty (30) days of the time stated for the closing of tenders, the bid deposit will be returned to us forthwith unless a satisfactory arrangement is made with us covering its retention for a further stated period.
This tender includes the following addenda:

Addendum #	Date	Initial

If we are notified of the acceptance of this tender within the above specified time we will:

Enter into a formal contract agreement with the Owners.

Furnish a general analysis of the contract sum, the total aggregating the amount of our tender.

Provide a Construction Schedule and complete the entire work on or before the dates stated.

Our tender includes the following sub-contractors and suppliers, (own forces may be used, see Item 12, Section B).

Carpentry _____
Cutting and Patching _____
Roofing _____
Select Demolition _____
Mechanical _____
Electrical _____

_____
Submitted by (Name of Bidder)

_____
Authorized Signature

END

1. REFERENCES

    1. CSA - S269.1 – [1975] Falsework for Construction Purposes.

    2. CAN/CSA - S269.2 – [M87] Access Scaffolding for Construction Purposes.

2. CONSTRUCTION SAFETY MEASURES

    1. Observe construction safety measures of:

        a) Latest edition of the National Building Code of Canada

        b) National Fire Code of Canada

        c) Provincial Government, including but not limited to the:

            I. Provincial Building Code Act

            II. Latest edition of the Occupational Health & Safety Act Statutes of Prince Edward Island (including any amendments to and regulations).

            III. Workers' Compensation Act

            IV. Fire Prevention Act

            V. Dangerous Goods Transportation Act

            VI. Industrial Best Practices for Equipment Isolation and Lockout Policy

    2. In case of conflict or discrepancy the more stringent requirement shall apply.

    3. Maintain clear emergency exit paths.

    4. Ensure that employees working on this specific project have met training requirements as legislated by the Prince Edward Island Occupational Health and Safety Act and its regulations.

    5. Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of the building and workplace.

3. OVERLOADING

    1. Ensure no part of Work is subjected to loading that will endanger its safety or will cause permanent deformation.

4. FALSEWORK

    1. Design and construct falsework in accordance with CSA s269.2.

5. HOISTS AND CRANES

    1. Operate such equipment only by qualified hoist or crane operators, and maintain current inspection certificate.

6. SCAFFOLDING AND FALL ARREST

    1. Design and Construct Scaffolding in accordance with CSA S269.

    2. Each user of scaffolding shall examine scaffolding for sufficiency before using it. He or she shall make it secure, or shall notify the Contractor in Writing that he or she will not commence work until it is made secure.

    3. Comply with the requirements of the Fall Protection and Scaffolding Regulations, Province of Prince Edward Island 1988.

7. EQUIPMENT AND TOOLS

    1. Each user of equipment or tools shall be appropriately trained and be responsible to examine for sufficiency before use. Make equipment and tools safe if necessary, or notify the Contractor in writing that user will not commence work with such tools until it is made safe.

8. WHMIS

    1. Comply with the requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and comply regarding labeling and provision of material safety data sheets.

    2. Have a copy of WHMIS data sheets available at the workplace on delivery of materials.

9. HAZARDOUS MATERIALS

    1. Should material resembling hazardous materials [other than those identified with the Contract Documents], including but not limited to spray or trowel applied asbestos, be encountered in course of work; stop work immediately. Do not proceed until written instructions have been received from Consultant.

    2. Any material which contains asbestos that is disturbed or removed during construction work (see Asbestos content Report), shall be removed in accordance with the regulations set out by the Occupational Health and Safety Act. All costs for proper cutting, removal and disposal of all asbestos on this contract shall be included in Tender. Refer also to Section 01900.

    3. Where work entails use, storage, or disposal of toxic or hazardous materials, chemicals and/or explosives, or otherwise creates a hazard to life, safety, health, or the environment; work shall be in accordance with the Jurisdictional Authority.

10. SITE CLEANING

1. Except where special permission is obtained, maintain clear access on public sidewalks and roads

2. Maintain walks and roads clear of construction materials and debris, including excavated material. Clean walks and roads as frequently as required to ensure that they are cleared of materials, debris and excavated material.

3. Remove snow and ice from public sidewalks.

11. FIRE SAFETY REQUIREMENTS

1. Enforce fire protection methods, good housekeeping and adherence to local and underwriter's fire regulations including, but not limited to, Fore Protection Act and the Provincial Building Code Act. Provide UL approved fire extinguishers, and other firefighting services and equipment, except where more explicit requirements are specified as the responsibility of individual Sections.

2. Hot Work will not be permitted on or within the building structure, tanks, or confined spaces, except as outline herein. Prior to conducting hot work, a hot work permit shall be prepared and submitted. An example format for a hot work permit shall be included in the Safety document submission. The permit shall describe compliance with the following procedures. After tank or confined space interiors or building areas have been decontaminated, hot work may be conducted only when the tank or confined space is inverted. Hot work shall not be performed unless monitoring indicates atmospheres within and immediately surrounding are less than eight percent (8%) oxygen inside less than ten percent (10%) of the LFL outside; continuous monitoring shall continue until the hot work is completed. The hot work prohibition includes welding, cutting, grinding, sawing, or other similar operations which could be expected to potentially generate combustion-producing temperatures or sparks, or which could produce potentially hazardous fumes or vapours. An individual at each hot work site shall be designated as a fire watch. This person's sole responsibility shall be to monitor the hot work and have immediate access to at least two (2) twenty (20) pound fire extinguishers located at each hot work site. All extinguishers shall be currently inspection tagged, approved safety pin and tamper resistant seal. A new permit shall be obtained at the start of each work shift during which hot work will be conducted.

3. Smoking permitted in designated areas only. Exercise care in the use of smoking materials.

4. Advise the Fire Chief in the area of Work of any work that would impede fire apparatus response, including but not limited to violation of minimum overhead clearance prescribed by the fire chief, erecting of barricades and digging of trenches.

5. Fire Separations:

   .1 Ensure that fire separations are installed to maintain total integrity and that they are not breached by Work following their installation.

.2 Replace fire separations which have suffered a lessening of their required rating during construction.

6. Ensure nothing subverts the integrity of fire protection provided for the building structure.

7. Coordinate work of all sections so that they do not encroach on space required for fire protection and its installation. Ensure that fire protection damaged during construction is totally replaced.

12. REPORTING FIRES

1. Know the location of the nearest fire alarm box and telephone, including the emergency phone number.

2. Report immediately all fire incident to the fire department as follows:

.1 Activate nearest fire alarm box, or

.2 Telephone 911

.3 Where fire alarm box is exterior to building, the person activating the fire alarm box shall remain at the box to direct Fire Department to scene of the fire.

.4 When reporting a fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

13. ENVIRONMENTAL PROTECTION

1. Ensure that pollution and environmental control of construction activities are exercised during the Work to requirements of the federal and provincial environmental acts; including, but not limited to, the Prince Edward Island Environmental Protection Act.

14. SAFETY DOCUMENT SUBMISSION

1. Ensure Safety Document Submission applies to Work of this specific project and site.

2. Submit two copies of Safety Document at the Pre-Construction Meeting. Do not commence Work nor deliver material on-site prior to submission.

3. Included in Safety Document submission specific information detailing the methods and procedures to be implemented ensuring adherence to the acts, regulations, codes and policies specified in this section and to:

.1 Ensure the health and safety of persons at or near the Work; including, but not limited to, the Public.

.2 Ensure the measures and procedures of the regulatory agencies specified are carried out.

.3 Ensure every employee, self-employed person and employer performing Work under this contract complies with the regulatory agencies specified.

.4 Where changes to the methods and procedures in the execution of work change submitted safety methods and procedures, modify submitted Safety Documentation and submit modifications, in writing to the Consultant and Minister prior to implementation.

15. SAFETY DOCUMENT ORGANIZATION

1. Organize information in the form of an instructional manual as follows:

.1 Place in binders of commercial quality, 8-1/2" x 11" x 3" maximum ring size.

.2 Cover: Identify binder with typed or printed title "Project Safety Document" and list the title of the project.

.3 Provide tabbed fly leaf for each separate heading, with typed heading on tab.

.4 Where drawings are within the safety document, provide with reinforced punched binder tab. Bind in with text; fold in larger drawings to size text pages.

.5 Arrange content under Safety Document headings specified herein.

16. SAFETY DOCUMENT HEADINGS

1. Employee Safety Training

.1 Place, under this heading, a statement indicating employees working on this specific project have met specified training requirements.

2. Company Safety Policy

.1 Place, under this heading, information pertaining to the company's policy and commitment to Occupational Health and Safety, including the responsibilities of management, supervisors and works.

3. Company Safety Rules in General Terms

.1 Place, under this heading, information of a general, global nature, applying to every work environment where the company has staff pertaining to rules directing compliance to policy. For example, state company safety rules with respect to use of hard hats, safety glasses, safety footwear, CSA approval on such items, use of alcohol or non-prescription drugs.

4. Hazard Assessment

.1 Place, under this heading, information identifying possible hazards specific to this project and identify safe methods and procedures for the execution of work to ensure safety in the work place.

.2 Arrange contents of this heading by technical section number on the project manual.

5. Emergency Action Plan

.1 Place, under this heading, information detailing action to be taken in the event of various emergencies.

.2 Arrange content under the following sub-headings:

(a) First Aid

i. Include information concerning establishment of a First Aid Station, related supplies, staff awareness of location and staff training in First Aid Care of Casualties.

(b) Contact Emergency Support Groups

i. Include relative information including phone location for emergency use, the emergency telephone numbers (and their location) for the various organizations which must be contacted in case of an emergency, and staff training in procedures.

(c) Cessation of Work

i. Include relative information how work cessation during emergencies is handled and communicated to persons present on site.

(d) Joint Occupational Health and Safety Committee Representative

i. Place under this heading information detailing membership and terms of reference.

17. <u>SAFETY OFFICER</u>

1. Provide a Safety Officer at the work site to perform safety management, surveillance, inspections, and safety enforcement for the contractor. The Safety Specialist shall be the safety "competent person". The Safety Officer shall be at the work site at all times whenever work or testing is being performed, shall conduct daily safety inspections.

.1 Qualifications

(a) Qualifications of Safety Officer

i. Ability to manage the on-site contractor safety program through appropriate management controls.

ii. Ability to identify hazards and have the capability to expend resources necessary to abate the hazards.

iii. Must have worked on similar types of projects that are equal to or exceed the scope of the project assigned with the same responsibilities.

iv. Shall, as a minimum, have attended a recognized training qualification program including at least 40 hours of classroom instruction.

(b) Qualifications of Qualified Person, Confined Space Entry:

i. The qualified person shall be capable (by educations and specialized training) of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and protective action to ensure worker safety.

(c) Qualification of Crane Operators must be submitted to the consultant for approval and must be authorized to operate the crane.

.2 Meetings

(a) Preconstruction Conference

i. The safety officer shall attend the preconstruction conference (see outline attached).

