

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
**Bid Receiving Public Works and Government
Services Canada/Réception des soumissions
Travaux publics et Services gouvernementaux
Canada**
800 Burrard Street, 2nd floor
800, rue Burrard, 2e étage
Vancouver
British Columbia
V6Z 0B9
Bid Fax: (604) 775-9381

INVITATION TO TENDER
APPEL D'OFFRES

**Tender To: Public Works and Government Services
Canada**

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

**Soumission aux: Travaux Publics et Services
Gouvernementaux Canada**

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici et sur toute feuille ci-annexée, au(x) prix indiqué(s).

Comments - Commentaires

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

Issuing Office - Bureau de distribution
**Public Works and Government Services Canada -
Pacific Region**
800 Burrard Street, 12th floor
800, rue Burrard, 12e étage
Vancouver
British C
V6Z 0B9

Title - Sujet Elijah Smith - Lighting Upgrade	
Solicitation No. - N° de l'invitation E0276-141875/A	Date 2014-01-17
Client Reference No. - N° de référence du client	GETS Ref. No. - N° de réf. de SEAG PW-\$PWY-026-7199
File No. - N° de dossier PWY-3-36281 (026)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2014-02-04	
Time Zone Fuseau horaire Pacific Standard Time PST	
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Liu (PWY), Patty	Buyer Id - Id de l'acheteur pwy026
Telephone No. - N° de téléphone (604) 775-6227 ()	FAX No. - N° de FAX (604) 775-6633
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: PWGSC - Elijah Smith Federal Building - Whitehorse, YK	

Instructions: See Herein

Instructions: Voir aux présentes

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

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INVITATION TO TENDER

IMPORTANT NOTICE TO BIDDERS

LIMITATION OF LIABILITY

PWGSC is limiting the Contractor's first party liability for work in Low Rise, High Rise and Heritage Buildings. See changes to GC1.6 "Indemnification by the Contractor" of R2810D in the Supplementary Conditions.

INSURANCE TERMS

The Insurance Terms have been amended. Refer to the Supplementary Conditions.

R2940D CLAUSE IS CANCELLED AND SECTION 3.8 OF R2830D IS MODIFIED

Following the repeal of the Fair Wages and Hours of Labour Act, R2940D clause will be non applicable for contracts awarded after January 1st 2014. For contracts awarded prior to that date the clause remains applicable.

As a result section 3.8 of R2830D has been modified as indicated in Supplementary Conditions SC03.

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- SI10 Web Sites

GENERAL INSTRUCTIONS TO BIDDERS (GI) - R2710T (2013-06-27)

The following GI's are included by reference and are available at the following Web Site

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R>

- GI01 Code of Conduct and Certification - Bid
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BA08 Signature

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SPECIAL INSTRUCTIONS TO BIDDERS (SI)

SI01 CODE OF CONDUCT AND CERTIFICATIONS - RELATED DOCUMENTATION

By submitting a bid, the Bidder certifies that the Bidder and its affiliates are in compliance with the provisions as stated in Section 01 Code of Conduct and Certifications - Bid of Standard Instructions to Bidders R2710T (2013-06-27). The related documentation therein required will assist Canada in confirming that the certifications are true.

SI02 BID DOCUMENTS

1. The following are the bid documents:

- a. Invitation to Tender - Page 1;
- b. Special Instructions to Bidders
- c. General Instructions to Bidders [R2710T] (2013-06-27)
- d. Clauses & Conditions identified in "contract documents"
- e. Drawings and Specifications;
- f. Bid and Acceptance Form and related Appendice(s); and
- g. Any amendments issued prior to solicitation closing

2. General Instructions to Bidders is incorporated by reference and is set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site:

<http://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>

SI03 ENQUIRIES DURING THE SOLICITATION PERIOD

1. Enquiries regarding this bid must be submitted in writing to the Contracting Officer named on the Invitation to Tender - Page 1 as early as possible within the solicitation period. Except for the approval of alternative materials as described in GI15 of R2710T, of the General Instructions to Bidders, enquiries should be received no later than five (5) calendar days prior to the date set for solicitation closing to allow sufficient time to provide a response. Enquiries received after that time may not result in an answer being provided.
2. To ensure consistency and quality of the information provided to Bidders, the Contracting Officer shall examine the content of the enquiry and shall decide whether or not to issue an amendment.
3. All enquiries and other communications related to this bid sent throughout the solicitation period are to be directed ONLY to the Contracting Officer named on the Invitation to Tender - Page 1. Failure to comply with this requirement may result in the bid being declared non-responsive.

SI04 SITE VISIT

A Site Visit has been scheduled for at Wednesday, January 29, 2014 at 0900 PST. Interested Bidders are to meet in the lobby of the Elijah Smith office building located at 300 Main Street, Whitehorse, YT.

SI05 REVISION OF BID

A bid may be revised by letter or facsimile in accordance with GI10 of R2710T of the General Instructions to Bidders. The facsimile number for receipt of revisions is (604) 775-9381.

SI06 BID RESULTS

1. A public bid opening will be held in the office designated on the Front Page "Invitation to Tender" for the receipt of bids shortly after the time set for solicitation closing.
2. Following solicitation closing, bid results may be obtained by calling No. (604) 775-9384.

SI07 INSUFFICIENT FUNDING

In the event that the lowest compliant bid exceeds the amount of funding allocated for the Work, Canada in its sole discretion may

- a. cancel the solicitation; or
- b. obtain additional funding and award the Contract to the Bidder submitting the lowest compliant bid; and/or
- c. negotiate a reduction in the bid price and/or scope of work of not more than 15% with the Bidder submitting the lowest compliant bid. Should an agreement satisfactory to Canada not be reached, Canada shall exercise option (a) or (b).

SI08 BID VALIDITY PERIOD

1. Canada reserves the right to seek an extension to the bid validity period prescribed in BA04 of the Bid and Acceptance Form. Upon notification in writing from Canada, Bidders shall have the option to either accept or reject the proposed extension.
2. If the extension referred to in paragraph 1) of SI10 is accepted, in writing, by all those who submitted bids, then Canada shall continue immediately with the evaluation of the bids and its approvals processes.
3. If the extension referred to in paragraph 1) of SI10 is not accepted in writing by all those who submitted bids then Canada shall, at its sole discretion, either
 - a. continue to evaluate the bids of those who have accepted the proposed extension and seek the necessary approvals; or
 - b. cancel the invitation to tender.
4. The provisions expressed herein do not in any manner limit Canada's rights in law or under GI11 of R2710T "General Instructions to Bidders".

SI09 CONSTRUCTION DOCUMENTS

The successful Contractor will be provided with one paper copy of the sealed and signed drawings, the specifications and the amendments upon acceptance of the offer. Additional copies, up to a maximum of (2) two will be provided free of charge upon request by the Contractor. Obtaining more copies shall be the responsibility of the Contractor including costs.

SI10 WEB SITES

The connection to some of the Web sites in the solicitation documents is established by the use of hyperlinks. The following is a list of the addresses of the Web sites:

Treasury Board Appendix L, Acceptable Bonding Companies

<http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=14494§ion=text#appl>

Buy and Sell <https://www.achatsetventes-buyandsell.gc.ca>

Canadian economic sanctions <http://www.international.gc.ca/sanctions/index.aspx?lang=eng>

Contractor Performance Evaluation Report (Form PWGSC-TPSGC 2913)

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/2913.pdf>

Bid Bond (form PWGSC-TPSGC 504) <http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/504.pdf>

Performance Bond (form PWGSC-TPSGC 505)

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/505.pdf>

Labour and Material Payment Bond (form PWGSC-TPSGC 506)

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/506.pdf>

Standard Acquisition Clauses and Conditions (SACC) Manual

<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>

PWGSC, Industrial Security Services <http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html>

PWGSC, Code of Conduct and Certifications

<http://www.tpsgc-pwgsc.gc.ca/app-acq/cndt-cndct/index-eng.html>

PWGSC Consent to a Criminal Record Verification (PWGSC-TPSGC 229)

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/229.pdf>

Construction and Consultant Services Contract Administration Forms Real Property Contracting

<http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/formulaires-forms-eng.html>

SUPPLEMENTARY CONDITIONS (SC)

SC01 LIMITATION OF LIABILITY

GC1.6 of R2810D is deleted and replaced with the following:

GC1.6 Indemnification by the Contractor

1. The Contractor shall indemnify and save Canada harmless from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by Canada or in respect of claims by any third party, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by, or attributable to the activities of the Contractor in performing the Work, provided such claims are caused by the negligent or deliberate acts or omissions of the Contractor, or those for whom it is responsible at law.
2. The Contractor's obligation to indemnify Canada for losses related to first party liability shall be limited to:
 - a. In respect to each loss for which insurance is to be provided pursuant to the insurance requirements of the Contract, the Commercial General Liability insurance limit for one occurrence as referred to in the insurance requirements of the Contract .
 - b. In respect to losses for which insurance is not required to be provided in accordance with the insurance requirements of the Contract, the greater of the Contract Amount or \$5,000,000, but in no event shall the sum be greater than \$20,000,000.

The limitation of this obligation shall be exclusive of interest and all legal costs and shall not apply to any infringement of intellectual property rights or any breach of warranty obligations.
3. The Contractor's obligation to indemnify Canada for losses related to third party liability shall have no limitation and shall include the complete costs of defending any legal action by a third party. If requested by Canada, the Contractor shall defend Canada against any third party claims.
4. The Contractor shall pay all royalties and patent fees required for the performance of the Contract and, at the Contractor's expense, shall defend all claims, actions or proceedings against Canada charging or claiming that the Work or any part thereof provided or furnished by the Contractor to Canada infringes any patent, industrial design, copyright trademark, trade secret or other proprietary right enforceable in Canada.
5. Notice in writing of a claim shall be given within a reasonable time after the facts, upon which such claim is based, became known.

SC02 INSURANCE TERMS

- 1) Insurance Contracts
 - (a) The Contractor must, at the Contractor's expense, obtain and maintain insurance contracts in accordance with the requirements of the Certificate of Insurance. Coverage must be placed with an Insurer licensed to carry out business in Canada.

- (b) Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract. The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.

2) Period of Insurance

- (a) The policies required in the Certificate of Insurance must be in force from the date of contract award and be maintained throughout the duration of the Contract.
- (b) The Contractor must be responsible to provide and maintain coverage for Products/Completed Operations hazards on its Commercial General Liability insurance policy, for a period of six (6) years beyond the date of the Certificate of Substantial Performance.

3) Proof of Insurance

- (a) Before commencement of the Work, and no later than thirty (30) days after acceptance of its bid, the Contractor must deposit with Canada a Certificate of Insurance on the form attached herein.
- (b) Upon request by Canada, the Contractor must provide originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Certificate of Insurance.

4) Insurance Proceeds

In the event of a claim, the Contractor must, without delay, do such things and execute such documents as are necessary to effect payment of the proceeds.

5) Deductible

The payment of monies up to the deductible amount made in satisfaction of a claim must be borne by the Contractor.

SC03 LABOUR

Clause R2830D subsection GC3.8 has been modified as follows;

1. Title has been changed from "Labour and Fair Wages" to "Labour".
2. Delete subsection 1.
3. Following subsections must be renumbered accordingly.

CONTRACT DOCUMENTS (CD)

1. The following are the contract documents:

- a. Contract page when signed by Canada;
- b. Duly completed Bid and Acceptance Form and any Appendices attached thereto;
- c. Drawings and Specifications;
- d. General Conditions:

GC1 General Provisions	R2810D	(2013-04-25)
GC2 Administration of the Contract	R2820D	(2012-07-16);
GC3 Execution and Control of the Work	R2830D	(2010-01-11);
GC4 Protective Measures	R2840D	(2008-05-12);
GC5 Terms of Payment	R2850D	(2010-01-11);
GC6 Delays and Changes in the Work	R2860D	(2013-04-25);
GC7 Default, Suspension or Termination of Contract	R2870D	(2008-05-12);
GC8 Dispute Resolution	R2880D	(2012-07-16);
GC9 Contract Security	R2890D	(2012-07-16);
GC10 Insurance	R2900D	(2008-05-12);
Supplementary Conditions;		
Allowable Costs for Contract Changes Under GC6.4.1	R2950D	(2007-05-25);
Schedules of Wage Rates for Federal Construction Contracts;		
- e. Any amendment issued or any allowable bid revision received before the date and time set for solicitation closing;
- f. Any amendment incorporated by mutual agreement between Canada and the Contractor before acceptance of the bid; and
- g. Any amendment or variation of the contract documents that is made in accordance with the General Conditions.

2. The documents identified by title, number and date above are incorporated by reference and are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site
buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual

3. The language of the contract documents is the language of the Bid and Acceptance Form submitted.

BID AND ACCEPTANCE FORM (BA)**BA01 IDENTIFICATION**

Elijah Smith Building Lighting Upgrade
Elijah Smith Office Building
300 Main Street, Yukon, YT

BA02 BUSINESS NAME AND ADDRESS OF BIDDER

Name: _____

Address: _____

Telephone: _____ Fax: _____ PBN: _____

BA03 THE OFFER

The Bidder offers to Canada to perform and complete the Work for the above named project in accordance with the Bid Documents for the **TOTAL BID AMOUNT INDICATED IN APPENDIX 1.**

BA04 BID VALIDITY PERIOD

The bid shall not be withdrawn for a period of [30] days following the date of solicitation closing.

BA05 ACCEPTANCE AND CONTRACT

Upon acceptance of the Contractor's offer by Canada, a binding Contract shall be formed between Canada and the Contractor. The documents forming the Contract shall be the contract documents referred to in CONTRACT DOCUMENTS (CD).

BA06 CONSTRUCTION TIME

Substantial work completion on March 14, 2014 and final completion on or before March 31, 2014.

BA07 BID SECURITY

The Bidder is enclosing bid security with its bid in accordance with GI08 - Bid Security Requirements of R2710T - General Instructions to Bidders.