(b) Meeting On Work Procedures

i. Meet with Contracting Officer to discuss work procedures and safety precautions required by the APP. Ensure the participation of the contractor's superintendent, the quality control, and representatives of each subcontractor or trade performing work at the site.

(c) Weekly Safety Meetings

i. Hold weekly at the project site. Attach minutes showing contract title, signatures of attendees and a list of topics discussed.

(d) Work Phase Meetings

i. The appropriate activity hazard analysis shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection.

(e) New Employee Indoctrination

i. New employees will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

PRE-CONSTRUCTION CONTRACTOR SAFETY CHECKLIST

Use this text as a guideline for completing the attached checklist. This checklist is a general, *pre-construction* review of the contractor safety program, as well as an information session to identify what the PEI Department of Transportation, Infrastructure and Energy (TIE) requires of our contractors. Where the item requires a submission, ensure that it is received. If the item does not apply, enter N/A for not applicable.

The following information will assist you in establishing what will be reviewed in each section.

1. **Safety Policy:** Each employer is required by law (in Prince Edward Island) to have a safety policy and program and to implement that policy. TIE will ask for and receive a copy of that program.

2. **Safety Representative:** Each contractor is required to advise TIE who their safety representative is. That representative has duties as described in the Occupational Health and Safety Act.

3. **Emergency Procedure:** Each contractor must have a site specific layout and emergency plan complete with emergency phone numbers.

4. **Employee Orientation:** Each and every person working for a contractor, including sub-contractors will be given an orientation to familiarize them with the site safety program. Unless otherwise specified, each sub-contractor is responsible for the orientation of their workers.

5. **Safe Work Plan:** Most contractors are involved in tasks that subject workers to hazards. In order to ensure that these workers are secured from hazard, the contractor will supply TIE with a written safe work plan which affords protection against the hazards. This plan must be signed by a company representative and communicated to the workers involved in the task.

6. **Personal Protective Equipment Review:** Advise that all workers require CSA Class “b” hard-hat, CSA “Green Patch” (eight inch) footwear, eye, ear, and respiratory protection as required (boots and hat at all times).

7. **Fall Protection:** Fall restraint or fall arrest protection required where a fall of 2.4 meters (8 feet) or more is possible. **NO EXCEPTIONS**

8. **Housekeeping:** Advise of daily, or as needed, clean-up requirements.

9. **Tool Box Talks:** Each contractor is required to conduct weekly safety meetings with their forces and advise TIE they have been done.

10. **Material Handling/Storage:** Advise contractor about storage areas and handling of material so as not to endanger their worker or another worker. Stacked material to be banded, chained, blocked, or otherwise secured.

11. **Landing Platforms:** Advise contractor about movement of material on or off platforms, all material to be secured. Platform gates or chains to be kept closed at all times workers are on platform. If not possible, worker to be tied off with fall restraint system independent of platform.

12. **WHMIS Training:** Receive verification that all contractor workers are trained and that the contractor submits their MSDS.

13. **GFCI:** Advise contractor that all tools are required to have ground fault circuit interrupters (where electricity is supplied by contractor).

14. **Accident Investigations:** Any injury to any of their workers must be investigated and reported to TIE.

15. **Verbal, Written, Gone:** Explain Zero Tolerance Program.

16. **Joint/Worker Safety Committee:** Sites of over twenty (20) workers must establish a safety committee; over fifty (50), an additional worker committee. Workers required to attend committee meetings will do so and not be prevented by employers.

17. **Fire Protection:** All trades involved in performing hot work of any kind are required to provide fire protection at the work location.

18. **Guardrails:** Advise contractors that where temporary removal of guardrails is necessary, the area around them must be cordoned off with a barrier. Guardrails must be replaced as soon as possible.

19. **First Aider:** Each contractor is required to have a first aid kit and trained first aider. Employer must name their first aider.

20. **Visitors:** Advise contractor that any visitors to site must be suitable protected from hazard. They must wear hard hat, safety vest, and proper safety footwear while on site.
21. **Task Lighting:** Review responsibilities of task specific lighting (who provides it).

22. **Swamper/Riggers Competency:** Where cranes are used, the contractor must use a swamper/rigger. They shall provide TIE with a written statement identifying, by name(s), their rigger and that the named person is a competent worker as described in the construction regulations.

23. **Scaffolds:** Review scaffold building requirement:
    - Use all braces required by design
    - Access ladder for platform over 1.5 meters
    - Full width platform if height over 3 meters (10 feet)(PEI Regulations require double planks)
    - Full guardrails and toeboards
    - Tied in three times base dimension or use of outriggers
    - Engineered over 50 feet in height (standard frame type)

24. **Elevating Work Platforms:**
    - All boom and scissors lifts required to be CSA approved and have approval on machine
    - Operators manual required on machine at all times
    - Maintenance record on machine at all times
    - Operator must receive training in operation of equipment
    - Fall protection must be used at all times on a boom lift

- Fall protection required to be used on scissor lift when unit is being moved

25. **Protruding Rebar:** Installers of reinforcing steel must protect the protruding hazard or make arrangements to have it protected. Removal of protective coverings for task purposed only is allowed, however, protective covering must be replaced as soon as possible.

26. **WCB Clearance Certificates:** Advise contractor that TIE will not release any funds for payment until Workers Compensation Board Clearance Certificate has been received by TIE.

PRE-CONSTRUCTION CONTRACTOR SAFETY CHECKLIST

PROJECT: _____ DATE: _____

CONTRACTOR: _____

WORK BEING PERFORMED: _____

_____ _____

_____ _____

(Print name and title) (Print name and title)

_____ _____

E-D Project Manager/Superintendent (Sign) Contractor Representative (Sign)

☑ Means Yes
☒ Means No

☐ 1. Safety Policy Submitted
☐ 2. Safety Representative
☐ 3. Emergency Procedure Review
☐ 4. Employee Orientation
☐ 5. Written Safe Work Plan Submitted
☐ 6. Personal Protective Equipment Review
Hard hats and Footwear
Safety Glasses
☐ 7. Fall Protection
☐ 8. Housekeeping
☐ 9. Tool Box Safety Talks (Weekly)
☐ 10. Material Handling/Storage
☐ 11. Landing Platforms
☐ 12. WHMIS Training Verification – MSDS received
☐ 13. GFCI Requirements
☐ 14. Accident/Incident Investigations Notification
☐ 15. Verbal, Written, Gone
☐ 16. Joint Worker Safety Committee
☐ 17. Fire Protection
☐ 18. Guardrails
☐ 19. First Aider on Staff – Name Supplied
☐ 20. Visitors and Safety Equipment
☐ 21. Task Lighting
☐ 22. Swampers/Riggers Competency (in writing)
☐ 23. Scaffolds
☐ 24. Elevating Work Platforms
☐ 25. Protruding Rebar Protection
☐ 26. WCB Clearance Certificate

END

1. GENERAL

a) The General Contractor is to provide each item and properly execute all work as specified herein, indicated by drawings, specifications, addenda, or change orders issued with respect to this Project.

b) The General Contractor shall co-ordinate, administer and supervise all work and material acquisition unless noted otherwise in either the Specifications or Drawings. Faulty work by any Section which could have been avoided by proper co-ordination and/or supervision by the General Contractor will not be accepted.

c) Unless specified otherwise, the provisions of this Section shall apply to all Sections of the specifications.

d) Study all Contract documents to determine additional work required by your section on which the work of other sections depends.

e) Establish rates of wages and conditions of work in accordance with the Industrial Standards Act of the Province of Prince Edward Island. Wherever possible give preference to local labour.

f) Workmanship shall be of highest quality in accordance with best standard practice for this type of work, except where specified more precisely.

2. SPECIFICATION FORMAT

a) These specifications are not intended as a detailed description of installation methods but serve to indicate particular requirements in the completed work.

b) Conform to the latest edition of the National Building Code, together with all its related supplements, hereinafter referred to as the "Code" or "code". Where Drawings and Specifications exceed code requirements provide such additional requirements.

c) Where a material is designated on Drawings or in the Specifications for a certain application, unless otherwise specified, that material shall conform to standards designated in the latest edition of the National Building Code and any other Code, Act or Bylaw of Provincial or Local Application provided that in the case of conflict or discrepancy the more stringent requirement shall apply. Similarly, unless otherwise specified, installation methods and standards of workmanship shall also conform to standards invoked by the aforementioned code. Where no particular material is specified for a certain use, the bidder shall select from the choice offered in the code in each case.

d) References to codes, standards, including manufacturer’s direction for installation shall be the latest edition thereof.

e) Provide a copy of all certificates of acceptance issued by Provincial or Local authorities.

f) Parts of the specification are written in short form, therefore it is understood that where a component of the work is stated in a heading followed by a material or operation, the words "Shall be", "Shall consist of" or similar words or phases are implied which denote complete supply and installation of such materials of operations for the component of work designated by the heading.

g) Where the aforementioned Code or this specification does not provide all information necessary for complete installation of any item, then the manufacturer's instructions for first quality workmanship shall be strictly complied with.

h) Where words in the Contract Documents occur in the singular number, they shall be taken as plural where applicable in accordance with the quantities required to satisfy the requirements of the Contract.

3. STANDARDS AND DEFINITIONS

a. Where a reference is made to specification standards produced by various organizations, conform to latest edition of standards, as amended and revised to date of Contract.

b. Have a copy of each specified standard which relates to your work available on the Site to be produced immediately on the Consultant’s request.

4. CO-OPERATION

a. Co-operate with and co-ordinate with other trades as required for the satisfactory and expeditious completion of the work. Take field dimensions relative to this work. Fabricate and erect work to suit field dimensions and field conditions. Provide all forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the work and set in place or instruct the related trades as to their location. Pay the cost of extra work caused by and make up time lost as the result of failure to provide the necessary co-operation, information or items to be fixed to or built in, inadequate time.

b. This Section shall provide other Sections with and be responsible for levels and dimensions which other sections require for establishing proper locations for their work.

5. MATERIAL STORAGE AND HANDLING

a. Store packaged materials in original, undamaged condition with manufacturers' labels and seals intact. Handle and store materials in accordance with manufacturers' and suppliers' recommendations and in a manner to prevent damage to materials during storage and handling.

6. SITE VISIT

a. All bidders submitting tenders for this work shall first examine the site and all conditions therein. All tenders shall take into consideration all such conditions as may affect the work under this contract, no claims for extras resulting from conditions existing at the time of tender will be accepted by the Owner.

7. EXAMINATION

a. All trades shall examine the existing conditions upon which their work depends. Report to the General Contractor with a copy to the consultant in writing defects in such work. The application of their work, or any part of it, shall be deemed acceptance of the work upon which their work, or that part of it which has been applied depends.

b. Drawings are, in part, diagrammatic and are intended to convey scope of work and indicate general and approximate location, arrangement and sizes of building components.

8. CONSTRUCTION SAFETY

a. Observe construction safety measures of the latest edition of the National Building Code Part 8, Provincial Government Workers/ Workers Compensation Board and municipal authority provided in any case of conflict or discrepancy more stringent requirements shall apply.

b. Comply with requirements of FCC no. 301.

c. Ensure no part of Work is subjected to loading that will endanger its safety or will cause permanent deformation.

d. Design and construct falsework in accordance with CSA S269.2.

e. Operate such equipment only by qualified hoist or crane operators, and maintain current inspection certificate.

f. Design and Construct Scaffolding in accordance with CSAS269.2.

g. Comply with the requirements of the Fall Protection & Scaffolding Regulations, Province of Prince Edward Island 1988.

h. Each user of equipment or tools shall be appropriately trained and be responsible to examine for sufficiency before use. Make equipment and tools safe if necessary, or notify the Contractor in writing that user will not commence work with such tools until it is made safe.

i. Comply with the requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and comply regarding labelling and provision of material safety data sheets.

.1 Have a copy of WHMIS data sheets available at the workplace on delivery of materials.

9. PROTECTION

a. Take reasonable and required measures, including those required by authorities having jurisdiction to protect the public and those employed on work from bodily harm and to protect adjacent public and private property from damage. Make full restitution for such harm and damage resulting from failure to take adequate protective measures. Make good damage to work from whatever cause.

b. Take all necessary precautions to guard site, premises, materials and the public at times other than when supervised work is in progress.

c. Provide and maintain in working order, suitable Underwriters' labelled, fire extinguishers and locate in prominent positions to approval of authorities having jurisdiction.

d. Provide all signs, ramps, barricades and hoarding and protective measures necessary to the safe execution of the work and protection of the public.

e. Protect, relocate and maintain existing, active services wherever they are encountered. Wherever inactive services are encountered, cap them off and remove the unwanted portion, with the approval of the authorities having jurisdiction or the public utility concerned, in the manner approved by them.

f. All trades shall protect previously installed work while carrying out their own work.

g. Damaged work shall be made good by appropriate trades but at the expense of those causing damage.

h. Attach and fasten fixtures and fittings in place in safe, sturdy, secure manner so that they cannot work loose or fall or shift out of position during the occupancy of building as a result of vibration or other causes in normal use.

i. Protect existing buildings, landscaping, curbs, roads and lanes and utilities. If, during work, any buildings, landscaping, curbs, roads and lanes are damaged, repair or replace them at no extra expense to the Owner.

j. Provide safety helmets for Consultants, Owner's representatives and any other authorized visitors to site if required.

10. FASTENINGS

a. Supply all fastenings, anchors and accessories and adhesives required for fabrication and erection of the work.

b. Exposed metal fastenings and accessories shall be of same texture, colour and finish as base metal on which they occur.

c. Exterior anchors for windows and roofing sheet metal and anchors occurring on or in an exterior wall shall be noncorrosive or hot dip galvanized steel.

d. Anchoring and fastening devices or adhesive shall be of appropriate type and shall be used in sufficient quantity in such a manner as to provide positive permanent anchorage of the unit to be anchored in position. Install anchors at spacing to provide for required load carrying capacity.

e. Keep exposed fastenings to a minimum, evenly spaced and neatly laid out.

f. Supply adequate instructions and templates and, if necessary, supervise installation where fastenings or accessories are required to be built into work of other trades.

g. Fastenings shall be of permanent type. Wood plugs are not permitted.

h. Fastenings which cause spalling or cracking of material to which anchorage is being made are not permitted.

i. Do not use powder actuated fastening devices which are stressed in withdrawal on any part of this work without written approval from the Consultant. Take particular stringent safety precautions when using powder actuated fastenings. Only low velocity plunger-type are permitted.

11. CUTTING, FITTING, AND PATCHING

a. All cutting and patching shall be the responsibility of the General Contractor.

b. All excavation backfilling and concrete work required to complete the work of Section 15 and or Section 16 shall be the responsibility of the General Contractor.

c. Where new work connects with existing and where existing work is altered, cut and patch and make good to match existing work.

d. Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

12. EXISTING SERVICES

a. Where work involves breaking into or connecting to existing services, submit work schedule sufficiently in advance to allow coordination of possible interruption with the Owner. Confirm each interruption 24 hours immediately prior to scheduled date of implementation.

13. ENVIRONMENTAL PROTECTION

a. Ensure that pollution and environmental control of construction activities are exercised during the work to requirements of the federal and provincial environmental acts; including, but not limited to, the Prince Edward Island Environmental Protection Act.

14. HAZARDOUS MATERIAL

a. Should material resembling hazardous materials [other than those identified within the Contract Documents], including, but not limited to spray or trowel applied asbestos, be encountered in course of work; stop work immediately. Do not proceed until written instructions have been received from Consultant.

b. Any material which contains asbestos that is disturbed or removed during construction work (see Asbestos Content Report (where applicable)), shall be removed in accordance with the regulations set out by the Occupational Health & Safety Act. All costs for proper cutting, removal and disposal of all asbestos on this contract shall be included in Tender. Refer also to Section 2C (as applicable).

c. Where work entails use, storage, or disposal of toxic or hazardous materials, chemicals and or explosives, or otherwise creates a hazard to life, safety, health, or the environment; work shall be in accordance with the Jurisdictional Authority.

15. CLEANING

a. All rubbish and construction debris must be removed from all the site on a regular basis, so that the site is maintained in a clean, safe condition. Materials removed are to be disposed of in a manner acceptable to the Provincial Department of Environment and Energy.

b. Vacuum clean all areas prior to painting and close all areas after completion of painting to restrict access to authorized persons.

c. On completion of work, by other trades, mop clean all resilient flooring strip using wet method to remove all layers of new or existing finish. Reseal with one coat sealer and two coats wax (wax to contain a minimum of 22%solids). Vacuum

clean all carpets. All cleaning to be carried out by competent cleaners.

d. Dust and clean all surfaces including glass (interior and exterior), doors and hardware.

e. Arrange and pay for replacement of heating, ventilation and air conditioning filters if operated during construction.

16. FIRES

a. Do not light fires of any sort to burn rubbish resulting from the work.

17. ACCESS TO SITE

a. Access to site shall be directed by the Consultant.

18. SITE LIMITS

a. The limits of the site are shown on the drawings and all activity relating to the contract shall be confined within these limits.

19. MAINTENANCE MANUALS

Prior to the issuance of the final certificate the following items shall be assembled and incorporated into a three-ring binder complete with table of contents:

a. All warranties and guarantees submitted by manufacturers.

b. The printed or typewritten copies of recommended maintenance procedures for all items requiring regular maintenance.

c. A copy of all approved shop drawings.

20. PERMITS

Obtain and pay for all required permits, licenses, and inspections; required by applicable laws and regulations. Except the building permit which will be paid for by the Owner.

21. TOBACCO PRODUCT USAGE BAN

The use of Tobacco products is not permitted within the building or property.

a. Property -Includes all lands and buildings under the control of the government of PEI.

b. Tobacco Products -Includes cigarettes, cigars, pipes, chewing tobacco, snuff, and any other products containing or reasonably resembling tobacco or tobacco products except approved cessation products used in approved cessation programs.

c. Tobacco Usage Ban – Includes smoking, chewing, dipping or any other form of use of tobacco products.

END OF SECTION

1. CUTTING AND PATCHING

a. Cut, patch and make good to leave work in a finished condition where new work connects with existing.

b. Sections responsible for various categories of cutting and patching are as follows:

1. All cutting and patching shall be the responsibility of the General Contractor.

c. Carry out cutting and patching in the following manner:

1. Regardless of which Subcontractor or Section of the specifications is responsible for any portion of cutting and patching work, in each case tradesmen qualified in the work being cut and patched shall be employed to carry out or supervise this work to ensure that it is correctly done.

2. Where new work connects with existing and where existing work is altered, cut and patch and make good to match existing work.

3. Do not cut, drill or sleeve load-bearing members without first obtaining The Consultant's written authority for each condition.

4. Drill work carefully, leaving clean hole not larger than required. This applies to both new and existing work.

5. Cut holes after they are located by trades requiring them.

6. Bulkheads to be constructed with steel studs, furring and seam filled gyproc.

7. Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.

8. Co-ordinate work of your Section with work of other Sections, taking into account existing installations to assure best arrangement of components in available space. For critical locations consult with Consultant before commencing work.

9. At penetrations of fire rated ceilings, walls and floor/roof assemblies, completely seal voids with fire rated material, fill thickness of constructed element

END OF SECTION

1. GENERAL

.1 This section shall install and maintain the items required to prevent environmental damage.

.2 Ensure that pollution and environmental control of construction activities are exercised during the Work to requirements of the federal and provincial environmental acts; including, but not limited to, the Prince Edward Island Environmental Protection Act.

2. DISPOSAL OF WASTE

.1 Do not bury rubbish or waste material on site.

.2 Provide containers or otherwise prevent material from being wind-blown around the site and on to adjoining properties.

.3 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

.4 All rubbish and construction debris must be removed from all the site on a regular basis, so that the site is maintained in a clean, safe condition. Materials removed are to be disposed of in a manner acceptable to the Provincial Department of Communities, Land and Environment.

END OF SECTION

1. GENERAL

.1 This section shall be responsible for the demolition and removal of items indicated on the drawings and those which must be demolished to allow for new construction, including mechanical or electrical components, which will be demolished under the supervision of the section sub-contractor.

2. PROTECTION

.1 Prevent movement, settlement or damage of structures and parts of existing building to remain. Provide bracing, shoring and underpinning as required. Make good damage caused by demolition.

.2 Take precautions to support affected structures and, if safety of building services appears to be endangered, cease operations and notify Architect.

.3 If during the demolition work a situation should develop or a condition be exposed which has the potential to endanger the safety of the occupants or users of the building or structure in which demolition work is being carried out, or occupants or users of adjoining buildings or structures, the Contractor will cease operations, take whatever emergency action, in the Contractor's opinion, is required to ensure the immediate safety of the occupants or users of these buildings or structures, and notify the Architect before continuing with the work.

3. DESCRIPTION OF WORK

.1 Perform all demolition removal and restitution as indicated, implied and required to properly complete the work of this contract.

.2 Refer closely to drawings and specifications to determine extent of demolition requirement.

.3 Demolition drawings serve only as a guide to demolition requirements. Location of new components and finishes where components exist implies removal of such components prior to new construction.

.4 Demolition of existing components, required to facilitate construction of new work is required.

4. EXECUTION

.1 Dispose of demolished materials in accordance with authorities having jurisdiction.

.2 Do not disrupt active or energized utilities and services.

.3 At the end of each days work leave the site in a safe condition, with no danger of any component toppling or falling.

.4 Remove existing equipment, services and obstacles where required for refinishing or making good of existing surfaces, and replace as work progresses.

.5 Do not sell or burn materials on site.