BA08 SIGNATURE

Name and title of person authorized to sign on behalf of Bidder (Type or print)

Signature

Date

APPENDIX 1 - COMBINED PRICE FORM

1. The prices per unit shall govern in establishing the total extended amount. Any arithmetical errors in this Appendix will be corrected by Canada
2. Canada may reject the bid if any of the prices submitted do not reasonably reflect the cost of performing the part of the work to which that price applies.

UNIT PRICE TABLE

The Unit Price Table designates Work to which a Unit Price Arrangement applies.

- a. Work included in each item is as described in the referenced specification section.
- b. The Price per Unit shall not include any amounts for Work that is not included in that unit price Item.

Item	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity (EQ)	Price per Unit GST/HST extra (PU)	Estimated amount (EQ x PU) GST / HST extra
1	Fluorescent Luminaires Type 'A' Upgrade including disposal (as per the Spec Section 01 11 00 Part 1.2.3.1)	1 luminaire	1,383		
2	Spare Lamps (as per the Spec Section 26 50 00 part 32.3.1)_	4 ft lamp	250		
TOTAL BID AMOUNT Excluding GST / HST					

This tender shall be evaluated and awarded based on the lowest compliant bid price for items in Appendix 1 only.

APPENDIX 2 - OPTIONAL WORK

Pricing described in OPTIONAL WORK must be provided by the bidder.

The following work shall be considered an optional addition to this tender package. Any bid without the inclusion of the following lines will be considered non-compliant and therefore disqualified.

The Contractor grants to Canada the irrevocable option to acquire the goods and /or services described below as Optional Work and as described in the Specification and Drawings of the Contract under the same conditions and at the prices and/or rates stated in Contract. The exercise of any option will be at Canada's sole discretion, the options may only be exercised by the Contracting Authority and will be evidenced through a contract amendment for administrative purposes only.

The Contracting Authority may exercise the option within one (1) year after contract award by sending a written notice to the Contractor.

(1) 4' Linear Fluorescent Luminaires Type 'B-K' Upgrade including disposal (as per the Spec Section 01 11 00 Part 1.2.3.2)

Item	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity (EQ)	Price per Unit applicable taxes extra (PU)	Extended amount (EQ x PU) applicable taxes extra
1	Type 'B'	1 luminaire	3		
2	Type 'C'	1 luminaire	88		
3	Type 'D'	1 luminaire	90		
4	Type 'E'	1 luminaire	22		
5	Type 'F'	1 luminaire	5		
6	Type 'G'	1 luminaire	1		
7	Type 'H'	1 luminaire	136		
8	Type 'I'	1 luminaire	34		
9	Type 'J'	1 luminaire	32		
10	Type 'K'	1 luminaire	10		
TOTAL AMOUNT FOR OPTIONAL WORK (1) Excluding applicable taxes					

(2) 6" Recessed CFL Downlight Retrofit Type 'L' Upgrade including disposal (as per the Spec Section 01 11 00 Part

Item	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity (EQ)	Price per Unit applicable taxes extra (PU)	Extended amount (EQ x PU) applicable taxes extra
1	Type 'L'	1 luminaire	268		
TOTAL AMOUNT FOR OPTIONAL WORK (2) Excluding applicable taxes					

(3) Building's Control Devices Upgrade including disposal (as per the Spec Section 01 11 00 Part

Item	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity (EQ)	Price per Unit applicable taxes extra (PU)	Extended amount (EQ x PU) applicable taxes extra
1	Existing 347V switch to be replaced with new wall mounted occupancy switch	1 Device	41		
2	Existing 347V switch to be replaced with new wall mounted vacancy switch	1 Device	44		
3	New wall mounted occupancy sensor	1 Device	38		
4	New wall mounted vacancy sensor	1 Device	28		
5	New ceiling mounted occupancy sensor	1 Device	12		
6	New ceiling mounted occupancy sensor c/w by pass switch	1 Device	7		
7	Existing 347V	1 Device	5		

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Item	Class of Labour, Plant or Material	Unit of Measurement	Estimated Quantity (EQ)	Price per Unit applicable taxes extra (PU)	Extended amount (EQ x PU) applicable taxes extra
	switch to be replaced with new 3 way wall mounted occupancy sensor				
8	Existing switch to be removed	1 Device	9		
TOTAL AMOUNT FOR OPTIONAL WORK (3) Excluding applicable taxes					

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ANNEX A - CERTIFICATE OF INSURANCE FORM

VIEW ATTACHED

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NOTE TO TENDERERS: Use the mailing label below and affix it securely to the outside of the envelope or package containing your tender. For revisions to tenders submitted by facsimile (fax # (604) 775-9381), use this sheet as the cover sheet. Always ensure your company name, return address, tender number and closing date appear legibly on the outside of your bid submission.

REAL PROPERTY CONTRACTING
Public Works & Government Services Canada
219- 800 Burrard Street
Vancouver, B.C. V6Z 2V8

Requisition No.: E0276-141875/A

Tender Closing Date & Time: February 04, 2014 @ 1400 P.S.T.

Project Description: Elijah Smith Building - Lighting Upgrade
Whitehorse, YT

PL



CERTIFICATE OF INSURANCE

Description and Location of Work	Contract No.	E0276-141875
	Project No.	

Elijah Smith Building - Lighting Upgrade

Name of Insurer, Broker or Agent	Address (No., Street)	City	Province	Postal Code
Name of Insured (Contractor)	Address (No., Street)	City	Province	Postal Code
Additional Insured ; Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services				

Type of Insurance (Required when Checked)	Insurer Name and Policy Number	Inception Date D / M / Y	Expiry Date D / M / Y	Limits of Liability		
				Per Occurrence	Annual General Aggregate	Completed Operations Aggregate
<input checked="" type="checkbox"/> Commercial General Liability				\$ 5 000 000 . 00	\$	\$
<input type="checkbox"/> Umbrella/Excess Liability				\$	\$	\$
<input checked="" type="checkbox"/> Builder's Risk / Installation Floater				\$		
<input type="checkbox"/> Pollution Liability				\$	<input type="checkbox"/> Per Incident <input type="checkbox"/> Per Occurrence	Aggregate \$
<input type="checkbox"/> Marine Liability				\$		
<input type="checkbox"/> Aviation Liability				\$	<input type="checkbox"/> Per Incident <input type="checkbox"/> Per Occurrence	Aggregate \$
<input type="checkbox"/>				\$		

I certify that the above policies were issued by insurers in the course of their insurance business in Canada, are currently in force and include the applicable insurance coverages stated on page 2 of this Certificate of Insurance, including advance notice of cancellation / reduction in coverage.

Name of person authorized to sign on behalf of Insurer(s) (Officer, Agent, Broker)

Telephone Number

Signature

Date

D / M / Y

<p>General</p> <p>The insurance policies required on page 1 of the Certificate of Insurance must be in force and must include the insurance coverage listed under the corresponding type of insurance on this page.</p> <p>The policies must insure the Contractor and must include Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services as an additional Insured.</p> <p>The insurance policies must be endorsed to provide Canada with not less than thirty (30) days notice in writing in advance of a cancellation of insurance or any reduction in coverage.</p> <p>Without increasing the limit of liability, the policies must protect all insured parties to the full extent of coverage provided. Further, the policies must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.</p>	<p>Commercial General Liability</p> <p>The insurance coverage provided must not be substantially less than that provided by the latest edition of IBC Form 2100.</p> <p>The policy must either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto:</p> <ul style="list-style-type: none"> (a) Blasting. (b) Pile driving and caisson work. (c) Underpinning. (d) Removal or weakening of support of any structure or land whether such support be natural or otherwise if the work is performed by the insured contractor. <p>The policy must have the following minimum limits:</p> <ul style="list-style-type: none"> (a) \$5,000,000 Each Occurrence Limit; (b) \$10,000,000 General Aggregate Limit per policy year if the policy contains a General Aggregate; and (c) \$5,000,000 Products/Completed Operations Aggregate Limit. <p>Umbrella or excess liability insurance may be used to achieve the required limits.</p>	<p>Builder's Risk / Installation Floater</p> <p>The insurance coverage provided must not be less than that provided by the latest edition of IBC Forms 4042 and 4047.</p> <p>The policy must permit use and occupancy of any of the projects, or any part thereof, where such use and occupancy is for the purposes for which a project is intended upon completion.</p> <p>The policy may exclude or be endorsed to exclude coverage for loss or damage caused by asbestos, fungi or spores, cyber and terrorism.</p> <p>The policy must have a limit that is not less than the sum of the contract value plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Canada at the site of the project to be incorporated into and form part of the finished Work. If the value of the Work is changed, the policy must be changed to reflect the revised contract value.</p> <p>The policy must provide that the proceeds thereof are payable to Canada or as Canada may direct in accordance with GC10.2, "Insurance Proceeds" (https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2900D/2).</p>
<p>Contractors Pollution Liability</p> <p>The policy must have a limit usual for a contract of this nature, but not less than \$1,000,000 per incident or occurrence and in the aggregate.</p>	<p>Marine Liability</p> <p>The insurance coverage must be provided by a Protection & Indemnity (P&I) insurance policy and must include excess collision liability and pollution liability.</p> <p>The insurance must be placed with a member of the International Group of Protection & Indemnity Associations or with a fixed market in an amount of not less than the limits determined by the <i>Marine Liability Act</i>, S.C. 2001, c. 6. Coverage must include crew liability, if it is not covered by the statutory requirements of the Territory or Province having jurisdiction over such employees.</p> <p>The policy must waive all rights of subrogation against Canada as represented by Public Works and Government Services Canada for any and all loss of or damage to the watercraft however caused.</p>	<p>Aviation Liability</p> <p>The insurance coverage shall Include Bodily Injury (including passenger Bodily Injury) and Property Damage, in an amount of not less than \$5,000,000 per incident or occurrence and in the aggregate.</p>

Requisition No. EO276-141875

SPECIFICATIONS

For Energy Conservation and Lighting Upgrades:
Elijah Smith Federal Building
Whitehorse, Yukon

Project No. R.031112.070

January 2013

APPROVED BY:


2014/01/08
Regional Manager, Env Services Date


2014 01/08
Construction Safety Coordinator Date

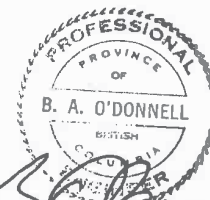
TENDER:


2014 01 08
Project Manager

Date

Section Number	Section Title	No. of Pages
Division 01		
01 11 00	Summary of Work	11
01 33 00	Submittal Procedures	4
01 35 30	Health and Safety Requirements	8
01 45 00	Quality Control	2
01 61 00	Common Product Requirements	4
01 74 11	Cleaning	3
01 74 21	Construction/Demolition and Waste Management Disposal	6
01 77 00	Closeout Procedures	2
01 78 00	Closeout Submittals	6
Division 26		
26 05 00	Common Work Results – Electrical	5
26 05 21	Wires and Cables (0-1000 V)	4
26 05 29	Hangers and Supports for Electrical Systems	2
26 05 32	Outlet Boxes, Conduit Boxes and Fittings	2
26 05 34	Conduits, Conduit Fastenings and Conduit Fittings	3
26 09 24	Lighting Controls Devices - Low Voltage	7
26 50 00	Lighting	8

END OF SECTION



B. A. O'Donnell
Jan 8, 2014

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 11 00 – Summary of Work
- .2 Section 01 33 00 – Submittal Procedure.
- .3 Section 01 35 30 – Health and Safety Requirements.
- .4 Section 01 45 00 – Quality Control.
- .5 Section 01 61 00 – Common Product Requirements.
- .6 Section 01 74 11 – Cleaning.
- .7 Section 01 74 21 – Construction/Deconstruction and Waste Management Disposal.
- .8 Section 01 77 00 – Closeout Procedures.
- .9 Section 01 78 00 – Closeout Submittals.
- .10 Section 26 05 00 – Common Work Results – Electrical.
- .11 Section 26 05 21 – Wires and Cables (0-1000 V).
- .12 Section 26 05 29 – Hangers and Supports for Electrical Systems.
- .13 Section 26 05 32 – Outlet Boxes, Conduit Boxes, and Fittings.
- .14 Section 26 05 34 – Conduits, Conduit Fastenings, and Conduit Fittings.
- .15 Section 26 09 24 – Lighting Control Devices – Low Voltage.
- .16 Section 26 50 00 – Lighting.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises implementation of lighting upgrades, located at the Elijah Smith Office Building in Whitehorse, YT.
- .2 All work as described in these specifications including all site work and project close out documentation to target the substantial work completion on March 14, 2014 and final completion on or before March 31, 2014.
- .3 Scope-of-Work shall not be limited to but shall include:
 - .1 Upgrading the base building linear fluorescent luminaires (Type 'A') as follows:
 - .1 Remove existing fluorescent lamps, lampholders, and ballasts;
 - .2 Clean all internal surfaces of the luminaires housings, including surfaces under the ballast channel;
 - .3 New replacement lampholders shall be installed;
 - .4 New high efficiency electronic ballasts shall be installed;
 - .5 New energy saving T8 lamps shall be installed;
 - .6 Install fluorescent ballast wiring disconnects for ballasts wiring;
 - .7 Clean all specular aluminum louvers and reinstall.
 - .8 Luminaires must be certified by CSA or other acceptable agency and new labels to be provided.