.6 Remove contaminated or dangerous materials, as defined by authorities having jurisdiction relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

.7 All demolished materials become the property of the Contractor, unless indicated otherwise, and are to be removed from the site and disposed of in a manner and in a location acceptable to Provincial Authority governing such disposal.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section includes:

.1 General requirements that are common to Sections of Division 26 – Electrical, and Division 27 – Communications.

1.2 RELATED SECTIONS

.1 Division 1 – General Requirements.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International) Latest Edition of the following:

.1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2 No. 0-M91 (R2006), General Requirements.

.3 CAN3-C235-83 (R2006) Preferred Voltage Levels for AC Systems, 0 to 50,000V.

1.4 SCOPE OF WORK

.1 The work shall include all labour, materials and equipment necessary for the complete installation of the electrical, communications and electronic safety and security systems shown on the drawings and described in these specifications.

.2 It is the requirement of this work to provide all systems completely functioning in intended system operation, notwithstanding that every item necessarily required may not be specifically mentioned.

.3 This Contractor is the Prime Contractor and is responsible for the following:

.1 Supply and installation of conduit sleeves and required fire sealing;

.2 Supply and install new data cabling “J” hooks as indicated on the drawings;

.3 Supply and install new data cabling and outlets as indicated on the drawings, including the labeling of the cabling at outlet and rack end;

.4 Supply and install new data cabling patch panels and horizontal wire manager to accommodate new cabling;

.5 Supply and installation of the surface mounted nonmetallic raceway and outlet boxes, as indicated. One raceway and box for power and one raceway and box for data;

.6 Supply and install surface mounted receptacles as indicated;

.7 Testing of data cabling;

.8 Wireless Access Points are supplied and installed by ITSS;

.9 This Contractor is financially responsible to obtain a subcontractor for the:

.1 Construction of a partition wall to create the new chase from the upper level to the lower level, as indicated;

.2 Cleaning, wall repair and painting associated with the installation of the new wall.

1.5 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.

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

1.6 SUBMITTALS

.1 Submittals: in accordance with Section C – General conditions of contract.

.2 Submit requested documentation to Engineer.

.3 Product Data: submit WHMIS MSDS in accordance with Section G – Safety Requirements

.4 All inquiries, shop drawings, requests for substitutions and similar items shall be submitted to the Engineer.

.5 Shop drawings:

.1 Submit drawings in accordance with Section C – General Conditions of contract.

.2 Submit installation details of proposed location, layout and arrangement of conduit and boxes, and other items that must be shown to ensure co-ordinated installation.

.3 Faxes are not acceptable for shop drawings. If sent by fax, they will not be reviewed.

.4 Do not begin fabrication until shop drawings have been reviewed by Consultant. Allow five (5) working days for Consultant review.

.5 Consultant review of shop drawings does not relieve the contractor of the responsibility for co-ordination of field measurements required to complete the work.

.6 Contractor shall approve all shop drawings by signing and dating them prior to submitting to Consultant.

.7 If changes are required, notify Engineer of these changes before they are made.

.6 Quality Control:

.1 Provide CSA certified material.

.2 Where CSA certified material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.

.3 Pill testing of empty conduit system.

.4 Permits and fees: in accordance with General Conditions of contract.

.5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Engineer.

.7 Manufacturer's Field Reports: submit to Engineer written report, within 3 days of review, verifying compliance of Work

.8 As-Built Drawings:

.1 On a set of drawings, record all changes as work progresses. Incorporate all information issued in Addenda, Site Instructions and Change Orders and all changes in actual installation as a result of site conditions and coordination.

.2 Identify each drawing in lower right hand corner in letters at least 13 mm high as follows: AS-BUILT DRAWING. This drawing has been revised to show electrical systems as installed, Name of Contractor, Signature of Contractor and Date.

.3 Submit to the General Contractor for approval and make all corrections as directed.

.9 Sustainable Design:

.1 Submit Product Data/MSDS Sheets for VOC Emitting Materials which clearly identify the actual VOC Emissions for compliance with LEED.

.2 Adhesive, sealants, paints and coatings must conform to Low VOC Standards in accordance with 01 35 60 LEED Requirements and Procedures.

1.7 SUBSTITUTIONS

.1 It is the intent of these specifications to establish the required quality of materials. Where manufacturer’s name, catalogue reference, data are used, it is done in order to establish the required quality, style, size or function. The decision as to suitability shall rest with the Engineer.

.2 All materials not meeting the standards as set down by these specifications shall not be allowed on the job site.

.3 Substitutions affecting the design will not be permitted. Additional costs to any other trade as a result of a change or substitution by this Contractor shall be borne by this Contractor.

.4 The listing of a manufacturer as acceptable does not imply acceptance of all products of that manufacturer and only products of that manufacturer

and only products meeting the standards as set out in the specifications will be accepted.

.5 All requests for alternates must be submitted no later than five (5) working days prior to tender close.

.6 Faxes are not acceptable for request for alternates. If sent by fax, they will not be reviewed.

1.8 SAMPLES

.1 Submit samples as requested.

.2 After review and acceptance, samples will be returned for incorporation into work.

1.9 TEST REPORTS

.1 Submit certified test reports and certificates to Engineer from approved independent testing laboratories.

.1 Indicate compliance with specifications for specified performance characteristics and physical properties.

.2 Manufacturer's Field Services: submit copies of manufacturer's field inspection reports.

1.10 OPERATION AND MAINTENANCE DATA

.1 Provide operation and maintenance data for incorporation into operation and maintenance manual as per Section C – General conditions of contract.

.2 Include in Operation and Maintenance Data:

.1 Table of Contents.

.2 Names, addresses and telephone numbers of local suppliers for items included in Operation and Maintenance Manuals.

.3 Copy of reviewed Shop Drawings.

.4 Name and address of Electrical Contractor.

.5 Copy of all test certificates.

.6 Copy of all final panelboard schedules.

.7 Copy of signed transmittal verifying all maintenance materials turned over to the owner/user.

.8 Two (2) paper copies of drawings and specifications.

.9 Include details of design elements, component function and maintenance requirements to effectively operate, maintain or repair.

.10 Include technical data, product data, component illustrations, technical descriptions and parts list, wiring and schematic diagrams not considered proprietary, test and verification reports. Advertising or sales literature is not acceptable.

1.11 MAINTENANCE MATERIALS

.1 Provide maintenance materials in accordance with Division 01 – General Requirements and as indicated in respective specification sections.

1.12 FIRESTOPPING

.1 All fire stopping work is to be performed by this Contractor.

.2 Electrical contractor shall coordinate all fire rated assembly penetrations with Sub Contractors.

.3 Electrical Contractor shall provide required clearances between outside surface of conduits and inside surface of sleeves, core drilled holes or listed fire rated systems.

1.13 ACCESS HATCHES

.1 All access doors shall be provided by this contractor.

1.14 INTERPRETATION OF PLANS AND SPECIFICATIONS

.1 These specifications are to be considered as an integral part of the plans which accompany them and neither the plans nor the specifications shall be used alone. Any item which is omitted in one but which is reasonably implied in the other shall be considered properly and sufficiently specified and must, therefore, be provided by this Contractor.

.2 Drawings are diagrammatic. Building dimensions shall not be scaled from the Electrical plans.

.3 Any discrepancy between the drawings and the building shall be questioned before proceeding with any installation.

1.15 CO-OPERATION OF CONTRACTORS

.1 This Contractor shall become familiar with the work of other contractors and in lying out and installing the work shall co-operate with the other Contractors, so as to facilitate the progress of the work as a whole and avoid interference or delays. Where interference exists, this Contractor shall notify the General Contractor and/or project manager and the engineer before installing the work. Any changes in the work or alterations of the Electrical Contractor's schedule required for such co-operation will not be considered as a claim for extra compensation.

.2 Due to the complexities of many sub-trades, and the restrictive space available in this project, it is required that all trades co-operate closely so as to install all systems in their allotted locations as indicated on the drawings, or as coordinated on site.

1.16 ERRORS AND OMISSIONS

.1 The drawings are not intended to show every item of accessory equipment, but the Contractor shall tender on and install all essential details to provide for efficiency of operation and ease of maintenance.

.2 Should this Contractor discover errors or discrepancies in the plans or specification, he shall refer the matter to the Engineer for change or clarification and shall not proceed with that portion of the work until advised by the Engineer to do so.

1.17 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section C – General Conditions of Contract.

.2 Store and handle materials in accordance with Section C – General Conditions of Contract and manufacturer's written instructions.

1.18 SYSTEM START-UP

.1 Instruct operating personnel in operation, care and maintenance of systems, system equipment and components.

1.19 PERMITS, FEES AND INSPECTION

.1 Submit to Electrical Inspection Department necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Obtain an electrical work permit and pay associated fees.

.3 Notify Engineer of changes required by the Electrical Inspection Department.

1.20 WARRANTY

.1 Warranty duration: 12 calendar months following Substantial Completion.

.2 Coverage: warrant against failure to perform to characteristics as specified.

.3 Manufacturer's warranty: submit manufacturer's warranty, for Engineer's acceptance.

1.21 COMMISSIONING

.1 Not Applicable

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

.1 Provide material and equipment in accordance with Section C – General Conditions of Contract

.2 Material and equipment to be CSA or ULC certified. Where CSA or ULC certified material and equipment are not available, obtain special approval from authority having jurisdiction, before delivery to site.

.3 Ensure labels are visible and readable after equipment is installed.

.4 Factory assemble electrical panels and component assemblies.

2.2 FINISHES

.1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two (2) coats of finish enamel.

.1 Paint outdoor electrical equipment "equipment" green finish to EEMAC Y1-1.

.2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

.3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

2.3 EQUIPMENT IDENTIFICATION

.1 Identify electrical equipment with nameplates and labels as follows:

.1 Nameplates: 3 mm thick plastic engraving sheet, matt white finish face, black core, lettering accurately aligned and engraved into core, self-adhesive type.

.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
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

.3 Labels:

.1 Embossed plastic labels with 6 mm high letters, unless specified otherwise.

.4 Wording on nameplates to be approved by Engineer prior to manufacture.

.5 Allow for minimum of twenty-five (25) letters per nameplate.

.6 Identification to be in English.

.7 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics. Label both box and cover.

.8 All power, switches, data and telephone outlets shall have a transparent identification permanently installed on coverplate.

2.4 WIRING IDENTIFICATION

.1 Identifying wiring with permanent indelible identifying markings, either numbered or 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 C22.1–12.

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

2.5 CONDUIT AND CABLE IDENTIFICATION

.1 Not Applicable.

2.6 HOUSEKEEPING PADS

.1 Not Applicable.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

.1 Confirm other related work is complete to receive work of this and related electrical sections.

.2 Commission electrical systems.

.3 Qualifications:

.1 Electricians: qualified, licensed electricians or apprentices in accordance with Provincial Act respecting manpower vocational training and qualifications.

.2 Apprentices: employees registered in provincial apprentices program permitted, under direct supervision of qualified licensed electrician, to

perform specific tasks. Permitted activities determined based on level of training attained and demonstration of ability to perform specific duties.

.4 Contractor holding valid Master Electrical contractor licensed as issued by Province must oversee that work is being constructed.

3.2 INSTALLATION

.1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, MSDS, and product datasheets.

.2 Protect electrical equipment from dust and dirt. Plug or cap openings in conduit, fixtures and equipment during construction with Consultant approved materials.

.3 Conceal conduit in finished areas, unless otherwise authorized. Run exposed conduit parallel to building lines, and maintain maximum headroom.

.4 Install outlets, plates and other visible items parallel to building lines. Line up exposed raceways, parallel and at right angles to building walls, partitions, and ceilings.

.5 Set equipment and components plumb and level, accurate to position intended, and position hanger rods plumb.

3.3 LOCATION OF OUTLET BOXES

.1 Do not install outlet boxes back to back in same wall or partition.

- .1 Provide minimum 150 mm horizontal separation between boxes.
- .2 Prior to completion of rough-in, relocate outlets up to 3 m at no change in Contract cost.
- .3 Locate disconnect devices on latch side of door.

.2 Equipment mounting height, from finished floor to centerline of equipment item unless indicated otherwise:

- .1 Local switches: 1200 mm
- .2 Receptacles:
  - .1 General: 400 mm
  - .2 Above top of continuous baseboard heater: 200 mm
  - .3 Above top of counters or counter splash backs: 150 mm
  - .4 In Mechanical Room: 1200 mm
- .3 Telephone outlets: 400 mm
- .4 Data outlets: 400 mm
- .5 Fire alarm:
  - .1 Pull stations: 1200 mm
  - .2 Fire alarm horn/strobes: 2300 mm

.3 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.4 Attach electrical equipment, components and devices directly to structure and structural supporting elements.

3.4 NAMEPLATES AND LABELS

.1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.5 CONDUIT AND CABLE INSTALLATION

.1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.2 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

.3 Locate outlets in accordance with Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

3.6 TESTING

.1 Provide advance notice Consultant of proposed testing schedule.

.2 Perform tests at time of acceptance of work.

.3 Perform following tests on completed power systems:

.1 Polarity tests: test circuits for correct operation of devices, switches and controls.

.2 Work, in handling, installing, applying, protecting and cleaning of products for inclusion in operation and maintenance manuals.

3.7 TEST RESULTS

.1 Submit test results to Consultant for review.

.2 Testing methods and test results: to CSA, CEC and authorities having jurisdiction.

.3 Remove and replace conductors found damaged, with new materials.

.4 Provide required labour and tools, if during testing Consultant requests equipment be opened and removed from their housings to examine equipment, terminations and connections.

3.8 TRAINING

.1 Not Applicable.

3.9 CLEANING

.1 Perform final cleaning of electrical equipment, systems and components.

3.10 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

3.11 CONTROL OF HAZARDOUS ENERGY

.1 Lock out and tag out all electrical and other equipment before performing work as per CAN/CSA-Z460-05.

3.12 CASH ALLOWANCE FOR UTILITY

.1 Not Applicable.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for wire and box connectors.

1.2 RELATED SECTIONS

.1 Division 1 – General Requirements.

.2 Section 26 05 00 – Common Work Results – Electrical.

.3 Section 26 05 21 – Wires and Cables 0 – 1000 V.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International) Latest Edition of the following:

.1 CSA C22.2, No. 18 (R2009), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.

.2 CSA C22.2 No. 65 (R2008), Wire Connectors.

.2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC) Latest Edition of the following:

.1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

Part 2 Products

2.1 MATERIALS

.1 Pressure type wire connectors to: CSA C22.2 No. 65-03, with current carrying parts of copper sized to fit copper conductors as required.

.2 Fixture type splicing connectors to: CSA C22.2 No. 65-03, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

.3 Bushing stud connectors to: EEMAC 1Y-2 to consist of: .1 Connector body and stud clamp for stranded, copper conductors. .2 Clamp for stranded copper conductors. .3 Stud clamp bolts. .4 Bolts for copper conductors. .5 Bolts for aluminum conductors. .6 Sized for conductors as indicated.

.4 Clamps or connectors for armoured cable, flexible conduit, as required to: CAN/CSA-22.2 No. 18.1.

.5 Joints required in connecting all wiring up to and including # 8 are to be made using twist-on connectors. ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.6 Joints for all other wiring shall be made using colour-keyed compression type connectors followed by a layer of CSA approved vinyl plastic type.

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. Commission electrical systems.

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

.1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.

.2 Install fixture type connectors and tighten. Replace insulating cap.

.3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Division 01 – General Requirements.

.2 Section 26 05 00 – Common Work Results – Electrical.

.3 Section 26 05 20 -Wire and Box Connectors -0 -1000 V.

.4 Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

1.2 REFERENCES

.1 CSA C22.2 No .0.3-09 (R2005), Test Methods for Electrical Wires and Cables Latest Edition.

.2 CAN/CSA-C22.2 No. 131-M89 (R2004), Type TECK 90 Cable Latest Edition.

Part 2 Products

2.1 BUILDING WIRES

.1 Conductors: solid for #10 AWG and smaller; stranded for #8 AWG and larger. Minimum size: #12 AWG. For longer runs use minimum: #10 (20-40 m); #8 (40-55 m) or #6 (>55 m) at 120 volt. On 600V circuits size to assure maximum 1.5% voltage drop.

.2 Conductors: size as indicated, with 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90 (RWU90 where specifically indicated).

.3 Conductors: ACM (Nual) conductors may be used for feeders greater than 3/0 copper and longer than 5 m.

.4 Neutral conductor insulated for 600V shall be continuous with no fuses, switches, or breaks of any kind.

.5 Wiring requirements for specialized systems such as fire alarm, public address, etc. are indicated in the respective specification sections or on drawings.

.6 The voltage drop shall in no case exceed 3% of the line volts for branch circuits.

.7 Voltage drop shall be calculated based on 80% of the circuit breaker current rating for all branch circuits unless noted otherwise.

.8 Voltage drop for motor branch circuits shall be calculated based on current equal to 80% of the ampacity of the branch circuit conductors.

.9 Branch circuit conductor sizes specified on drawings are the minimum required. Upsize branch circuit conductor sizes as required so that the voltage drop is less than the maximum value permitted.

2.2 TECK CABLE

.1 Not Applicable.

2.3 ARMOURED CABLES

.1 Not Applicable.

2.4 CONTROL CABLES

.1 Low energy 300 V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type, TW wire braid over each group and overall covering of PVC jackets.

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 OF BUILDING WIRES

.1 Not Applicable.

3.3 INSTALLATION OF TECK CABLE 0 – 1000 V

.1 Not Applicable.

3.4 INSTALLATION OF ARMOURED CABLES

.1 Not Applicable.

3.5 INSTALLATION OF CONTROL CABLES

.1 Not Applicable.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International):

.1 CSA C22.2 No .41-07, Grounding and Bonding Equipment.

Part 2 Products

2.1 CONNECTIONS AND TERMINATIONS

.1 Copper compression connectors to CSA C22.2 as required sized for conductors.

Part 3 Execution

3.1 INSTALLATION

.1 Install, terminations, and splices in accordance with manufacturer's instructions.

.2 Bond and ground as required to CSA C22.2, No. 41.

.3 Do not install more than three (3) connections per junction box unless specifically permitted by Engineer in writing.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

1.2 REFERENCES

.1 Canadian Standards Association, CSA C22.1-12, Canadian Electrical Code, Part 1.

Part 2 Products

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

.2 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as indicated.

.3 Rod electrodes: copper clad steel 19 mm dia. by 3 m long.

.4 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

.5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.
.2 Protective type clamps.
.3 Bolted type conductor connectors.
.4 Thermit welded type conductor connectors.
.5 Bonding jumpers, straps.
.6 Pressure wire connectors. Execution

2.2 MANUFACTURER'S

.1 Acceptable manufacturers: Burndy Corp., Erico Inc., Cadweld Div., Thomas & Betts (or approved equivalent.

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 GENERAL

.1 Install complete permanent, continuous grounding system including electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Make buried connections, and connections to conductive water main and grounding electrodes using copper welding by thermit process.

.5 Use mechanical connectors for grounding connections to equipment provided with lugs.

.6 Soldered joints not permitted.

.7 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.8 Install separate ground conductor to outdoor lighting standards.

.9 Connect building structural steel and metal siding to ground by welding copper to steel.

.10 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.11 Install grounding conductors in conduit except where run in cable tray. Bond to EMT conduit.

.12 Ground secondary enclosures.

3.3 ELECTRODES

.1 Make ground connections to continuously conductive underground water pipe on street side of water meter.

.2 Install water meter shunt.

.3 Install rod electrodes and make grounding connections.

.4 Bond separate, multiple electrodes together.

.5 Use size 2/0 AWG copper conductors for connections to electrodes.

.6 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

3.4 EQUIPMENT GROUNDING

.1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: Service equipment, transformers, duct systems, frames of motors, starters, control panels, building steel work, elevators, distribution panels, outdoor lighting.

.2 Where feeders over 100 A capacity pass through junction or pull boxes the ground continuity through the box shall be ensured by the use of grounding bushings and conductors sized in accordance with table 18 of CSA 22.1.

.3 Run continuous bond wire the entire length of cable tray. Bond to cable tray at each section.

3.5 GROUNDING BUS

.1 Install copper grounding bus mounted on insulated supports, on walls of electrical rooms as indicated on drawings.

.2 Use thermit weld connections for all connections to perimeter ground bus.

3.6 FIELD QUALITY CONTROL

.1 Verifications requirements in accordance with Division 01 – General Requirements.

.2 Perform tests in accordance with Section 26 05 00 -Common Work Results - Electrical.

3.7 COMMUNICATION SYSTEMS

.1 Install grounding connections for telephone, sound, fire alarm, intercommunication systems as follows:

.1 Telephones: make telephone grounding system in accordance with telephone company's requirements.

.2 Sound, fire alarm, intercommunication systems as indicated.

3.8 FIELD QUALITY CONTROL

.1 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation.

.2 Perform tests before energizing electrical system.

.3 Disconnect ground fault indicator during tests.

3.9 COMMISSIONING

.1 Contractors are required to complete the commissioning, field quality assurance and testing and performance verification as outlined in this and subsequent sections.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

Part 2 Products

2.1 SUPPORT CHANNELS

.1 U shape, size 41 x 41 x 2.5 mm thick, surface-mounted or suspended.

2.2 CABLE SUPPORTS

.1 J-Hook secured to wall or structural member for support of communications cabling. See plans for more information.

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 Secure equipment to hollow or 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.

.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 51mm and smaller.

.2 Two-hole steel straps for conduits and cables larger than 51mm.

.3 Beam clamps to secure conduit to exposed steel work.

.7 Suspended support systems:

.1 Support individual cable or conduit runs with 6 mm dia. threaded rods and spring clips.

.2 Support 2 or more cables or conduits on channels supported by 10 mm dia 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 Engineer.