- .2 Upgrading the remaining 4' linear fluorescent luminaires (Types 'B' to 'K') as follows:
 - .1 Remove existing fluorescent lamps, lampholders, and ballasts;
 - .2 Clean all internal surfaces of the luminaires housings, including surfaces under the ballast channel;
 - .3 New replacement lampholders shall be installed;
 - .4 New high efficiency electronic ballasts shall be installed;
 - .5 New energy saving T8 lamps shall be installed;
 - .6 Install fluorescent ballast wiring disconnects for ballasts wiring;
 - .7 Clean all specular aluminum louvers and reinstall.
 - .8 Luminaires must be certified by CSA or other acceptable agency and new labels to be provided.
 - .3 Retrofitting all 6" recessed CFL downlights (Type 'L') with 11W (nominal) solid-state light emitting diode (LED) downlight conversion modules.
 - .4 Upgrading of the building's control devices as follows:
 - .1 Detailed investigation to identify lighting circuits, low voltage lighting controls and equipment locations.
 - .2 Replacement of existing 347 volt line voltage switches with occupancy / vacancy sensors as per the provided drawings.
 - .3 Installation of new 347 volt line voltage wall mounted occupancy / vacancy sensors to control lighting in rooms as per the provided drawings.
 - .4 Upgrade of wiring / circuiting to ensure lighting in rooms with occupancy / vacancy sensors are not controlled via the low voltage lighting control system.
 - .5 Disposing of materials in accordance with Section 01 74 21.
 - .6 Inputting project information online into BC Hydro's Power Smart Partner Express
- .4 Approximate floor by floor quantities of the luminaire types included in the Work are provided below:

	Luminaire Quantities by Type											
Floor	A	B	C	D	E	F	G	H	I	J	K	L
Basement	3	-	46	74	22	-	-	-	34	30	-	5
Main Floor	339	3	18	-	-	2	-	1	-	-	4	75
2 nd Floor	377	-	-	2	-	3	-	45	-	-	-	65
3 rd Floor	398	-	-	2	-	-	-	45	-	-	-	59
4 th Floor	266	-	-	2	-	-	1	45	-	2	-	62
5 th Floor	-	-	24	10	-	-	-	-	-	-	-	2
Elevators	-	-	-	-	-	-	-	-	-	-	6	-
Totals	1383	3	88	90	22	5	1	136	34	32	10	268

Luminaire Type	Description
A	2 Lamp 2'x4' Recessed Troffer in T-bar Ceiling
B	2 Lamp 1'x4' Recessed Troffer in T-bar Ceiling
C	2 Lamp 4' Striplight with Reflector
D	2 Lamp 4' Striplight with Wireguard
E	2 Lamp 4' Wall Mount Luminaire
F	2 Lamp 4' Wrap Luminaire
G	2 Lamp 4' Pendant Luminaire
H	1 Lamp 1'x4' Recessed Troffer in T-bar Ceiling
I	1 Lamp 4' Striplight with Wireguard
J	1 Lamp 4' Wall Mount Luminaire
K	1 Lamp 4' Valance Striplight
L	6" Recessed CFL Downlight

- .5 'Base Building' fluorescent luminaires are defined to be Luminaire Type 'A' only.

1.3 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .2 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .3 Maintain fire access/control.
 - .1 Provide and maintain temporary fire protection and fire extinguishers wherever welding, soldering or other open flame equipment is used. Provisions for temporary fire protection to be co-ordinated with Contractor and Departmental Representative.

1.4 SPECIFIED QUANTITY ADJUSTMENTS

- .1 Tender price to be based on the quantities, specifications, and drawings and as indicated in the Scope of Work above.
- .2 Upon award of contract, perform a review of each area of work. Contractor must verify each luminaire type, voltages in each type, lampholder requirements, etc. prior to ordering of any material. Contractor must notify Departmental Representative of any conflicts with tender documents. Confirm all quantities and submit for any adjustments prior to ordering of materials.
- .3 Any price adjustments due to increases or deletions in quantities will be based on Unit Price table as submitted at time of Tender.

1.5 CONTRACTOR USE OF PREMISES

- .1 Co-ordinate use of premises under direction of Departmental Representative.
- .2 Must be accompanied by the commissioner at all times.
- .3 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.6 OCCUPANCY

- .1 Premises will be occupied during entire construction period for execution of normal operations.
- .2 Co-operate with Departmental Representative in scheduling operations to minimize conflict and to facilitate Owner usage.
- .3 Work to be conducted outside of Owner's normal operating hours.

1.7 EXAMINATION OF EXISTING SITE CONDITIONS

- .1 Carefully examine any existing buildings, local conditions affecting the Work and building site, together with all other trades to make sure that Work under Specification can be satisfactorily carried out without changes. Work of all trade Divisions to be examined, before commencing Work, and any defect or interference affecting Work to be reported at once to the Departmental Representative.
- .2 No allowance will be made for any expense incurred through failure to make these examinations or on account of any condition on site or item existing thereon which was visible or known to exist at time Tender for Work was submitted.

1.8 ON-SITE PHOTOGRAPHY

- .1 The Contractor shall verify with the Departmental Representative which areas are classified as restricted prior to taking any photographs on site.
- .2 When working in areas of restricted access, the Contractor must obtain the Departmental Representative's approval prior to taking any photographs of the facilities and/or on-site conditions. Use of photographs taken within such areas shall be strictly for the contractor's internal use only, and shall not be distributed to third parties.

1.9 PROJECT MEETINGS

- .1 Within 7 business days of the award of the contract, a project kick off meeting is to be held between the Owner, Departmental Representative, Consultant and the Contractor, including the contractors assigned site foreman. Purpose of the meeting is to:
 - .1 Meet involved parties and exchange contact information;
 - .2 Project scheduling;
 - .3 Contract, billing procedures and progress billings;
 - .4 Security, locked rooms, additional work;
 - .5 Contractor provided information; certificate of insurance, performance and labour and materials bond, and letter of good standing from WorkSafe BC;
 - .6 Contractor to provide documentation indicating good standing as a BC Hydro Alliance member;
 - .7 Client safety requirements;
 - .8 Construction documents; specifications; addendums and floor plans;
 - .9 Project specific issues;
 - .10 Contractor issues;
 - .11 Scheduling of meetings.
- .2 The Departmental Representative will chair the kick off meeting, and prepare and distribute the Minutes of the meeting.

- .3 The Contractor to call Progress Meetings at regular intervals, weekly, at which all Subcontractors and Suppliers must attend. The Departmental Representative is to chair the meeting and prepare and distribute the Minutes of such meetings. Minutes to be distributed to the Departmental Representative, the Consultant, the Contractor, the subtrades and Suppliers and others as affected, within four (4) business days of the meeting date.
- .4 Special Progress Meetings may be called at the request of the Departmental Representative, Consultant or the Contractor.

1.10 SCHEDULE OF WORK

- .1 The on-site work associated with this project must be done to suit the Departmental Representative's schedule.
- .2 The primary work must be done outside of normal occupants' hours of use between 6 pm and 6 am during week and all day on weekends.
- .3 Spaces occupied by Department Justice, Public Prosecution, and CBSA will need to be done during regular work hours under additional supervision from the tenants.
- .4 Provide a general work schedule at the commencement of the Work in the building and weekly updates detailing areas where Work will occur during the next week. Areas of restricted access will need to be scheduled to suit Departmental Representative and not scheduled with other Work.
- .5 Owner will pay for the cost of commissionaires.
- .6 Co-ordinate all work with the Departmental Representative to minimize disruptions to the occupants.
- .7 Work in each area must be scheduled with the Departmental Representative at least one week ahead of planned work. Provide a detailed area schedule upon request. Each area and schedule must be approved by the Departmental Representative. Contractor must allow changes or limited access to occur. It may be necessary to adjust schedule or areas planned to suit occupant specific schedules or security requirements. Contractor must co-operate and adjust schedule to suit.
- .8 Work within occupant areas must be fully completed at the end of the workday, for individual offices, conference room and small areas. No room or area to be left partially done.

1.11 FURNISHED ITEMS

- .1 Contractor Responsibilities:
 - .1 Designate submittals and delivery date for each product in progress schedule.
 - .2 Review shop drawings, product data, samples, and other submittals. Submit to Departmental Representative notification of observed discrepancies or problems anticipated due to non-conformance with Contract Documents.
 - .3 Receive and unload products at site.
 - .4 Inspect deliveries jointly with Departmental Representative; record shortages, and damaged or defective items.
 - .5 Handle products at site, including uncrating and storage.
 - .6 Protect products from damage, and from exposure to elements.
 - .7 Assemble, install, connect, adjust, and finish products.
 - .8 Provide installation inspections required by public authorities.

- .9 Repair or replace items damaged by Contractor or subcontractor on site (under his control).

1.12 CERTIFICATES AND PAYMENTS

- .1 Arrange and pay for permits, tests and certificates of inspection for the Work. Do Work in compliance with all laws, rules, ordinances and regulations having jurisdiction.
- .2 Inspection certificates, as follows, to be submitted before final acceptance will be issued:
 - .1 Electrical Inspection;
 - .2 Luminaire Retrofit Recertification;
 - .3 Seismic Engineer Certification (where required).

1.13 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
 - .1 Accept liability for damage, safety of equipment and overloading of existing equipment.
 - .2 Owner or tenant property shall not be moved or altered unless it is required in order to complete work and permission to move said property is approved by the Departmental Representative and the move is supervised by a Departmental Representative.
- .2 Protect the Owner's property, property of all and any occupants and tenants, and finished and unfinished work from damage, due to carrying out of the Work.
 - .1 Cover Owner's and occupant's property, desks, equipment, floors and other work with tarpaulins, as required, for this purpose.

1.14 EXISTING SERVICES

- .1 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .2 The Departmental Representative reserves the right to complete and / or repair any work that is not in operation condition beyond scheduled shutdowns, in order to maintain the Owner's operation. Any costs incurred with this work will be charged to the Contractor.
- .3 Provide any extension cords, lamps and miscellaneous materials, temporarily required to maintain the Owner's equipment in operation at all times.

1.15 CO-ORDINATION

- .1 Lay out the work of each trade so that it does not conflict with Work under other Division of Specification. Make good damage to Owner's property or other trade's work, caused by improper location or carrying out of Work.

1.16 EQUIPMENT PROTECTION ON-SITE

- .1 Store electrical material and equipment in a dry, clean location and cover with polyethylene plastic to preserve factory finish.
- .2 Repair and finish factory finished equipment, damaged or scratched during installation, in an approved manner.

- .3 Clean luminaires, not acceptable because of dust and dirt, in an approved manner.

1.17 TEMPORARY AND TRIAL USAGE

- .1 Temporary and trial usage by Owner of any electrical device, or any equipment or any other work or materials supplied before final completion and written acceptance will not be construed as evidence of acceptance of same by Owner's.
- .2 Owner to have the privilege of such temporary and trial usage, as soon as Contractor claims that said work is completed and in accordance with Specifications, for such reasonable length of time as is deemed to be sufficient for making a complete and thorough test of same. Claims for damage are not to be made by Contractor for the injury to or breaking of any parts of such work, which may be used, whether caused by weakness or inaccuracy of structural parts or by defective materials or workmanship of any kind whatsoever.

1.18 CUTTING AND PATCHING

- .1 Cutting and patching of new and existing work to accommodate the Work, unless otherwise noted, will be done by and paid for by the trade requiring same. Layout such work for approval by Departmental Representative before undertaking same.
- .2 Holes required in existing construction to accommodate conduit or wireways to be cut neatly or drilled.

1.19 REPAIR OF SURFACES

- .1 Include for patching, filling and painting of surfaces where replacement or removal of the existing lighting controls will expose wall, ceiling or other surfaces.
- .2 Patch drywall and plaster surfaces with non-shrinking materials that are compatible with existing surfaces.
- .3 Patch concrete surfaces with sealant to prevent exposed areas from chipping or erosion.
- .4 Patch wooden surfaces with wood or suitable filler to match existing surfaces.
- .5 All surfaces to be painted, or finished to conform to immediate surrounding surfaces. Paint colour to be determined by paint chip analysis or confirmation of paint code provided by Departmental Representative.
- .6 Where removal of an outlet box or other such item, Contractor shall provide a cover plate of sufficient size to cover the opening and will finish surfaces to the edge of the outlet box. Cover plates to be painted to match existing used in the area or surrounding surfaces. For exterior areas, cover plates to be gasketed, weather tight, and water resistant. For insulated areas, ensure that open or outlet box is filled with appropriate and sufficient insulation material to maintain 'R' value of surrounding surfaces.

1.20 PERSONNEL IDENTIFICATION AND LOGBOOK REQUIREMENTS

- .1 Provide a list of all personnel who will be visiting or working on the site to the Departmental Representatives prior to starting work by the Contractor. This list to detail each worker's Full Name, Worker Type (electrician, labourer, apprentice, etc), Employee Number and Work Qualifications.
- .2 The personnel list, as given to the Departmental Representative to constitute the crew list of workers eligible to work on the project site. No substitutions or additions to crewmembers to be made without the prior written consent of the Departmental Representative.

- .3 For all crews comprising more than four (4) workers, identify which workers within the crew hold valid first aid certificates and what level of certification the worker holds. All personnel who will be visiting the site or working on-site will need to be escorted at all times by the Commissionaire.
- .4 Provide clear, and legible photo company identification badges for all construction personnel. Identification badges must be worn when workers are on site and must be visibly displayed at all times that the worker is on Owner's property. The Contractor is to be responsible for the enforcement of this requirement. Construction personnel not conforming to this requirement may be requested to leave the property immediately.
- .5 Journeymen / electricians and apprentices must carry valid and up-to-date qualification certificates at all times on site and when performing work. Any worker found not to be in possession of valid qualification certificates will be demoted in their work tasks for the duration of the workday. Workers violating the requirement to carry valid qualifications on more than one occasion may be removed from the project.
- .6 Obtain from the Departmental Representative a site identification tag upon entering the site. Return tag by the end of the day or projection completion as directed by the Departmental Representative .
- .7 ACCESS TO BUILDING
- .8 Keys and/or access cards will be provided to the Commissionaire escorting the Contractor.
- .9 The Commissionaire will provide access to areas and rooms for work to be conducted.

1.21 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Other documents as specified.

1.22 INTERIM FIELD REVIEW

- .1 During the Work, Departmental Representative at intervals to suit the progress of the work, may conduct interim field reviews of the Work.
- .2 The contractor to have qualified manpower present for all interim field reviews, with ladders and tools, to provide the Departmental Representative with access to the Work and to demonstrate progress and installations.