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

.14 Do not support conduit from other conduit.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

Part 2 Products

2.1 SPLITTERS

.1 Not Applicable.

2.2 JUNCTION AND PULL BOXES

.1 Welded steel construction with screw-on flat covers for surface mounting.

.2 Covers with 25 mm minimum extension all around, for flush-mounted pull and junction boxes.

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 SPLITTER INSTALLATION

.1 Not Applicable.

3.3 JUNCTION AND PULL BOXES INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Install pull boxes so as not to exceed 30 m of conduit run or 2-90° bends between pull boxes.

.3 Mount cabinets with top not higher than 1800 mm above finished floor.

.4 Maximum three (3) connections per junction box unless explicitly permitted by Engineer.

3.4 IDENTIFICATION

.1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results – Electrical.

.2 Install size 2 identification labels indicating system name, voltage and phase.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

1.2 REFERENCES

.1 CSA C22.1-12, Canadian Electrical Code, Part 1.

.2 CAN/CSA-C22.2 No. 18-98 (R2003) Outlet Boxes, Fittings and Associated Hardware.

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 for special devices.

.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 SHEET STEEL OUTLET BOXES

.1 Electro-galvanized steel single and multi-gang flush device boxes for flush installation, minimum size 76 x 51 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.

.2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.

.3 102 mm square or octagonal outlet boxes for lighting fixture outlets.

.4 102 mm square outlet boxes with extension and plaster rings for voice and data outlets.

2.3 MASONRY BOXES

.1 Not Applicable.

2.4 CONCRETE BOXES

.1 Electro-galvanized sheet steel concrete type boxes for flush mounted devices in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

.1 Cast FS boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.

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 32 mm and pull boxes for larger conduits.

.4 Double locknuts and insulated bushings on sheet metal boxes.

.5 **EMT fittings to be steel set screw type.**

2.7 IDENTIFICATION

.1 All boxes installed above finished ceilings and in interstitial levels shall have their covers color coded, as described in these specifications, and shall be labelled as to room number they serve.

2.8 FLOOR BOXES

.1 Not Applicable.

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 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, and armored cable connections. Reducing washers are not allowed.

.5 All boxes shall be installed recessed/flush unless indicated otherwise.

.6 Install all outlet boxes in exterior walls with flexible vapour barrier and seal with caulking.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

1.2 REFERENCES

.1 Canadian Standards Association (CSA) Latest Edition of the following:

- .1 CAN/CSA C22.2 No. 18.1-04 (R2009), Metallic Outlet Boxes.
- .2 CAN/CSA C22.2 No. 18.3-04 (R2009), Hardware for the Support of Conduit, Tubing and Cable Fittings.
- .3 CAN/CSA C22.2 No. 18.5-02 (R2007), Positioning Devices.
- .4 CSA C22.2 No. 45.1-07, Electrical Rigid Metal Conduit – Steel.
- .5 CSA C22.2 No. 45.2-07, Electrical Rigid Metal Conduit – Aluminum, Red Brass and Stainless Steel.
- .6 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
- .7 CSA C22. 2 No. 83.1-07, Electrical Metallic Tubing – Steel.
- .8 CSA C22.2 No. 211.2-06, Rigid PVC (Un-plasticized) Conduit.
- .9 CAN/CSA C22.2 No.227.3-05, Non-Metallic Mechanical Protection Tubing (NMPT), National Standard of Canada (February 2006).

Part 2 Products

2.1 CONDUITS

.1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83 – M 1985 (R003), with couplings.

2.2 CONDUIT FASTENINGS

.1 One-hole steel straps to secure surface conduits 51 mm and smaller. Two hole steel straps for conduits larger than 51 mm.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits at 1.5 m oc.

.4 Threaded rods, 6 mm diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Rain tight EMT connectors shall be used on "vertical" sections of conduit runs where terminating into tops of electrical equipment incorporating drip shields or hoods.

.2 Fittings: Use set screw connectors and fittings for EMT. Coating: same as conduit.

.3 Factory "ells" where 90 degree bends are required for 25 mm and larger conduits.

.4 Connectors for flexible conduit shall be set screw galvanized steel.

.5 Connectors for liquid tight flexible conduit shall be water tight, compression type galvanized steel.

.6 Threaded plastic or metal bushings to be installed on all EMT connectors sizes 35 mm and larger.

.7 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

.1 Weatherproof expansion fittings with internal bonding assembly suitable for 25 mm linear expansion.

.2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.

.3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

.1 Polypropylene.

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

.2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.

.3 EMT shall be installed as a complete system.

.4 Support of electrical systems raceway shall be independent of any type of suspended ceiling support rods, wires, etc. and mechanical piping or duct systems.

.5 Use electrical metallic tubing (EMT) for all work, unless otherwise indicated, for panelboard feeders, branch circuit wiring, fire alarm and communications, etc., where not installed underground unless specifically indicated otherwise. Provide a separate green ground for all conduit systems, including E.M.T.

.6 Minimum conduit size for lighting and power circuits: 20 mm.

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

.8 Mechanically bend steel conduit over 22 mm dia.

.9 Install rigid galvanized steel threaded conduit for service cables for electrical vault to service entrance boards.

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

.11 Install fish cord in empty conduits.

.12 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.

.13 Dry conduits out before installing wire.

.14 Securely fasten in place within 83 mm of each outlet box, junction box, cabinet, coupling or fitting, maximum spacing between supports as follows:

.1 1.5 m for 21 mm trade size conduit and smaller.

.2 2 m for 27 mm to 35 mm trade size conduit.

.3 3 m for 41 mm trade size and larger.

.15 Ground Wires:

.1 Provide a separate green ground wire in all conduit, including EMT.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Run conduits in flanged portion of structural steel.

.3 Group conduits wherever possible on suspended or surface channels.

.4 Do not pass conduits through structural members except as indicated.

.5 Do not locate conduits less than 76 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

.6 Unless approved in writing by Engineer, surface conduits are acceptable only in electrical, communications and mechanical rooms.

3.4 CONCEALED CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Do not install horizontal runs in masonry walls.

.3 Do not run conduits horizontally in walls and do not run conduit on inside of metal studs.

.4 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

.1 Not Applicable.

3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

.1 Not Applicable.

3.7 CONDUITS UNDERGROUND

.1 Not Applicable.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials for moulded-case circuit breakers.

1.2 RELATED SECTIONS

.1 Division 1 – General Requirements.

.2 Section 26 05 00 – Common Work Results – Electrical.

.3 Section 26 24 17 – Panelboards Breaker Type.

1.3 REFERENCES

.1 Canadian Standards Association (CSA International) Latest Edition of the following:

.1 CSA-C22.2 No. 5-2 (R2007), Moulded-Case Circuit Breakers, Moulded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).

1.4 SUBMITTALS

.1 Submit Shop Drawings in accordance with Section C.

Part 2 Products

2.1 BREAKERS - GENERAL

.1 Moulded-case circuit breakers: to CSA C22.2 No. 5

.2 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.

.3 Common-trip breakers: with single handle for multi-pole applications.

.4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.

.1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

.5 Circuit breakers to have minimum symmetrical rms interrupting capacity rating to match panel.

2.2 THERMAL MAGNETIC BREAKERS

.1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 GFCI BREAKERS

.1 Not Applicable.

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 Install circuit breakers as indicated.

3.3 TESTS

.1 Not Applicable.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

.2 Section 26 05 28 – Grounding – Secondary.

1.2 REFERENCES

.1 American National Standards Institute

.1 ANSI J-STD-607-A-2002, Joint Standard -Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.

.2 Telecommunications Industries Association (TIA)/Electronic Industries Alliance (EIA)

.1 TIA/EIA-606-2002, Administration Standard for the Commercial Telecommunications Infrastructure.

.3 U.S. Department of Labor/Occupational Safety and Health Administration (OSHA)

.1 Nationally Recognized Testing Laboratory (NRTL).

1.3 SYSTEM DESCRIPTION

.1 Telecommunications grounding and bonding system consisting of grounding bus bars, bonding backbones, and other bonding conductors.

.2 Provides ground reference for telecommunications systems within building and bonding to ground of equipment in telecommunications rooms.

.3 Metallic pathways, cable shields, conductors, and hardware within telecommunications spaces are bonded to telecommunications grounding and bonding system.

Part 2 Products

2.1 TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)

.1 Predrilled copper bus bar, listed by NRTL with holes 8 mm diameter for use with standard sized lugs to: ANSI J-STD-607-A.

.2 Dimensions 6 mm thick, 50 mm wide, 600 mm long to: ANSI J-STD-607-A.

2.2 TELECOMMUNICATIONS GROUNDING BUSBARS (TGB)

.1 Not Applicable.

2.3 BONDING CONDUCTOR FOR TELECOMMUNICATIONS

.1 Copper conductor, green insulated, size as indicated to: ANSI J-STD-607-A.

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 TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)

.1 Install TMGB on insulated supports 50 mm high close to telephone backboard.

3.3 TELECOMMUNICATIONS GROUNDING BUSBARS (TGB)

.1 Not Applicable

3.4 BONDING CONDUCTORS – GENERAL

.1 When placed in ferrous metallic conduit or EMT, bond one end of conduit or EMT using grounding bushing.

3.5 BONDING CONDUCTOR FOR TELECOMMUNICATIONS

.1 Install bonding conductor for telecommunications, size as indicated, from TMGB to service equipment (power) ground.

.2 Use approved 2-hole compression lugs for connection to TMGB.

3.6 BONDING TO TMGB

.1 Bond metallic communications raceways terminated at the telephone backboard to TMGB using #6 AWG green insulated copper conductor.

.2 For communications cables near telephone backboard having shield or metallic member, bond shield or metallic member to TMGB.

.3 Bond equipment racks and cabinets near telephone backboard to TMGB using #6 AWG green insulated copper conductor.

3.7 BONDING TO TGB

.1 Not Applicable.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

.2 Section 26 05 31 – Splitters, Junction and Pull Boxes.

.3 Section 26 05 34 -Conduits, Conduit Fastenings and Conduit Fittings.

.4 Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

.5 Section 26 05 36 – Cable Trays for Electrical Systems.

1.2 SYSTEM DESCRIPTION

.1 Raceway system for communications systems consisting of outlet boxes, cover plates, conduits, pull boxes, fish wires, cable tray and overhead J-hook distribution system. Products

Part 2 Products

2.1 MATERIAL

.1 Conduits: In accordance with Section 26 05 34 -Conduits, Conduit Fastenings and Conduit Fittings.

.2 Junction and pull boxes: in accordance with Section 26 05 31 – Splitters, Junction and Pull Boxes.

.3 Outlet boxes, conduit boxes and fittings: in accordance with Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

.4 Fish wire: polypropylene type.

.5 J-hooks: As noted on the drawings..

.6 Cable tray: Not Applicable.

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 Install fish wire, outlet boxes, pull boxes, coverplates, conduit, cable tray, J-hooks, miscellaneous and positioning material to constitute a complete system, in preparation for cable installation under this contract.