1.23 INITIAL SITE WORK UPON AWARD OF WORK

- .1 Upon award of contract, perform a “general review” of the Work throughout the building. This effort MUST be done before ordering of any materials. The review will not be limited to, but to include the following:
 - .1 Confirm with Departmental Representative scheduling of project, Departmental Representative’s requirements, phasing of Work, hours when work can be conducted, storage location for materials, security and access procedures;
 - .2 Open a random sampling of luminaires and confirm the existing voltages supplied in each area. Products must be ordered to match existing voltages unless specifically requested to change voltages;
 - .3 Confirm the existing wiring method and determine if existing luminaires are properly grounded for the primary retrofit type;
 - .4 Open one of each type of existing luminaires that require retrofitting to determine the reflector requirements, and modification methods;
- .2 Changes required as identified by this review must be submitted for approval before ordering of products. Cost adjustments will be made based on the pricing as submitted in the Unit Price Table of the Tender. Subsequent minor quantity or product adjustments are to be based on the tender amounts as identified in the Unit Price Table.
- .3 Conduct an on-site orientation and procedure meeting for all personnel who will be working on-site prior to commencing the Work. During this orientation, workers are to be advised of sign-in procedures, location of staging areas, location of storage facilities, security requirements / procedures, locations of first aid stations and emergency contact numbers.

1.24 WORK IN EXISTING BUILDING

- .1 Work includes changes to the existing building and may include changes of old and new construction to suit as shown or as specified herein.
- .2 Install services and equipment, which are to be concealed, as close as possible to building structure for accessibility and so that necessary furring if required can be kept to minimum dimensions.
- .3 Obtain approval from Departmental Representative prior to penetrating any structural surfaces including floor slabs. Obtain from Departmental Representative approval of locations of all penetrations prior to commencing work. Replace/repair any building services that are damaged due to this construction (example: drilling through concrete floors) at no extra cost.
- .4 Carefully route new conduits and other new services so that they do not interfere with existing installation. Arrange and pay for any necessary relocation of existing conduit, cable tray, bus duct or any other services required for the proper installation of new Work, regardless of whether the conduit, tray or duct to be moved is the work of trade doing new Work.
- .5 Remove existing luminaires, wiring, conduit, wiring devices and equipment as necessary to suit new Work. Cut back and cap conduits and electrical outlets, not being used, in an approved manner so that finished Work presents a neat and clean appearance. Remove unused wiring back to panel board. All conduit located on ceiling not required shall be removed back to none visible location.
- .6 Luminaires removed and not required to suit new layout become the property of the Contractor and will be removed from the site. Prior to removal from the site, the

Contractor to confirm with the Departmental Representative any luminaires that Departmental Representative may wish to keep. These luminaires shall be turned over to Departmental Representative at no additional cost. Refer to Section 26 50 00 – Lighting for ballast removal.

- .7 The remaining removed equipment and material shall become the property of the Contractor and shall be removed from site unless otherwise requested by the Departmental Representative.
- .8 Arrange and pay for the repair of any damaged or dislodged fireproofing material after completion of work in ceiling space.
- .9 In area with solid ceilings, electrical and systems junction boxes along with associated wire and conduit are to be relocated to areas where ceiling access is possible, or access panels may be provided with the approval of the Departmental Representative.
- .10 Exercise due care and diligence when working in the occupied areas. Desks, equipment and furniture must be covered when the work is taking place. Clean-up and restore the work area after each day's installation to ensure that no disruption to the work area takes place.
- .11 Co-ordinate with the Departmental Representative for all work on site, as to minimize disruptions. Installation of equipment must take place outside of the Occupants regular business hours. Work taking place outside of the occupied areas that does not involve power interruptions may occur during the day with prior approval from the Departmental Representative.
- .12 When working in areas of restricted access, Contractor must be escorted, or receive permission from Departmental Representative to access all rooms with restricted access. These areas include rooms identified on doors or at entrances and women's washrooms, locker areas, or other similar rooms.
- .13 No areas or rooms to be left unfinished at the end of a work shift, with the exception of large work areas requiring more than one shift to complete the work. In those areas, the area must be operative and ready for occupant use prior to the end of workers shift.
- .14 Contractor must not use facilities to clean equipment and must leave the facilities in appropriate condition for occupant use.
- .15 Obtain Departmental Representative's approval prior to any welding to ensure that the smoke detection system is turned off prior to work.
- .16 Specific areas of buildings within this facility may contain free standing materials or containers, open or enclosed, in which corrosive liquids, noxious, explosive or corrosive vapours, or areas of excessive moisture may be encountered. All work in these locations is to be conducted in accordance with the requirements of WCB and Section 22 of the Canadian Electrical Code, CAN/CSA C22.1-2012.
- .17 Areas of the facility may contain sensitive equipment. Extra special care will be required in these areas. Work in sensitive areas to be co-ordinated with the Departmental Representative to ensure minimal disruption. Each area will be contacted prior to the commencement of work, and any special instructions if provided must be adhered to.

1.25 STARTING UP AND TRAINING

- .1 Provide services of a skilled electrician as required to start in its proper sequence, and to thoroughly explain the operation and maintenance of each system provided to the full satisfaction of Departmental Representative if so required. In addition, provide specialized instructions by the respective manufacturers as described under the

appropriate clauses of this Specification. Arrange with the Departmental Representative the most suitable time for instructions to their operating and maintenance personnel. Keep a record of dates and duration of each instruction period together with the names of persons to whom the instructions were given. Submit one signed copy of such record included in the Maintenance Manual.

- .2 Where Departmental Representative wishes to take over certain areas ahead of project completion date and these areas are intended to be fed from the new distribution systems, make temporary connections to such areas using services existing in these areas. Reconnect these areas to the permanent services, as shown, at a later date when new distribution systems are available in the areas concerned.

1.26 WARRANTY AND CORRECTION AFTER COMPLETION

- .1 Submit a written warranty to Owner for one year from date of final acceptance for any part of Work accepted by the Departmental Representative. Should any defects, failure or unacceptable workmanship become apparent during the warranty period, the work is to be replaced or repaired at no cost to the Owner.

END OF SECTION

Part 2 General

2.1 RELATED REQUIREMENTS

- .1 Section 01 78 00 – Closeout Submittals.

2.2 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Provided shop drawing for review of the following products. Products indicated are provided as a minimum requirement. Addition products may be submitted at the discretion of the contractor. Products shall include; occupancy / vacancy sensors and power packs..
- .3 Do not proceed with Work affected by submittal until review is complete.
- .4 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .5 Where items or information is not produced in SI Metric units, converted values are acceptable.
- .6 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .7 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .8 Verify field measurements and affected adjacent Work is co-ordinated.
- .9 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .10 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .11 Keep one reviewed copy of each submission on site.

2.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .3 Allow 14 business days for Departmental Representative's review of each submission.

- .4 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .5 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .6 Accompany submissions with transmittal letter, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .7 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .8 After Departmental Representative's review, distribute copies.
- .9 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .10 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .11 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
- .2 Testing must have been within 3 years of date of contract award for project.
- .12 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .13 Submit electronic copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .14 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .15 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .20 The review of shop drawings by Departmental Representative is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

2.4 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit:
- .2 Workers' Compensation Board status;
- .3 Transcription of insurance;
- .4 Integrity Check Form.

END OF SECTION

Part 3 General

3.1 REFERENCES

- .1 Government of Canada.
 - .1 Canada Labour Code - Part II
 - .2 Canada Occupational Health and Safety Regulations.
- .2 National Building Code of Canada (NBC):
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
- .3 Canadian Standards Association (CSA) as amended:
 - .1 CSA Z797-2009 Code of Practice for Access Scaffold
 - .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
 - .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
 - .4 CSA-C22.1-12, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations
- .4 Fire Protection Engineering Services, HRSDC:
 - .1 FCC No. 301, Standard for Construction Operations.
 - .2 FCC No. 302, Standard for Welding and Cutting.
- .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
- .6 Province of British Columbia:
 - .1 Workers Compensation Act Part 3-Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation.
 - .3 Current B.C. Electrical Code

3.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.

3.3 WORKERS' COMPENSATION BOARD COVERAGE

- .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
- .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.

3.4 COMPLIANCE WITH REGULATIONS

- .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
- .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

3.5 SUBMITTALS

- .1 Make submittals to the Departmental Representative in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Work affected by submittal shall not proceed until review is complete.
- .3 Submit the following:
 - .1 Health and Safety Plan.
 - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .5 Emergency Procedures
- .4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within 7 business days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.
- .5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
- .6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
 - .1 Be construed to imply approval by the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project

3.6 RESPONSIBILITY

- .1 Assume responsibility as the Prime Contractor for work under this contract.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

- .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and Ordinances, and with site-specific Health and Safety Plan.

3.7 HEALTH AND SAFETY COORDINATOR

- .1 The Health and Safety Coordinator must:
 - .1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
 - .2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
 - .3 Be on site during execution of work.

3.8 GENERAL CONDITIONS

- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
- .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
 - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
 - .2 Secure site at night time as deemed necessary to protect work areas against entry.
- .3 Observe fall-protection requirements of Part II of the Canadian Labour Code when performing work on platforms or ladders above a height of 2.4m above ground.

3.9 PROJECT/SITE CONDITIONS

- .1 Work at site will involve contact with:
 - .1 Federal Government employees.
 - .2 SNC Lavalin employees.
 - .3 Members of the public.
 - .4 Potentially hazardous products.
 - .5 Electrical power.

3.10 REGULATORY REQUIREMENTS

- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
- .2 In event of conflict between any provisions of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.

3.11 WORK PERMITS

- .1 Obtain all statutory permits related to project before start of work.

3.12 FILING OF NOTICE

- .1 The Contractor is to complete and submit a Notice of Project as required by Provincial authorities.
- .2 Provide copies of all notices to the Departmental Representative.

3.13 HEALTH AND SAFETY PLAN

- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
- .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work, procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
 - .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.
 - .4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
- .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
- .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents

3.14 EMERGENCY PROCEDURES

- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .4 Departmental Representative.
- .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first-aid attendant, of the nature and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative or designated Owners' site personnel.
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
 - .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work on, over, under and adjacent to water.
 - .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
- .5 Revise and update emergency procedures as required, and re-submit to the Departmental Representative.

3.15 HAZARDOUS PRODUCTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
- .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per Section 01 33 00.
 - .2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
 - .3 Provide adequate means of ventilation.

3.16 ASBESTOS HAZARD

- .1 Modifications to spray- or trowel-applied asbestos surfaces can be hazardous to health.
- .2 The premises at which the work is to be performed may contain asbestos that is captive in building components. The scope of work of this project is not anticipated to require performance of any activities that would liberate captive asbestos. However, should it be necessary to perform any drilling, cutting or scraping of existing building components that could possibly contain asbestos, this work shall not be performed without first consulting with the Departmental Representative, and thereafter observing all safe working practices as stipulated by the Departmental Representative.

3.17 MERCURY AND PCB REMOVAL

- .1 Mercury-containing fluorescent and high intensity lamps and ballasts and capacitors which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.
- .2 Remove, handle, transport and dispose of in accordance with all statutory regulations.

3.18 REMOVAL OF LEAD-CONTAINING PAINTS

- .1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.
- .2 Carry out demolition activities involving lead-containing paints in accordance with applicable Provincial regulations.

3.19 ELECTRICAL SAFETY REQUIREMENTS

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
 - .1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.
 - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

3.20 ELECTRICAL LOCK-OUT

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.
- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.
- .3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

3.21 OVERLOADING

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

3.22 FALSE-WORK

- .1 Design and construct false-work in accordance with CSA S269.1-1975 (R2003).

3.23 SCAFFOLDING

- .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and B.C. Occupational Health and Safety Regulations.

3.24 CONFINED SPACES

- .1 Carry out work in confined spaces in compliance with Provincial regulations (Occupational Health and Safety Regulation, Part 9).

3.25 POWDER ACTUATED DEVICES

- .1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Departmental Representative.

3.26 FIRE SAFETY AND HOT WORK

- .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.

3.27 FIRE SAFETY REQUIREMENTS

- .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

3.28 FIRE PROTECTION AND ALARM SYSTEM

- .1 Fire protection and alarm systems shall not be:
 - .1 Obstructed.
 - .2 Shut off.
 - .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.

3.29 UNFORESEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.

3.30 POSTED DOCUMENTS

- .1 Post legible versions of the following documents on site:
 - .1 Health and Safety Plan.
 - .2 Sequence of work.
 - .3 Emergency procedures.
 - .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
 - .5 Notice of Project.
 - .6 Floor plans or site plans.
 - .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
 - .8 Workplace Hazardous Materials Information System (WHMIS) documents.
 - .9 Material Safety Data Sheets (MSDS).
 - .10 List of names of Joint Health and Safety Committee members, or Health and Safety Representative, as applicable
- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

3.31 MEETINGS

- .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

3.32 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The Contractor will be responsible for any costs arising from such a "stop work order."

END OF SECTION

Part 4 General

4.1 RELATED SECTIONS

- .1 Section 01 35 29.06 – Health and Safety Requirements.
- .2 Section 01 61 00 – Common Product Requirements.
- .3 Section 01 74 11 – Cleaning.
- .4 Section 01 74 21 – Construction/Deconstruction Waste Management and Disposal.
- .5 Section 26 05 00 – Common Work Results – Electrical.

4.2 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative's instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Owner shall pay cost of examination and replacement.

4.3 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Owner.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

4.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

4.5 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

4.6 REJECTED WORK

- .1 Refer to CCDC, GC 2.4.
- .2 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .3 Make good other Contractor's work damaged by such removals or replacements promptly.
- .4 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

4.7 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

4.8 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

4.9 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical systems.

END OF SECTION

Part 5 General

5.1 RELATED REQUIREMENTS

- .1 Section 01 45 00 – Quality Control.

5.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-94, Stipulated Price Contract.
 - .2 DOC 14-2000, Design-Build Stipulated Price Contract.
 - .3 DOC 15-2000, Design-Builder/ Consultant Contract.
- .2 Within text of each specifications section, reference may be made to reference standards. List of standards reference writing organizations is contained in Section.
- .3 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .4 If there is question as to whether products or systems are in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .5 Cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.

5.3 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

5.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

5.5 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .5 Store sheet materials on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .6 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .7 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .8 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

5.6 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

5.7 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

5.8 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative and Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Departmental Representative and Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

5.9 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

5.10 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Departmental Representative if there is interference. Install as directed by Departmental Representative.

5.11 REMEDIAL WORK

- .1 Refer to CCDC2-2008.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

5.12 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

5.13 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

5.14 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Departmental Representative.

5.15 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

END OF SECTION

Part 6 General

6.1 RELATED SECTIONS

- .1 Section 01 11 00 – Summary of Work.
- .2 Section 01 33 00 – Submittal Procedure.
- .3 Section 01 45 00 – Quality Control.
- .4 Section 01 74 21 – Construction/Deconstruction and Waste Management Disposal.
- .5 Section 26 05 00 – Common Work Results – Electrical.
- .6 Section 26 50 00 – Lighting.

6.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC 2-94, Stipulated Price Contract.
- .2 Public Works Government Services Canada (PWGSC) Standard Acquisition Clauses and Conditions (SACC)-ID: R0202D, Title: General Conditions "C", In Effect as Of: May 14, 2004.

6.3 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Provide and use marked separate bins for recycling. Refer to Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .6 Dispose of waste materials and debris at designated dumping areas on Crown property.
- .7 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.
- .8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .9 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

6.4 FINAL CLEANING

- .1 Refer to CCDC 2, GC 3.14.
- .2 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris including that caused by Owner or other Contractors.
- .6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
- .9 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
- .10 Clean lighting reflectors, lenses, and other lighting surfaces.
- .11 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .12 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

6.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 7 Execution

7.1 LUMINAIRE CLEANING

- .1 Ensure that all lamps, lenses and reflective surfaces in the luminaire are cleaned and restored to good operating condition.
- .2 Ensure that all lamps, and surfaces, including surfaces under the ballast channel or underneath reflectors, in the luminaire are cleaned and restored to good operating condition.
- .3 Clean all reflective surfaces in the luminaries prior to installation of lamps. Cleaning solution to be anti-static mild soap, cleaning pads or abrasive solutions are not permitted.
- .4 Aluminium deep cell parabolic louvers to be cleaned by dusting. Utilize a duster made of soft, anti-static materials. Clean all sides and tops of the louver and louver cells. Do not immerse the louvers in dip tanks, or bring any liquids into contact with the louvers.

Liquid cleaners, water, dust attracting sprays, spray cleaners, or soaps are not to be used to clean aluminium deep cell parabolic louvres.

- .5 All luminaries, lenses, louvres and lamps must be clean, and the lamps illuminated, at the time of final acceptance of the Work.

END OF SECTION

Part 8 General

8.1 WASTE MANAGEMENT GOALS

- .1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PWGSC's Waste Management Plan and Goals.
- .2 PWGSC's Waste Management Goal 75 percent of total Project Waste to be diverted from landfill sites. Provide Departmental Representative documentation certifying that waste management, recycling and reuse of recyclable and reusable materials have been extensively practiced.
- .3 Accomplish maximum control of solid construction waste.
- .4 Preserve environment and prevent pollution and environmental damage.

8.2 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedure.
- .2 Section 01 45 00 – Quality Control.
- .3 Section 01 74 11 – Cleaning.
- .4 Section 26 50 00 – Lighting.
- .5 Section 26 53 00 – Exit Signs.

8.3 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .3 Inert Fill: inert waste - exclusively asphalt and concrete.
- .4 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .5 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .6 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .7 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .8 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.

- .9 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.
- .10 Separate Condition: refers to waste sorted into individual types.
- .11 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
- .12 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .13 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA (Schedule A).

8.4 DOCUMENTS

- .1 Maintain at job site, one copy of following documents:
 - .1 Waste Reduction Workplan.
 - .2 Material Source Separation Plan.

8.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prepare and submit following prior to project start-up:
 - .1 Submit completed Waste Reduction Workplan (WRW): Schedule A (see end of section).
 - .2 Submit completed Demolition Waste Audit (DWA): Schedule B (see end of section).
 - .3 Submit Materials Source Separation Program (MSSP) description.
- .3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
 - .1 Failure to submit could result in hold back of final payment.
 - .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled or disposed of.
 - .3 For each material reused, sold or recycled from project, include amount in tonnes and the destination.
 - .4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

8.6 WASTE REDUCTION WORKPLAN (WRW)

- .1 Prepare WRW prior to project start-up.
- .2 WRW should include but not limited to:
 - .1 Destination of materials listed.
 - .2 Deconstruction/disassembly techniques and sequencing.
 - .3 Schedule for deconstruction/disassembly.
 - .4 Location.

- .5 Protection.
- .6 Clear labelling of storage areas.
- .7 Details on materials handling and removal procedures.
- .8 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .4 Describe management of waste.
- .5 Identify opportunities for reduction, reuse, and recycling of materials.
- .6 Post WRW or summary where workers at site are able to review content.
- .7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.
- 8.7 DEMOLITION WASTE AUDIT (DWA)**
 - .1 Prepare DWA prior to project start-up.
 - .2 Complete DWA: Schedule B.
 - .3 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.
- 8.8 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)**
 - .1 Prepare MSSP and have ready for use prior to project start-up.
 - .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Departmental Representative.
 - .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
 - .4 Provide containers to deposit reusable and recyclable materials.
 - .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
 - .6 Locate separated material in areas which minimize material damage.
 - .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
 - .1 Transport to approved and authorized recycling facility.
- 8.9 STORAGE, HANDLING AND PROTECTION**
 - .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
 - .2 Unless specified otherwise, materials for removal become Contractor's property.
 - .3 Protect, stockpile, store and catalogue salvaged items.
 - .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

8.10 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, oil, or paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

8.11 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Maintain security measures established by existing facility. Follow instructions of Commissionaire assigned to work crew for escort and access.

8.12 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 9 Execution

9.1 APPLICATION

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

9.2 LAMP DISPOSAL/RECYCLING

- .1 All lamps shall be recycled in accordance with federal and provincial guidelines. Where no federal, provincial or territorial stewardship / recycling program exist, include all costs associated with recycling of materials in bid pricing.
- .2 For projects in British Columbia, all lamps shall be recycled under the 'LightRecycle' stewardship program, with costs relating to recycling of removed mercury containing fluorescent and high intensity discharge lamps borne by the program.
- .3 Lamp recycling process shall recycle at least 95% of lamp components; glass including metal end caps, mercury, and phosphorus.
- .4 The name of an authorized recycle company must be submitted to the Departmental Representative for approval. Once approved, the contractor is obligated to use only that company for the duration of the project.
- .5 A certificate of disposal or manifest of acceptance of materials from the lamp recycler shall be provided at the completion of the Work, prior to final acceptance.

9.3 FLUORESCENT BALLAST REMOVAL

- .1 All existing ballasts that are to be removed or replaced due to the requirements of this specification shall be removed from the luminaire with wires removed at the case. Ballasts shall remain on site until approved for removal by the Departmental Representative.
- .2 If ballasts removed are leaking tar or other substance, be sure to wipe tar from all surfaces, ballast channels, wires and lenses using rags wetted in mineral spirits or paint thinner. Where lenses exhibit permanent tar markings that cannot be removed without damage to or deterioration of the lens, the lens is to be replaced with an acrylic lens to match existing.

9.4 PCB FLUORESCENT BALLAST REMOVAL

- .1 Upon award of the tender, and upon commencement of existing ballast replacement or luminaire removal, investigate to determine the existence of any identifiable or suspected PCB contaminated ballasts within the work area or near the work area.
- .2 Should the Contractor observe any identifiable or suspected PCB contaminated ballasts immediately notify the Departmental Representative. All suspected ballasts to be confirmed with the original manufacture and / or identification fact sheet as available from Environment Canada, Environmental Protection Series: "Identification of Lamp Ballasts Containing PCB's," Report EPS 2/CC/2 (revised) August 1991 or newest version.
- .3 The handling, transportation and storage of PCB ballasts, and any other contaminated material must be in accordance with requirements of the Environmental Management Act, and all applicable federal acts and regulations. These procedures are in addition to, not in replacement of, all governmental regulations and guidelines. In the event of contradiction between these specifications and governmental regulations or guidelines, the latter shall take precedence.
- .4 All ballasts shall be recycled in accordance with federal and provincial guidelines.
- .5 Where no federal, provincial or territorial stewardship / recycling program exists, include all costs associated with recycling of materials in bid pricing.

- .6 For projects in British Columbia, all ballasts shall be recycled under the 'LightRecycle' stewardship program, with costs relating to recycling of removed fluorescent and high intensity discharge ballasts borne by the program.

9.5 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused / recycled into specified sort areas.

9.6 SCHEDULE A: WASTE REDUCTION WORKPLAN (WRW)

Material Category	Projected Quantity of Waste (tonnes,ft, #)	Projected Diverted Waste (%)	Material Destination (Location or Hauler's Name)	Remarks
Lamps				
Ballasts				
Lampholders				
Metal scrap				
Wood scrap				
Plastic Packaging				
Cardboard Packaging				
Other (specify)				

9.7 SCHEDULE B - DEMOLITION WASTE AUDIT (DWA):

Material Category	Total Waste (tonnes, ft, #)	Diverted Waste (%)	Material Destination (Location or Hauler's Name)	Remarks
Fluorescent Lamps				
Ballasts				
Lampholders				
Metal scrap				
Wood scrap				
Plastic Packaging				
Cardboard Packaging				
Other (specify)				

END OF SECTION

Part 10 General

10.1 RELATED REQUIREMENTS

- .1 Section 01 74 11 – Cleaning.
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

10.2 REFERENCES

- .1 Canadian Construction Documents Committee (CCDC)
 - .1 CCDC2-2008, Stipulated Price Contract.

10.3 ADMINISTRATIVE REQUIREMENTS

- .1 Acceptance of Work Procedures:
 - .1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's inspection and submit verification that corrections have been made.
 - .2 Request Consultant's inspection.
 - .2 Consultant's Inspection:
 - .1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.
 - .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested, adjusted and balanced and fully operational.
 - .4 Certificates required by Electrical Inspection Branch: submitted.
 - .5 Operation of systems: demonstrated to Owner's personnel.

10.4 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 11 Execution

11.1 FINAL FIELD REVIEW

- .1 Submit request upon completion of the Work, in writing, to the Departmental Representative for a Final Field Review of the completed electrical work.
- .2 The Contractor is to have qualified manpower present for final field review, with ladders and tools, to provide the Departmental Representative with access to the Work and to demonstrate installations.
- .3 Do not submit this written request until:
 - .1 A minimum of 95% of the value of the project is completed;
 - .2 Local electrical inspection has been completed and accepted; the Contractor is to submit to the Departmental Representative copies of the accepted electrical inspection forms that have been properly signed by the local, city or municipal electrical inspector;
 - .3 Deficiencies noted during previous field reviews have been completed;
 - .4 Systems have been balanced and tested and are ready for operation;
 - .5 The clean up is finished in every respect;
 - .6 Contractor has completed a review of the work and has provided the Consultant with a list of any deficiencies found;
 - .7 Extended warranty offered by manufacturers beyond one year (fluorescent retrofit reflectors, ballasts, etc.) is outlined in a letter to the Owner;
 - .8 Listing of all PCB ballast quantities has been submitted to the Departmental Representative;
 - .9 Certificate of disposal of lamps is provided;
 - .10 Signed receipt indicating delivery of spare lamps and ballasts has been submitted to the Departmental Representative;
 - .11 Owner's operating personnel have been instructed in operation of systems.
- .4 Final field review will be conducted within approximately ten (10) business days of this request. Letter of acceptance or rejection along with a Field Review Report will be issued within approximately seven (7) business days of field review.
- .5 The Departmental Representative will perform only one field review of each area of the work upon the above request.
- .6 Upon receipt of the Field Review Report, the Contractor will complete the deficiencies within 30 business days and to notify the Departmental Representative when the Work is 100% completed. A field review of the areas of deficiency will then be conducted by the Departmental Representative.

END OF SECTION

Part 12 General

12.1 RELATED REQUIREMENTS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 45 00 – Quality Control.

12.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to contract completion to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's installation instructions and warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

12.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, one printed and one electronic copy final copy of operating and maintenance manuals in English.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

12.4 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.

- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.

12.5 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
 - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 – Quality Control.

12.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, at site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.

- .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

12.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .2 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Changes made by change orders.
 - .2 Details not on original Contract Drawings.
 - .3 References to related shop drawings and modifications.
- .4 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .5 Provide digital photos, if requested, for site records.

12.8 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .4 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .5 Include manufacturer's printed operation and maintenance instructions.
- .6 Include sequence of operation by controls manufacturer.
- .7 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .8 Provide installed control diagrams by controls manufacturer.
- .9 Additional requirements: as specified in individual specification sections.

12.9 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

12.10 MAINTENANCE MANUALS

- .1 At completion submit two complete sets of manufacturer's operating and maintenance instructions; one bound in three-ring, vinyl covered hard cover binder, 215.9 mm x 279.4 mm (8 1/2" x 11") size, the second as an electronic file before final acceptance of Work. Indicate on cover and spine of binder "project title", date of project completion. Contents of books not to include handwritten data.
- .2 Title sheet, in each book, to be labelled "Project Title – Lighting Upgrade - Maintenance Manual" and to bear the following:
 - .1 Project Title;
 - .2 Building Names;
 - .3 Date of Project Completion;
 - .4 Table of Contents
- .3 Each book to contain the following:
 - .1 Contact information including Contractor and Consultant company names, location address, telephone numbers, facsimile numbers, and email addresses;
 - .2 Manufacturer's literature, parts list, accepted shop drawing, and name and address of closest service organization and spare parts source, for each item of equipment;
 - .3 Copy of electrical work acceptance by electrical inspector;
 - .4 Extended equipment warranties;
 - .5 Records of Training Seminars (where applicable).
- .4 Review maintenance manual with Owner's operating staff or representatives to ensure a thorough understanding of each item of equipment and its operation.

12.11 MAINTENANCE MATERIALS

- .1 Spare Parts:
 - .1 Provide spare parts, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to site at location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.