.2 Cable Tray (Wire Basket): Not Applicable.

.3 J-Hooks:

- .1 Supply and install J-hooks for conveyance of communications system cabling from individual conduit stubs to communications rooms.
- .2 Maximum length of unsupported communications cabling shall be 610 mm.
- .3 J-hooks shall be spaced not more than 610 mm apart.
- .4 Coordinate locations of J-hooks with other trades to ensure that they are easily accessible.
- .5 J-hooks shall only be installed in accessible ceiling spaces and in service rooms.

.4 Conduits:

- .1 Provide conduits for conveyance of communications system cabling as follows:
  - .1 In ceiling spaces that are not accessible (i.e. above gypsum board ceilings).
  - .2 In public areas that have exposed (open) ceilings.
  - .3 For all fiber optic cables.

.5 Voice/Data Outlets:

- .1 Provide a 100mm x 100mm flush-mounted outlet box c/w square single-gang tile ring.
- .2 Provide minimum 21mm EMT conduit from outlet box to accessible corridor ceiling space or to nearest cable tray c/w pull rope and grounding bushing.
- .3 Bond conduit grounding bushing to nearest power conduit using #12AWG bare solid copper.

.6 Data outlets for wireless access points:

- .1 Provide a 100mm x 100mm surface-mounted outlet box in accessible ceiling space c/w square single-gang tile ring.
- .2 Provide conduit and bonding as indicated in Article 3.2.4.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 26 05 00 – Common Work Results – Electrical.

.2 Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

.3 Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

.4 Section 27 05 28 – Pathways for Communications Systems.

1.2 REFERENCES

.1 All materials, equipment and installation practices shall comply with the latest applicable standards from CSA, CEC, UL, IEEE, ANSI, EIA, TIA, and NBOHS. Work shall comply with all applicable city and provincial codes.

.2 CSA T-527 Grounding and bonding for telecommunications in commercial building.

.3 CSA T-528 Design guidelines for administration of telecommunications wiring systems in commercial building.

.4 CSA T-529 Design guidelines for telecommunications wiring systems in commercial building.

.5 CSA T-530 Building facilities, design guidelines for telecommunications.

.6 All wiring shall meet category 6 specifications.

.7 Where requirements of the specifications conflict with any of the above, the contractor shall advise the owner, who will render a decision before work is undertaken.

.8 Canadian Standards Association (CSA International):

.1 C22.1-12, Canadian Electrical Code, Safety Standard for Electrical Installations.

.2 CSA-C22.2, No. 214-08, Communications Cables.

.9 American National Standards Institute (ANSI)/Telecommunications Industry Association (TIA):

.1 ANSI/TIA-568-C.1 (February 2009), Commercial Building Telecommunications Cabling Standard.

.2 ANSI/TIA-568-C.3 (June 2008), Optical Fiber Cabling Components Standard.

.3 ANSI/BICSI-568-2008, Standard for Installing Commercial Building Telecommunications Cabling.

.4 TIA-568-B.10 (April 2008), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.

.5 TIA-606-A-1 (January 2009), Administration Standard for the Commercial Telecommunications Infrastructure.

1.3 SYSTEM DESCRIPTION

.1 This division shall provide a complete wiring system for telephone/data service. This Division shall furnish all labour and materials, tools, etc. to facilitate this work.

.2 Install fish wire, outlet boxes, pull boxes, coverplates, conduit, cable tray, J-hooks, miscellaneous and positioning material to constitute a complete system, in preparation for cable installation under this contract.

.3 Installation as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010, attached.

.4 Conduits:

.1 Provide conduits for conveyance of voice/data system cabling as follows:

.1 In ceiling spaces that are not accessible (i.e. above gypsum board ceilings).

.2 In public areas that have exposed (open) ceilings.

.5 Outlets for Voice/Data, security, access control and CCTV

.1 Supply and install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010.

.6 Data outlets for wireless access points:

.1 Supply and install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010.

1.4 SUBMITTALS

.1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results – Electrical.

.2 Submit proof of Performance Certificate.

.3 Submit Cable Test Results.

.4 Provide shop drawings in accordance with Section C General Conditions of Contract.

.5 As-built Records and Drawings:

.1 Provide As-build drawings in accordance with Section C General Conditions of Contract..

.2 Provide and place one (1) hard copy of as-built records in telecommunications room.

1.5 GUARANTEE

.1 Entire system “End to End”, shall be verified and guaranteed for a period of 25 years from date of acceptance. Guarantee shall be single source for all components “End to End” including patch cords.

Part 2 Products

2.1 MATERIALS

.1 UTP Cable (Data)

.1 Supply and install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010.

.2 Conduits shall be EMT size as indicated, installed where indicated.

.2 Outlets (Data)

.1 All Ceiling mounted Wireless Access Port (WAP) boxes are to be MDVO side entry boxes, grey in colour.

.1 Belden; A0645271

.2 All wall mounted LAN boxes are to be MDVO style jacks 4-port angled face plates supplied and install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010.

.3 UTP Cable (Telephone)

.1 Not Applicable.

.4 Outlets (Telephone)

Not Applicable.

.5 Patch Panels

.1 Supply and install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010.

.2 Contractor to allow for the supply and installation of three (3) 48 port Patch Panels.

.6 Patch Cords

.1 Supply and install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010, EXCEPT Contractor to supply patch cords at both the main data rack and in the individual

rooms. Number of patch cords required shall be determined by the number of data outlets shown on the Drawings. Patch cord length required in these amounts:

.1 4 feet, 100% of total count.

2.2 TERMINATIONS

.1 Install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010.

.2 This Contractor is to do all terminations at outlet and rack. Terminations are to be completed by a certified technician to provide 20-year life warranty on the system.

.3 Perform tests in accordance with Category 6 requirements.

.4 Identify cable at each end (at outlet and rack) and identify outlet cover plate by room or jack data number.

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 The network shall be designed and installed using industry standard equipment, and procedures. The contractor assumes responsibility for ensuring the electrical and mechanical integrity of all parts of the network. Any parts of the network not operating properly shall be made operational prior to system acceptance.

.2 Installation shall be performed, using accepted practices, by personnel with the following capabilities and experience:

.1 Communication installation experience with UTP.

.2 Knowledge of applicable building code, regulations, and CSA telecommunication standards, in particular, CSA T-530, CSA T-529, CSA T-528 and CSA T-527.

.3 All wiring shall be adequately supported and run perpendicular to building lines. Where conduit or a cable conveyance system is not used, wiring shall be supported every 2'-0" maximum by cable hook. Cabling shall be bundled using Velcro ties every 4'-0" maximum throughout building.

.4 Appropriate care and installation techniques shall be used to ensure that the manufactures specifications for minimum bend radius, maximum tensile rating and vertical rise are not exceeded.

.5 No splices are allowed in the UTP cable.

.6 Any additional materials deemed necessary for cable management (i.e. distribution rings, Velcro ties, cable hooks, etc.) shall be provided by the contractor. Plastic tie-wraps are not permitted. Supply and install required vertical and horizontal cable managers within the data racks and chimneys up to the ceilings as required.

.7 Each faceplate will have an appropriate icon to illustrate whether it is voice or data.

.8 Both the patch panels and the faceplates will be clearly labelled. The numbering scheme will be determined prior to the beginning of the installation.

.9 Each cable shall be permanently imprinted with a typewritten identification adhesive label. Identification tags must be installed within 2 feet of each end of the cable. The numbering scheme will be determined prior to the beginning of the installation.

.10 The maximum allowable cable length is 295 feet from the mechanical termination of the media at the horizontal cross-connect in the telecommunication closest to the telecommunications outlet/connector in the work area.

.11 Supply and install as per the Government of Prince Edward Island Structured Cabling Standards, January 26, 2010.

3.3 SYSTEM VERIFICATION

.1 Prior to system acceptance, the Contractor shall provide a certificate of proof of performance verifying that all work described in this document and any future revisions has been completed and that the complete network functions as intended. Entire data installation shall be Belden certified, end to end.

.2 Each MDVO faceplate shall be clearly labelled with the cable number or drop number as agreed upon prior to installation and as indicated in the label section with the Owner.

.3 Every pair of voice and data station wires shall be tested from the patch panel to the wall jack to ensure the pair polarity is maintained and that the pair plan is followed throughout the installation. The testing should also ensure that no shorts or opens exist within a given pair and that there are no shorts, miswires or reversals between the pairs. The testing will be conducted using a microtest penta scanner. All tests must meet CSA T-529 M95 ANSI/EIA/IA-568A (10.0) parameters. The installer shall submit documentation on the procedures used

and certify that the testing requirements were met. The length of each cable shall be documented.

.4 Testing will be performed in conformance with CSA T529 EIA/TIA 568A. All test results are to be provided to the Owner in hard copy and in electronic format.

.5 Every run of UTP backbone cable installed and terminated shall be tested from patch panel to patch panel to ensure that it meets all Cat 6e requirements as detailed in CSA T529 M95, EIA/TIA 568A. The Contractor shall submit documentation on the procedures used, certify that the testing requirements were met and provide completed test results. The test results become the property of the Owner upon system acceptance.

.6 Fiber testing shall be done in accordance with ANSI/TIA/EIA-568A. All results shall be tabulated in an organized fashion and returned to the Owner at the completion of the job, signed by the Installer completing the work. The test results become the property of the Owner upon system acceptance.

3.4 PRE-APPROVED DATA CABLING CONTRACTORS

.1 All cabling Contractors must be approved by Belden.

END OF SECTION

APPENDIX A

Government of Prince Edward Island
Structured Cabling Standards

Government of Prince Edward Island
Structured Cabling Standards
January 26, 2010

Emerging technologies dictate that it is no longer allowable to simply integrate various manufacturers' components into a building's structured cabling. In order to guarantee network performance, a single manufacturer's "system" of matched components is required. Our standard is Belden IBDN System 4800, GigaFlex Category 6.

It is also paramount that all new or renovated construction utilizes the latest available technology, eliminating the need and costly process of network infrastructure replacement, in the future.

The following standards apply to all network cabling installations:

1. All installers shall be familiar with and follow these industry standard documents:

   ANSI/TIA/EIA-569-A (CSA T530)
   ANSI/TIA/EIA-607 (CSA T527)
   ANSI/TIA/EIA-568-B.1, B.2, B.2-1 & B.3
   ANSI/TIA/EIA-606A
   ANSI/TIA/EIA-862
   TSB-155, IEEE 802.3an

2. The entire system shall meet or exceed the current day **Category 6** standard specifications, which includes four-pair, 23 gauge, copper cabling performance of 300 MHz. <u>Only matched components from one manufacture`s system shall be used to provide an end -to-end solution</u>. Provide complete system consisting of outlet boxes, cover plates, patch panels, patch cords, and cable, etc. The contractor shall verify that all system parts received meet specification, prior to installation.

3. 4-port angled face plates shall be for MDVO style jacks, with 3 ports used in each instance (2 data, 1 telephone). The upper ports are to be used for data terminations and the lower for voice, unless otherwise stated. The MDVO jacks in angled face plates are to be installed as designed by the manufacturer, which in this case has the printing inverted. This allows the release tab on the data cable to be facing upwards, making it easier to remove from the jack.

4. Each horizontal cable, data outlet, and patch panel port shall bear the same identifying number. The numbering scheme for the building data outlets shall be assigned in a logical, sequential manner. Numbering on the plates shall be <u>*viewable from both in front and above*</u>. A contractor must assign these jack numbers on the floor plans, prior to pulling in any cable.

5. Patch panels shall be Belden Category 6 Flex, for GigaFlex MDVO style jacks, for mounting in 19 inch floor mounted rack. Panels to be a matched components of the cabling system being installed; 24-port one rack unit high; 48-port two rack units high. Allow for 25% spares.

6. Patch cords shall be Category 6 Belden GigaFlex. Two patch cords required for each data line. Cable jacket and boots to match system color code:

   "Green" jacket and boots for Belden/CDT GigaFlex System
   "Blue or Grey" jacket and boots for Standard Cat5 UTP cable

   a) Standard patch cord lengths are not to exceed 10 feet. Cords of up to 25' *may* be used temporarily if it can be shown that the total electrical length of the connection to the switch remains under 100 feet, until such time as additional runs can be installed.

7. Contractor to supply patch cords at both the main data rack and in the individual rooms. Number of patch cords required shall be determined by the number of data outlets shown on the Drawings. Patch cord length required in these amounts:

   - 4 feet, 30% of total count.
   - 7 feet, 50% of total count
   - 10 feet, 20% of total count.

8. The installer shall be responsible for providing to IT Shared Services:
   - a map of the data outlet numbering and cable pathways on a copy of the building floor plan(s)
   - test results for each channel with a Level IV meter, using the standard specifications for Category 6.

9. All cable terminations shall be installed and tested to the T-568A wiring standard.

10. The contractor shall guarantee that all aspects of their installation shall be free from defects, and shall warranty workmanship and materials for a period of one (1) year from the date of inspection and acceptance by the representative of Provincial Treasury, IT Shared Services. The contractor shall assume all costs associated with repair or replacement; any form of cable trauma will be considered a defect and shall require replacement.

11. Category 6 data cabling shall meet or exceed specifications for Category 6, be 4 pair, 23 AWG, with FT4 rated insulation. Accepted systems are color-coded to uniquely identify the individual system horizontal cabling. For cabling:

Green	Belden/CDT (Nordx) System (4812LX)
Blue	Standard Cat5 UTP cable
White	All telephone copper cable

    Cabling for telephone shall be of Category 6 type (Belden 2412)

12. If an installed base of a manufacturer's Category 5E or 6 system is already

installed, consult with the IT Shared Services representative for the specification of product to be installed. If there are any deficiencies, anomalies, link length issues, design flaws, fit up problems regarding to the structured cabling system, the Contractor shall contact the IT Shared Services representative for clarification and/or resolution, before proceeding.

13. All Cat6 T-568A MDVO's shall bear the following colors for ease of identification, in the event of their usage:

Green	Belden/CDT (Nordx) Cat6 GigaFlex Data jacks
Blue	Regular Cat5 data jacks
White	Voice cable termination jacks GigaFlex
Black	Fax cable termination jacks GigaFlex

14. Patch panels shall only be mounted in IT Shared Services approved equipment racking device(s). This shall be in accordance with the attached Rack or Cabinet Package Documents. No substitutions.

15. Attachment of panels and devices to specified racks and cabinets shall use only 10-32 Robertson rack mounting screws; accepted - Middle Atlantic part # HS.

16. The Installer shall leave a minimum of 12" of excess UTP cable on the data outlet termination to facilitate future re-termination. The excess cable is to be stored in a sweeping "S" pattern; coils are <u>not</u> permitted.

17. The Installer shall leave a minimum of 3 meters of excess UTP cable on the patch panel end to facilitate future repositioning of panels on the rack unit. The excess cable is to be stored in a sweeping "S" pattern; coils are <u>not</u> permitted.

18. Where applicable, the rear outside of vertical cable management troughs shall be used to control cables attaching to the racking unit. This shall be in accordance with a document supplied to the installer, detailing the type and configuration of such device.

19. Where physical security is of concern, all network cables shall be enclosed in continuous conduit from the workstation outlet to the secure telecommunications room. The conduit shall be of sufficient size to meet the maximum forty (40) percent fill ratio and turn radius specifications.

20. Horizontal cabling shall be installed to the manufacturer's specifications, including but not limited to, the minimum bend radius. The contractor shall be responsible for proper bundling (with velcro wraps) and handing of all cables (with cable trays, Caddy Fasteners and/or "J" hooks) between the telecommunication closets and the workstation MDVOs, in common pathways (above corridors); the "home run" method is not permitted. Cable bundles should be supported at 2 foot intervals.

21. Each workstation outlet plate shall be configured with a minimum of 2 data drops

plus telephone service if required. Data drops shall only be used to deliver data services and shall not be used for any other service to the workstation.

22. **Installer shall be trained by the manufacturer of the cabling system being installed, following methods demonstrated in that training, and shall pocess a valid Certificate of Completion from the manufacturer, for the courses taken. Training must have been taken within the previous three (3) years, to be considered "valid". Certificates must be made available to the IT Shared Services representative for review, upon request.**

23. Before deviating from these methods, contact the Department of Provincial Treasury IT Shared Services representative.

24.

Belden IBDN System 4800 components include:

4812 005 1000	GigaFlex 4812, 4-pair, 23 AWG, CMR, Cat 6, Green, 1000 ft.
AX101070	CAT6+ Modular Jacks, for Data
AX101065	CAT6+ Modular Jacks, for Voice
AX101066	CAT6+ Modular Jacks, for Fax
AX350056	Belden GigaFlex PS6+ patch cables 4 feet, green
AX350057	Belden GigaFlex PS6+ patch cables 7 feet, green
AX350058	Belden GigaFlex PS6+ patch cables 10 feet, green
AX101456	Flex Patch Panel, 1U , 24-port, black
AX101458	Flex Patch Panel, 2U, 48-port, black
A0645269	MDVO Angled Entry Faceplate
AX101437	Interface Plate, Flush, 4-port, White

25.

Relay Rack Package Components

PART: Description	Product Code/Ordering #	Manufacturer	Quantity per pkg
Relay Rack Package - no substitutions			
Relay rack with 2 vertical cable management, black	DRR-44 + 2 DRCC-44CAN	Middle Atlantic	1
Power strip for rack	PB-12-IS/6FTCRD	Electron Metal	1
Organizer Ring Panel Horizontal Cable Management	AO403977	Belden IBDN	6
Horizontal Cable Manager, 1U, Black	HCM-1D	Middle Atlantic	4
Rack Drawer, 3U	UD3	Middle Atlantic	1
Universal Rackshelf, 1U, frontmount	U1	Middle Atlantic	1
Vented Center mount shelf, 2U	U2MS	Middle Atlantic	2
Formed blank panel 1U, black	EB1	Middle Atlantic	4
Formed blank panel 2U, black	EB2	Middle Atlantic	6
Heavy Duty Sliding Shelf	SS	Middle Atlantic	1
10-32 Pan Head Rack mounting screws and washers	HS	Middle Atlantic	100
IEC Power Cord, 12 inch, 4 per pkg	IEC-12X4	Middle Atlantic	1
IEC Power Cord, 18 inch, 4 per pkg	IEC-18X4	Middle Atlantic	1
IEC Power Cord, 24 inch, 4 per pkg	IEC-24X4	Middle Atlantic	1
Velcro Roll, 75 feet	99-050-QT-1	Polygon	1
Cable Ties, 7 inch, bag of 100	TY-525-MX	Thomas & Betts	1

26. Acceptable Conduit Runs
    - Achieve the best direct route (e.g., usually parallel to building lines) with no bend greater than 90 degrees or an aggregate of bends in excess of 180 degrees between pull points or pull boxes.
    - No continuous sections longer than 30.5 m (100 ft).
    - Be bonded to ground on one or both ends in accordance with national or local requirements.
    - Withstand the environment to which they will be exposed.
    - For runs that total more than 30.5 m (100 ft) in length, pull points or pull boxes should be inserted so that no segment between points/boxes exceeds the 30.5 m (100 ft) limit.
    - Total conduit runs should be kept to 45.8 m (150 ft) or less (including the sections through pull boxes).

27. Conduit Capacity

		Cable Outside Diameter mm (in)							
Inside Diameter (mm)	Trade Size	3.3 (0.13)	4.6 (0.18)	5.6 (0.22)	6.1 (0.24)	7.4 (0.29)	7.9 (0.31)	9.4 (0.37)	13.5 (0.53)
16	1/2	1	1	0	0	0	0	0	0
21	3/4	6	5	4	3	2	2	1	0
27	1	8	8	7	6	3	3	2	1
35	1-1/4	16	14	12	10	6	4	3	1
41	1-1/2	20	18	16	15	7	6	4	2
50	2	30	26	22	20	14	12	7	4
63	2-1/2	45	40	36	30	17	14	12	6
78	3	70	60	50	40	20	20	17	7
91	3-1/2	—	—	—	—	—	—	22	12
100	4	—	—	—	—	—	—	30	14

- cable capacity of horizontal pathway conduits that have no more than two 90 degree bends (180 degrees total) and are no longer than 30.5 m (100 ft).

The table shows the conduit fill ratio guidelines for horizontal cables; however, the number of cables that can be installed is actually limited by the allowed maximum pulling tensions of the cables. Maximum conduit fill ratio is 40%.

28. Maximum Category 6 cable lengths apply to all horizontal distribution cables; from the Horizontal Cross-connect (patch panel) to the telecommunications outlet

(workstation end), maximum cable length is 90 meters, (295 feet) including slack

Subsystem	Backbone lengths up to:	Data rates up to:
Campus backbones (OM1 fiber)	2 km (1.2 mi)	155 Mb/s
Campus backbones (OM2 fiber)	550 m (1804 ft)	1 Gb/s
Building backbones (OM2 fiber)	300 m (984 ft)	1 Gb/s
Building backbones (OM3 fiber)	300 m (984 ft)	10 Gb/s
Campus/building backbones (OS1 fiber)	2000 m (6560 ft)	10 Gb/s

requirements. BAS horizontal link lengths are also limited to 90 meters, independent of the media type.

29. Maximum fiber optic cable lengths are as follows:

    As a general guideline in premises applications for backbone cabling, OM1, 62.5/125 µm; OM2, 50/125 µm; or OM3, laser optimized 50/125 µm optical multimode fiber is recommended for applications supported for these lengths and data rates. Single mode fiber may also be required for premises applications.

30. Fiber optic backbone requirements shall be supplied on a separate design document.