- .2 Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
 - .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to site at location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.

12.12 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Departmental Representative.

12.13 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 business days before planned pre-warranty conference, to Departmental Representative for approval.
- .3 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .4 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten business days after completion of applicable item of work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties and bonds until time specified for submittal.
- .5 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

- .6 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
- .7 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .8 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

END OF SECTION

Part 13 General

13.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2
 - .3 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
- .2 Electrical and Electronic Manufacturer's Association of Canada (EEMAC)
- .3 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

13.2 DEFINITIONS

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

13.3 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates and labels for control items in English.

13.4 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings:
 - .1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .3 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .4 If changes are required, notify Departmental Representative of these changes before they are made.
- .3 Quality Control: in accordance with Section 01 45 00 – Quality Control.

- .1 Provide CSA certified equipment and material.
- .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction, inspection authorities for special approval before delivery to site.
- .3 Submit test results of installed electrical systems and instrumentation.
- .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 Departmental Representative.

13.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control.
- .2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

13.6 DELIVERY, STORAGE AND HANDLING

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.
- .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

13.7 SYSTEM STARTUP

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

13.8 OPERATING INSTRUCTIONS

- .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- .4 Post instructions where directed.
- .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

Part 14 Products

14.1 STANDARDS OF MATERIALS AND CERTIFICATION

- .1 Materials and equipment are specifically described and named in this Specification in order to establish a standard of material and workmanship.
- .2 Materials required for performance of work to be new and the best of their respective kinds and of uniform pattern throughout work.
- .3 Materials to be of Canadian manufacture where obtainable. Materials of foreign manufacture, unless specified are to be approved before being ordered. Products are to be purchased through manufacturer's Canadian Distributors or Wholesalers, or directly from the manufacturer, when obtainable.
- .4 Equipment items are to be standard products of approved manufacture. Identical units of equipment are to be of same manufacture. In any unit of equipment, identical component parts to be of same manufacture, but the various component parts comprising the unit need not be of one manufacture.
- .5 Chemical and physical properties of materials and design performance characteristics and methods of construction and installation of items of equipment, specified herein, to be in accordance with latest issue of applicable Standards or Authorities when such are either mentioned herein, or have jurisdiction over such materials or items of equipment.
- .6 Materials to bear approval labels as required by Code and / or Local Inspection Authorities and be eligible for sale and installation in Canada. All equipment to be approved by a certification agency listed in BC Electrical Bulletin 0-7-0. Where it is stated within this specification that equipment "must be CSA approved", or similar wording, it is to be taken that equipment bearing an appropriate certification label from

any certification organizations listed in federal, provincial or territorial bulletins is acceptable.

- .7 Install materials in strict accordance with manufacturer's recommendations.
- .8 Include items of material and equipment not specification noted on Drawings or mentioned in Specifications but which are necessary to make a complete and operating installation.
- .9 Confirm capacity or ratings of equipment being provided, when based on ratings of equipment being provided under other trade Section, before such items are purchased.
- .10 Remove materials, condemned as not approved for use, from job site and deliver and install suitable approved materials in their place.
- .11 Where requirements of this Specification exceed those of applicable standards, this Specification governs.

14.2 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction.
- .2 Decal signs, minimum size 175 x 250 mm.

14.3 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

14.4 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, 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.
- .4 Use colour coded wires in communication cables, matched throughout system.

14.5 ELECTRICAL PLATE FINISHES

- .1 Switch and other plates to match existing plates installed in the area.

Part 15 Execution

15.1 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

15.2 NAMEPLATES AND LABELS

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

15.3 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete.

- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

15.4 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

15.5 TEMPORARY LIGHTING AND POWER SERVICES

- .1 Provide temporary general lighting throughout construction site utilizing existing luminaires. In areas where lighting has been removed to suit construction, provide lighting strings with 150W, I.F. lamps at 10 foot centres.
- .2 Lighting levels to conform to WorkSafe YT's (WCB) Occupational Health and Safety Regulations.
- .3 Relocate temporary lighting throughout construction site as often as necessary, such that temporary lighting is provided in all areas where work is being performed.
- .4 Provide additional task lighting for specific working conditions where higher lighting levels are required.
- .5 Provide temporary power supplies with receptacles and extension cords from existing building services, for construction equipment, e.g.: drills, saws, etc. Locate, relocate and remove services as necessary.
- .6 Maintain the temporary facilities in good repair and in safe working condition throughout the duration of the construction project.
- .7 Remove, at the end of project, the above noted temporary systems.

15.6 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

Part 16 General

16.1 PRODUCT DATA

- .1 Provide product data in accordance with Section 01 33 00 – Submittal Procedures.
- .2 CSAC 22.2 No. 0.3-12 Test Methods for Electrical Wires and Cables.

16.2 DELIVERY, STORAGE AND HANDLING

- .1 Packaging Waste Management: remove for reuse and recycle in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 17 Products

17.1 BUILDING WIRES

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

17.2 CONDUCTORS, WIRES AND CABLES

- .1 All conductors are to be copper conductors. All AWG sizes given in this specification refer to the copper AWG size.
- .2 Wiring installed in conduit, unless otherwise noted, to be 600 volt RW-90 X-Link. Wiring in channel back of fluorescent luminaires to be 600 volt type GTF or TEW.
- .3 Use copper wiring, minimum No. 12 gauge for lighting and power wiring. Size wires for 2% maximum voltage drop to farthest outlet on a loaded circuit.
- .4 Home runs to 120 volt lighting and receptacle panels, which exceed 75 feet (23 m) in length, to be minimum No. 10 gauge. Home runs which exceed 38mm (125'-0") in length to be minimum No. 8 gauge.

17.3 ARMOURED CABLES

- .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90 - lead sheath over cable assembly and under armour.
- .3 Armour: interlocking type fabricated from galvanized steel strip.
- .4 Connectors: anti short connectors.

Part 18 Execution

18.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

- .3 Perform tests before energizing electrical system.

18.2 WIRING METHODS

- .1 Install wiring in conduit unless otherwise specified.
- .2 Use thin wall conduit for branch circuit and signal wiring in ceilings, and furred spaces. Use rigid galvanized steel conduit for wiring in poured concrete, or where conduit could be exposed to mechanical injury.
- .3 Enclose all visible surface conduits in public areas in Wiremold V2000 Series or accepted equivalent.
- .4 Type AC-90 armoured cable may be used for local lighting luminaire connections, but only in removable suspended ceilings and down drops in hollow walls and partitions. Obtain Departmental Representative's written authorization prior to using either flexible conduit or armoured cable in any other location.
- .5 Maximum of 6096mm (20'-0") of AC-90 to be run in ceiling space. All AC-90 cable and conduit are to be supported as high as possible above ceiling to allow removal of all ceiling tiles, luminaires, etc. Cables are not permitted to rest on false ceiling. All home runs must be in conduit.
- .6 Conduit is to be of sufficient size to permit easy removal of conductors at any time. Conduit sizes, where shown, are minimums and shall not be reduced. Do not bend conduit over sharp objects. Improperly formed bends and running threads will not be accepted. Do not use bends and fittings together.
- .7 Run conduits and cables in finished areas concealed, above finished ceilings, under floors, in walls and in partitions. Run conduit and cables in unfinished areas, such as mail sorting area, service rooms, etc., exposed and install at right angles or parallel to building lines, accurate in line and level.
- .8 Runs of conduit and cables, where shown are indicated only by general location and routing. Install conduits and cables to provide maximum head room and to interfere as little as possible with free use of spaces through which they pass. Install as close to building structure as possible, so that, where concealed, necessary furring can be kept to a minimum. Arrange conduits, installed in suspended ceilings, to provide minimum interference with removal of tiles.
- .9 Wiring and conduit for wall devices etc., to be routed in ceiling space of floor they are serving.
- .10 Install conduit and cables to avoid proximity to water and heating pipes. They are not to be run within 152.4 mm (6") of such pipes except where crossings are unavoidable, in which case they are to be kept at least 25 mm (1") from covering of pipe crossed.
- .11 Provide expansion joint sleeves with ground jumpers in conduit runs where they cross building expansion joints.
- .12 Provide a minimum of 1 hour fire protection around all emergency service feeders routed through non fire rated rooms in accordance with CAN/CSA – C282-M89.

18.3 GROUNDING

- .1 Ground electrical equipment and wiring in accordance with Canadian Electrical Code and Local Inspection Authority's Rules and Regulations.

- .2 Condition or existence of grounding of existing luminaires must be reviewed and proper grounding confirmed. Inform Departmental Representative if ungrounded luminaires or service feeder to luminaires are identified.

18.4 CIRCUITING REQUIREMENTS

- .1 Circuitry as indicated is diagrammatic only.
- .2 Where new lighting or additional luminaires are to be installed, extend the existing service to suit and connect to spare/new breakers in existing panelboards. Loading of lighting circuits is not to exceed 70% of breaker rating.
- .3 Where new lighting installation or revisions to lighting load will result in a significant reduction, resulting in less than 50% loading in the load on any circuits, Contractors are to consolidate like loads, (example; indoor fluorescent loads or exterior HID loads with like or similar loads) and recover redundant breakers as spares. Cap unused feeds in an approved or existing junction outlet box or remove back to the panelboard providing the local service. Update panelboard directories to reflect changes.

18.5 CONDUCTORS, WIRES AND CABLES

- .1 Colour code all conductors. Conductors No. 2 gauge and smaller to have colour impregnated into insulation at time of manufacture. Conductors size larger than No. 2 gauge may be colour coded with adhesive colour coding tape but only black insulated conductors are to be employed in this case, except for neutrals which are to be white whenever possible. Conductors of No. 8 gauge and larger must be stranded.
- .2 Colour code as follows:

Phase "A"	Red	Ground	Green
Phase "B"	Black	Neutral	White
Phase "C"	Blue	Control	Orange
- .3 Neutral conductors may be identified by a coloured insulation with three or more extruded longitudinal white stripes along the insulation, and will be deemed to have a white or natural covering. All neutral conductors used in the Work must match building standard.
- .4 Neatly train circuit wiring in cabinets, panels, pull boxes and junction boxes and hold with nylon cable ties.
- .5 Splice wire, up to and including No. 6 gauge, with twist-on style connections rated minimum 600 volts (1000 volts in luminaires). Connection body to be moulded of thermoplastic. Spring insert to have an expandable square-edge. Splice large conductors using split-bolt or compression type connections wrapped with PVC tape.
- .6 Where colour coding tape is utilized, it is to be applied for a minimum of 50.8 mm (2") at terminations, junction and pull boxes and conduit fittings. Do not paint conductors under any circumstances. Colour coding also applies to bussing in panels.

18.6 EQUIPMENT AND WIRING TESTING

- .1 Make tests of equipment and wiring at time requested.
- .2 Tests are to include measured insulation values, voltage and current readings to determine balance of panels and feeders under full load, and operation of each piece of equipment for correct operation.

- .3 Supply meters, materials and personnel as required, to carry out these tests.
- .4 Test electrical work to standards and function of Specification and applicable codes in an approved manner. Replace defective equipment and wiring with new material and leave entire system in complete first class operating condition.
- .5 Connect single phase loads so that there is the least possible unbalance of the supply phases.
- .6 Where specialized equipment or controls systems requiring commissioning are installed as part of Work, arrange and pay for services of manufacturer's factory service engineer / technician to supervise initial start-up or calibration of such equipment or controls. Engineer / technician shall check systems installation and verify operation is correct or shall adjust, balance and calibrate components, or direct installer to perform these tasks, including installation related wiring and operation of controls, to the satisfaction of the engineer / technician and the Consultant.
- .7 Instruct Owner's operating personnel in the operation of the installations. Provide these services for such periods, and for as many visits as may be necessary to put applicable portion of installation in complete working order, and to ensure that Owner's operating personnel are fully conversant with every aspect of the operation, care and maintenance thereof.

18.7 INSTALLATION OF ARMoured CABLES

- .1 Group cables wherever possible on channels.

END OF SECTION

Part 19 General

19.1 RELATED SECTIONS

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 26 05 00 – Common Work Results – Electrical.

19.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .4 Fold up metal banding, flatten and place in designated area for recycling.

Part 20 Products

20.1 HANGERS

- .1 Ensure that hangers used for electrical conduit are galvanized after fabrication.
- .2 Do not use perforated strapping (grabbler bars) to hang conduit.

Part 21 Execution

21.1 INSTALLATION

- .1 Secure equipment to poured concrete with expandable inserts.
- .2 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .3 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.
- .4 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .5 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
- .6 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 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .7 For surface mounting of two or more conduits use channels at 1200 mm on centre spacing.
- .8 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .9 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .10 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .11 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .12 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

21.2 SUPPORTS AND BASES

- .1 Supply and erect special structural and concrete work required for the installation of electrical equipment. Provide anchor bolts and other fastenings unless noted otherwise. Mount equipment required to be suspended above floor level, on a frame or platform bracketed from the wall or suspended from the ceiling. Carry supports to either the ceiling or the floor, or both as required, at locations where, because wall thickness is inadequate, it is not permitted to use such brackets.
- .2 Switches or other electrical equipment are to be complete with suitable bases or mounting brackets. Install angle or channel iron supports to bear the equipment where it is shown on or in structural tile walls, or walls are inadequate to bear the equipment.
- .3 Provide channel iron or other metal supports where necessary, to adequately support lighting luminaires. Do not use wood unless wood forms part of the building structure.
- .4 Support hangers, in general, from inserts in concrete construction or from building structural steel beams, using beam clamps. Provide additional angle or channel steel members, required between beams for supporting conduits, cables and bus ducts. Use coach screw rods or lag screws in any wood construction.
- .5 Provide any additional supports required from existing concrete construction for any piping or equipment, by drilling same and installing expansion bolt cinch anchors.
- .6 Do not use explosive drive pins in any section of Work without obtaining prior approval from Departmental Representative.

END OF SECTION

Part 22 General

22.1 RELATED SECTIONS

- .1 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .2 Section 26 05 00 – Common Work Results – Electrical.

22.2 REFERENCES

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

22.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

22.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 23 Products

23.1 OUTLET BOXES

- .1 Conform to CSA Standard C22.2 No. 18.
- .2 Ceiling boxes are to be 101.6 mm (4”) octagon or square, complete with fittings, where required to support luminaires.
- .3 Switch and receptacles boxes to be:
 - .1 No. 1104, where flush mounted in wood or drywall, with stud fasteners as required.
 - .2 Boxes for 347 volt switches are to be similar but sized as per Code with barriers between switches.
- .4 Where boxes are surface mounted in unfinished areas, they are to be FS condulets.
- .5 Standard outlet boxes are to be manufactured from code gauge galvanized steel.
- .6 Ensure outlet boxes installed outside building and/or in damp locations are FS weatherproof type. If in direct contact with the ground, they are to be made of cast iron.
- .7 Provide a suitable outlet box for each luminaire, switch, receptacle or other outlet, approved for the particular area in which it is to be installed.

23.2 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 35 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

Part 24 Execution

24.1 INSTALLATION

- .1 Support outlet boxes independently of conduit and cable.
- .2 Locate outlet boxes, mounted in hung ceiling space, so they do not obstruct or interfere with the removal of lay-in ceiling tiles.
- .3 Offset outlet boxes, shown back to back in partitions, horizontally to minimize noise transmission between adjacent rooms.
- .4 Use gang boxes at locations where more than one device is to be mounted. Use combination boxes with suitable barriers where outlets for more than one system are shown.
- .5 Flush mount boxes, panels, cabinets and electrical devices, which are installed in finished areas, and fit with suitable flush trims and doors or covers, unless specifically noted otherwise.

END OF SECTION

Part 25 General

25.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 74 11 – Cleaning.
- .3 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .4 Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

25.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA C22.2 No. 1-04(R2009), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981(R2007), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04(R2009), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985(R2008), Electrical Metallic Tubing.

25.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.

25.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 26 Products

26.1 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No. 45, galvanized steel threaded.
- .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .3 Flexible metal conduit: to CSA C22.2 No. 56, steel.

26.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits 50 mm and smaller.
- .2 Two hole steel straps for conduits larger than 50 mm.
- .3 Beam clamps to secure conduits to exposed steel work.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.

26.3 CONDUIT FITTINGS

- .1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.
Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends for NPS 1 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
 - .1 Set-screws are not acceptable.

Part 27 Execution

27.1 MANUFACTURER'S INSTRUCTIONS

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

27.2 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 Use rigid galvanized steel threaded conduit except where specified otherwise.
- .4 Use electrical metallic tubing (EMT) except in cast concrete or susceptible to mechanical injury.
- .5 Use flexible metal conduit for connection to recessed incandescent fixtures without prewired outlet box, connection to surface or recessed fluorescent fixtures and work in movable metal partitions.
- .6 Minimum conduit size for lighting and power circuits: 19 mm.
- .7 Bend conduit cold:
 - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .8 Mechanically bend steel conduit over 19 mm diameter.
- .9 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .10 Install fish cord in empty conduits.
- .11 Run 2-25 mm spare conduits up to ceiling space and 2-25 mm spare conduits down to ceiling space from each flush panel.
 - .1 Terminate these conduits in 152 x 152 x 102 mm junction boxes in ceiling space or in case of an exposed concrete slab, terminate each conduit in flush concrete, surface type box.
- .12 Remove and replace blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .13 Dry conduits out before installing wire.

27.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Do not pass conduits through structural members except as indicated.
- .5 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

27.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

27.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 28 General

28.1 RELATED SECTIONS:

- .1 Section 01 33 00 – Submittal Procedures.
- .2 Section 01 35 30 – Health and Safety Requirements.
- .3 Section 01 61 00 – Common Product Requirements.
- .4 Section 01 74 11 – Cleaning.
- .5 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .6 Section 01 78 00 – Closeout Submittals.
- .7 Section 26 05 00 – Common Work Results – Electrical.

28.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

28.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 – Submittal Procedures. Include product characteristics, performance criteria, and limitations.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 – Submittal Procedures. Indicate VOC content.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .3 Closeout Submittals:
 - .1 Submit maintenance data in accordance with Section 01 78 00 – Closeout Submittals.
- .4 Quality assurance submittals: submit following in accordance with Section 01 33 00 – Submittal Procedures.
 - .1 Test reports:
 - .1 Submit certified test reports indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Manufacturer's Instructions: submit manufacturer's installation instructions.
 - .4 Manufacturer's Field Reports: manufacturer's field reports specified.

28.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

28.5 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 61 00 – Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

Part 29 Products

29.1 MATERIALS

- .1 Control system: by one manufacturer and assembled from compatible components to match existing.

29.2 REMOTE CONTROL SWITCHES

- .1 Double throw, momentary contact, standard duty, rated 25 V, centre pivot rocker action.

29.3 LOW VOLTAGE RELAYS

- .1 Electrically operated by momentary impulse, mechanically latched until activated.
- .2 Two coil solenoid type with one coil to close relay contacts and one coil to open relay contacts.
- .3 Operating voltage: 24 V, rectified AC.
- .4 Load contacts: 20 A, 120V, AC.
- .5 Coloured pre-stripped leads.

Part 30 Execution

30.1 MANUFACTURER'S INSTRUCTIONS

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

30.2 LIGHTING CONTROLS

- .1 Provide lighting controls as outlined on the Installation Schedules and described herein.
- .2 All existing lighting control relays to be verified for correct operation. Provide replacement relays for any defective relays found during the review. Include in the tender price for the replacement of ten (10) relays.

30.3 INSTALLATION

- .1 Locate and install equipment in accordance with manufacturer's recommendations and as indicated in these specifications and drawings.

30.4 LOW VOLTAGE LIGHTING CONTROL – SYSTEM EXPANSION

- .1 Upgrade and expand the existing Douglas lighting control system to suit the modifications as detailed in the specifications and drawings.
- .2 The existing low voltage lighting control presently controlling the lighting includes relays for each lighting circuit in the building. The control is done via a existing low voltage switches located in each space.
- .3 Provide additional low voltage relays, and all necessary components, mounted in the existing relay panel or in suitably sized outlet boxes in the ceiling space
- .4 Low voltage wiring to be a minimum No. 18 AWG, FT-6 return air plenum rated or LVT installed in conduit.

30.5 OCCUPANCY SENSOR CONTROLS - GENERAL

- .1 Provide occupancy sensor controls for each area indicated.
- .2 With the exception of wall box mounted switch replacement occupancy sensors, all controls shall be low voltage type, with no minimum load required for proper operation.
- .3 Sensors shall possess zero-crossing switching circuitry to provide inrush current protection at activation.
- .4 For retrofit installation, wallswitch replacement sensors shall not require a neutral.
- .5 Contractor shall install, adjust and aim sensors so that the sensor(s) detection areas pick up occupancy in all areas of the room, with minimal “dead” spaces in the detection zone and without the sensor detecting movement or occupancy out of doorways, in adjacent corridors or rooms. Sensors must be adjusted to detect occupancy and activate lighting within no more than two normal walking strides of an average person.
- .6 In multiple sensor applications, sensors shall be spaced so that detection zones of the sensors overlap in the major motion area of the forward or side-to-side throw of the sensor detection zone. Distance between sensors to achieve adequate overlap shall be based on maximum distance of the detection zone forward or side-to-side throw (as applicable to facing and mounting of sensors) as detailed in manufactures literature, with sensors mounting spaced as to have overlapping detection zones approximate to half the distance difference between the minor and major movement coverage areas of the detection zones.
- .7 Where mounting heights are above 8’, adjust mounting spacing of sensors to account for changes in detection zone ranges as per manufacturer’s literature to ensure proper detection zone coverage and overlap.

- .8 Provide 24 VDC power to all low voltage sensors and control devices, with a maximum voltage deviation of +/- 5% at the device at full operation. Power supplies for sensors and control devices shall be as made by the control device manufacturer. Where multiple devices, sensors or "slave" relays, are utilized, no more than three devices may be powered from any one power supply.
- .9 Power supply must be installed in a separate junction box or suitably barriered enclosure, regardless of mounting configuration, visible or concealed. Power supply shall not be installed directly into line voltage junction box through use of the treaded neck. Mounting box shall be securely fastened to structure or line voltage junction box with at least two fasteners.
- .10 All controls wiring connections are to be enclosed within the sensor housing, a junction box or an enclosure. No power or controls wiring connections are to be made in free air or outside of a suitable enclosure.
- .11 For all sensor types, Contractor is to adjust settings to disable "learn mode" options for auto sensitivity and auto time delay functions. Settings to mask out resonant frequencies of mechanical or other systems are to remain active.
- .12 All sensors must have non-volatile memory so as to retain settings in the event of power outage.
- .13 Mount all sensors to be clear of obstructions. Passive Infrared (PIR) sensors must be mounted with unobstructed "view" of line-of-sight of detection zone.
- .14 All control components shall be of one manufacture and shall have a five (5) year warranty.
- .15 Time delay for all occupancy sensor control devices shall be set to fifteen minutes or as directed.
- .16 Wall mounted sensors shall be complete with swivel base and mounting bracket.
- .17 Ceiling mounted sensors shall be complete with surface mounting plate.
- .18 Sensors to be installed in storage rooms or other areas where impact from moving / moved equipment or airborne objects may contact sensor are to be complete with painted wireguard.
- .19 Unless otherwise noted, for installations of ceiling or wall mounted occupancy sensors, manual switch locations are to be retained to provide 'off override' control. Wall switch replacement type occupancy sensors or timer control devices shall also retain manual on / off functionality.
- .20 Where multiple circuits / switches are utilized to control the lighting in a room, provide one power supply or slave relay for each switch / circuit. Contractor to include in pricing to provide for the supply and installation of one power supply and one slave relay pack for all wall mounted and ceiling mounted occupancy sensors. Final quantities of equipment required to be determined at time of installation.
- .21 For installations of wall or ceiling mounted controls, where lighting is controlled by existing low voltage switches, the power supply or slave relays are to be installed into the line voltage feed, ahead of the low voltage switch typically located in room or low voltage control relay typically located in lighting relay panel in nearest electrical room.

30.6 WALL SWITCH PIR OCCUPANCY / VACANCY SENSORS

- .1 Wall switch passive infrared occupancy sensors shall have coverage of minimum of 900 square feet when mounted at 44" AFF.
- .2 Sensors shall have a minimum detection zone of 170 to 180 degrees side-to-side, with a forward throw minor movement detection zone of a minimum of 25' and a major movement detection zone of 35'.
- .3 Sensors indicated as vacancy sensors shall be adjusted such that lighting on function is not automatic. Switch shall be set for manual on auto off function.
- .4 Wall switch passive infrared occupancy sensors shall have no minimum loading requirement and be rated to control at minimum up to 1000 watts at 120 volt and 1800 watts at 277 volts. Where loads exceed rating, provide necessary low voltage control relays and any required power packs, located in ceiling space, necessary to control all lighting.
- .5 Wall switch occupancy sensors shall be mounted in place of existing line voltage switches and shall control all lighting within the space, with the exception of dimmer controlled accent or downlighting. Sensor colour shall match existing devices.
- .6 Where wall switch occupancy sensors is to be installed in a space where no switch currently exists, the device shall be installed at 44" AFF and shall be located on lock side of door, with clear view of room. Sensor colour shall match existing devices.
- .7 The sensors shall have manual push button switch set for manual off override only (i.e. no manual ON override).
- .8 Wall switch passive infrared occupancy sensors shall be manufactured by:
 - .1 Hubbell Automation LHIRS1 347 volt
 - .2 Leviton ODS10-I3 347 volt
 - .3 Watt Stopper PW-100 347 volt

30.7 CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSORS

- .1 Ceiling mounted dual technology occupancy sensors shall have coverage of minimum of 1,800 square feet when mounted at 8' AFF.
- .2 Dual technology occupancy sensors shall have passive infrared and Doppler ultrasonic sensors combined in one unit.
- .3 Sensors shall have a detection zone of 360 degrees offering a square or rectangular detection pattern, with a forward throw minor movement detection zone of a minimum of 45' and a major movement detection zone of 60' and side-to-side minor movement detection zone of a minimum of 20' and major movement detection zone of a minimum of 30'.
- .4 Dual technology occupancy sensors shall have a no minimum load rating for potential future connection of lighting loads within area.
- .5 Ceiling mounted dual technology occupancy sensors shall be manufactured by:
 - .1 Hubbell Automation OMNI-DT2000-RP c/w LV controls
 - .2 Leviton OSC20-M0W c/w OSP20-0D0 LV controls
 - .3 Watt Stopper DT-300 c/w LV controls

30.8 POWER PACKS

- .1 Power packs shall match existing lighting systems.
- .2 Power packs for sensors and control devices shall be as made by the control device manufacturer.
- .3 Where multiple devices, sensors or “slave” relays, are utilized, no more than three devices may be powered from any one power pack.
- .4 Power pack must be installed in a separate junction box or suitably barriered enclosure, regardless of mounting configuration, visible or concealed. Power pack shall not be installed directly into line voltage junction box through use of the treaded neck. Mounting box shall be securely fastened to structure or line voltage junction box with at least two fasteners.
- .5 Power packs for ceiling mounted ultrasonic and wall mounted dual technology occupancy sensors shall be manufactured by:
 - .1 Hubbell Automation MP-347A 347 volt
 - .2 Leviton OSP15-R30 347 volt
 - .3 Watt Stopper B347D-P 347 volt

30.9 FIELD QUALITY CONTROL

- .1 Site Tests:
 - .1 Perform tests in accordance with Section 26 05 00 – Common Work Results – Electrical.
- .2 Actuate control units in presence of Departmental Representative to demonstrate lighting circuits are controlled as designated.
- .3 Include in tender price for a minimum of 2 days on-site commissioning of new control devices 1 month after completion of the Work. Commissioning shall include:
 - .1 Gathering feedback from occupants regarding the operation of the new control devices;
 - .2 Making adjustments to new control devices to address any occupant concerns and/or suggestions.
- .4 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 29 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 29 - QUALITY ASSURANCE.

30.10 CLEANING

- .1 Proceed in accordance with Section 01 74 11 – Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 31 General

31.1 RELATED REQUIREMENTS

- .1 All retrofitted luminaires shall comply with the requirements of the Electrical Safety Branch Directive 02/96, dated May 14, 1996 or current revision.
- .2 The Contractor to ensure that all seismic restraint requirements, as directed by building or electrical codes for the city, municipality or district where each facility is located, for new or relocated luminaires are met and adhered to.
- .3 The installation of new luminaires or the relocation of existing luminaires must be supported independently of the T-bar ceiling in accordance with construction and local seismic requirements.

31.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI C82.1-04, Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
 - .2 ANSI C82.4-02 (R2007), Ballasts for High Intensity Discharge and Low Pressure Sodium Lamps Multi Supply Type.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- .3 ASTM International Inc.
 - .1 ASTM F1137-[00(2006)], Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 Canadian Standards Association (CSA International)
- .5 ICES-005-07, Radio Frequency Lighting Devices.
- .6 Underwriters' Laboratories of Canada (ULC)

31.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Quality assurance submittals: provide following in accordance with Section 01 45 00 – Quality Control.
 - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning and procedures.

- .4 Provide certification report(s) for all luminaire retrofits that require recertification, to Departmental Representative prior to commencement of installation and include copy in Data Book at completion of project.

31.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .4 Divert unused metal materials from landfill to metal recycling facility.
- .5 Dispose and recycle fluorescent and HID lamps and ballasts in accordance with Section 01 74 21.

31.5 GENERAL LUMINAIRE RETROFIT REQUIREMENTS

- .1 Include in the tender price for the replacement of all fluorescent lampholders on retrofitted luminaires.
- .2 All retrofitted luminaires that do not require recertification and updated certification labelling are to have new electrical information labels affixed at the time of retrofit. This includes luminaires where only the ballast is replaced. This labelling requirement is additional to the recertification labelling requirements. New labels to contain, at minimum, the name of the retrofit Contractor, permit number, the new configuration, input amps, wattage draw, ballast factor, power factor, and voltage.
- .3 Example label shown below. “Ballast Configuration” refers to ballast circuitry; i.e. Instant Start Electronic, Rapid Start Electronic, Program Start Electronic, Energy Saving Magnetic, etc. “Ballast Type” refers to ballast factor for relative light output; i.e. Normal, Low or High Light Output.

Contractor Name, Address, Contact Numbers	
Permit #	Date:
Ballast Configuration: Instant Start Electronic	
Ballast Type: Normal Light Output Lamp Type: T?	
Input Watts: XXw	Input Amps: X.XXA
Voltage: XXXV	Hz:
Ballast Factor: X.XX	Power Factor: X.XX
Min Starting Temp:	

- .4 Use of labels printed on office printers or from sheets of standard paper type office label blanks is not acceptable. Labels must be of mylar or polyester materials and printed with permanent inking. Labels must adhere firmly to the luminaire surfaces and not be dislodged by heat or handling. Printing on labels must not smudge or become illegible when touched.
- .5 In installations utilizing a ballast shared configuration, where one ballast operates lamps in two or more luminaires, labels shall include a denotation in the space at the bottom

of the label to indicate if the luminaire is the “Master” luminaire and containing the ballast or if the luminaire is the “Slave” luminaire containing no ballast with lamps being operated and power from a ballast located in another luminaire housing. The words “Master” and “Slave” shall be in bold type / print and no label shall contain both words.

- .6 Confirm all operating voltages prior to ordering of materials.

Part 32 Products

32.1 GENERAL LAMP REQUIREMENTS

- .1 All fluorescent, and luminaires located on the premises, indoor, and energized from the clients power supplies, including those not affected by this lighting system upgrade, are subject to this tender and must be fully functional at the completion of the Work.

32.2 FLUORESCENT LAMPS

- .1 Lamps to be T8, rapid start configuration, with medium bipin base.
.2 Energy saving T8 lamps to be the following nominal wattages and lumens:

Energy Saving Lamp Wattage	Nominal Initial / Mean Lumens
4' - T8: 25 watt	2,400 / 2,300

- .3 T8 lamps to have a minimum CRI of 85.
.4 Lamps to be suitable for operation on instant start and programmed rapid start ballasts from any ballast manufacturer as listed in this specification.
.5 Rated average lamp life to be minimum 36,000 hours per 3 hour start based on ANSI testing procedure utilizing Instant Start high/premium efficiency ballasts.
.6 Lamps to have a CCT of 4,100 K; verify lamp colour before ordering.
.7 Fluorescent lamps to be Low Mercury type and to contain less than 5 mg of mercury. Low Mercury fluorescent lamps to also meet or exceed acceptable levels as outlined in the US EPA (Environmental Protection Agency) standards for Toxic Characteristics Leaching Procedure (TCLP).
.8 Long-life energy saving lamps to meet the following lamps as minimum standards:
- | | | |
|----|---------------------------|--------------------------------------|
| .1 | Canadian General Electric | T8 Ecolux SXL; |
| .2 | Osram Sylvania Ltd | Octron 800 XL series; |
| .3 | Philips Lighting Inc. | Extra-long life Energy Advantage T8. |

32.3 SPARE LAMPS

- .1 Provide spare lamps for each type used on project as follows:
- | | | |
|----|--------------------|---|
| .1 | Linear Fluorescent | 250 (10 cases of 25) T8 25 watt – 4' lamps; |
|----|--------------------|---|
- .2 Obtain signed receipt from Departmental Representative indicating acceptance of lamps.

32.4 FLUORESCENT LAMP BALLASTS

- .1 Ballasts to be manufactured to CSA C22.2 No. 74 and to be CBM (Certified Ballast Manufacturers) certified.
- .2 Ballasts to be supplied with rated voltage matching supply voltage.
- .3 Ballasts to have Class "A" maximum sound rating for high frequency electronic and compact fluorescent types.
- .4 Ballast utilization to be as follows (unless otherwise noted):

Lamp Type	Ballast Type
4' - T8	Premium / High Efficiency Electronic

- .5 All ballasts to be high power factor, single or multiple lamps as required, with thermal auto-resetting protection and non-PCB capacitor.
- .6 All electronic ballasts shall utilize striation-reduction technology and be capable of operating energy saving lamps, within manufacturer recommended ambient temperature ranges, without striations.
- .7 Electronic fluorescent ballasts must be complete with integral End-of-Life (EOL) microprocessor circuitry that sense the increase in DC current draw as the lamp nears EOL. Circuitry will cause the ballast to "cut-out" and not attempt to re-strike or start the failed lamp. Upon replacement of the lamp with a new lamp, the circuitry will sense the change in current draw and the microprocessor will reset the circuitry and allow the new lamp to operate normally.
- .8 In addition to the manufacturer's warranty, the Contractor to provide at no charge to the Owner, a minimum one year replacement warranty from the date of accepted completion of the Work. This warranty is to provide for the replacement of any ballast(s) that fail within the first year of operation and is to include all labour and material costs associated with the replacement of the failed ballast(s).
- .9 Ballasts to match lamp starting configuration, unless noted otherwise in the specification.
- .10 All fluorescent ballasts to have a manufacturer's replacement warranty based on the following:
 - .1 Electronic (Instant Start) 5 years.

32.5 ELECTRONIC FLUORESCENT LAMP BALLASTS

- .1 Ballasts for T8 rapid start, lamps to be high frequency electronic type.
- .2 Unless otherwise stated or unavailable for specific lamp applications, all electronic ballasts are to be high efficiency type, as defined by NEMA 'premium efficiency' ballast program.
- .3 Lamps operating on multiple-lamp ballasts are to operate in parallel, allowing remaining lamps to maintain full light output if one or more lamps fails.
- .4 Ballasts to operate from 60 Hz input source, rated to match the supply voltage.
- .5 Normal Ballast Factor (NBF) ballasts have a ballast factor of at least 0.85, per ANSI C82.11.

- .6 Ballasts to have a power factor of at least 0.95.
- .7 Ballasts to operate lamps between 20 kHz and 60 kHz.
- .8 EMI/RFI to be in accordance with FCC 47 CFR Part 18.
- .9 Third harmonic content must not exceed 15% of output current. Total harmonic distortion of input current shall not exceed 20%.
- .10 Ballasts to be provided with integral leads, colour coded to ANSI C82.11 standards.
- .11 Instant Start (IS) ballasts maximum lamp crest factor shall be 1.7.
- .12 Normal ballast factor (NBF) IS ballasts shall meet the following ballasts as minimum standards:
 - .1 Canadian General Electric UltraMax N series;
 - .2 Osram Sylvania Quicktronic High Efficiency series;
 - .3 Philips Advance Optanium series;
 - .4 Universal Lighting Technologies ULTim8 series (Standard Light Output).

32.6 FLUORESCENT LUMINAIRE DISCONNECT

- .1 All new fluorescent luminaires with designated voltage ballasts above 150 volts or with multi-voltage ballasts where at least one of the voltages exceeds 150 volts to be complete with a disconnect rated for live make and break.
- .2 For fluorescent luminaire retrofits or ballast changes utilizing designated voltage ballasts above 150 volts or with multi-voltage ballasts where at least one of the voltages exceeds 150 volts are to be complete with a disconnect rated for live make and break.
- .3 Fluorescent luminaire disconnects shall meet the following luminaire disconnects as minimum standards:
 - .1 Ideal Manufacturing.
 - .2 Thomas and Betts.
 - .3 Wago Corporation.

32.7 FLUORESCENT LAMP HOLDERS

- .1 Fluorescent lampholders to have a minimum rating of 660 watts, 600 volts. Lampholders to be moulded in white, thermoset urea plastic, and have heavy-gauge, copper-alloy contacts.
- .2 Replacement fluorescent lampholders to match existing unless otherwise noted.
- .3 All fluorescent lampholders are to be shunted when used with instant start ballasts, and clearly and permanently marked with the word "SHUNTED" and/or a stamped with a prominent letter "S" on the backing.
- .4 Shunted fluorescent lampholders shall meet the following lampholders as minimum standards:
 - .1 Leviton 23351 (short) / 23357 (long);
 - .2 Standard 38241 (low) / 38197 (tall) or 38244 (straight-in for U bend lamps);

- .3 Etlin-Daniels FL005-WS (short shoulder shunted) / FL011-WS (long shoulder shunted).

32.8 SOLID-STATE DOWNLIGHT CONVERSION MODULES

- .1 Solid-state, Light Emitting Diode (LED) downlights and conversion modules shall be suitable for operation in any mounting position.
- .2 LED lamps utilized in retrofit modules or downlight conversions shall utilize high brightness diodes and shall have a minimum CRI of 80.
- .3 Modules shall have a CCT of 4,000K; verify lamp colour before ordering.
- .4 Light engine drivers shall be a constant current type providing nominal 525 MA current and be high power factor.
- .5 Wattages and luminous output values listed in specification documentation for solid-state conversion modules or downlights are nominal values; variances of 2 to 5% for equivalent performing products are allowed.
- .6 Conversion modules utilized shall be compatible with all manufacturers' downlights, cylinders and other luminaire styles without need for modification to the luminaire beyond installation of internal mounting brackets or trim retention systems. Exterior appearance of converted luminaires shall be unchanged from appearance prior to retrofit.
- .7 LED modules shall be mercury free. Lamps shall emit no ultraviolet or infrared wavelengths that could damage objects illuminated by these lamps.
- .8 LED modules shall be dimmable to minimum 5% light output on and be compatible with magnetic or electronic dimmers; both residential and commercial grade. LED modules should not emit high pitched sounds during dimmed operation.
- .9 LED life expectancy to "half life" shall be minimum 50,000 hours for all solid-state conversion modules and purpose build downlights. Life expectancy shall be based on testing and construction standards L70 and IESNA LM-79.
- .10 Luminous efficacy of solid-state, light emitting diodes shall be 65lumens per watt or greater.
- .11 Downlight conversion modules shall be self-contained and shall be complete with a black/white multi-groove baffle where existing luminaires are currently equipped with baffles. Baffles shall be at least 1½" deep and have sufficient depth to cover all mounting screws or openings.
- .12 Conversion modules shall be complete with a minimum 1/2" wide, white trim ring.
- .13 Baffles and reflectors for downlight conversion modules shall be of sufficient depth and design so that the direct lamp cut off angles shall be a minimum of 30 degrees above horizontal. Lamp image in the reflector shall be a minimum of 20 degrees.
- .14 Solid-state conversion modules or downlights shall be manufactured by:
 - .1 Cree
 - .2 Halo Lighting
 - .3 Lithonia Lighting
 - .4 Osram Sylvania Ltd.

- .5 Prescolite / Hubbell Lighting
- .6 Philips Lighting Inc.
- .7 Or Accepted Equivalent

Part 33 Execution

33.1 INSTALLATION

- .1 Locate and install luminaires as indicated.
- .2 Install luminaries accurately and carefully aligned, complete with all mounting hardware.
- .3 Install new or relocated luminaries so that recessed portions of the luminaries enclosure are a minimum of 12 mm (1/2") from combustible materials at every point other than at a point of support.
- .4 Install all ballasts in accordance with manufacturer's instructions so as not to void any ballasts or lamp warranties. Ballasts are to be installed and wired to conform to the manufacturer's wiring diagram for the ballast type being installed.
- .5 Install all lamps in accordance with luminaire and lamp manufacturer's instructions so as not to void any warranties.
- .6 All lighting luminaires to be supplied with accessory items such as yoked, plaster rings, frames, supports, etc., where required for proper installation of luminaires.
- .7 The Contractor to confirm the compatibility of lighting luminaires specified with ceiling types throughout the project.
- .8 Lighting drawings as provided are diagrammatic only and do not indicate exact mounting locations. Refer to architectural reflected ceiling drawings and details.
- .9 Install luminaires in service areas, such as Mechanical or Electrical rooms, to be clear of obstruction. Provide additional miscellaneous metal supports to clear ductwork where practical.
- .10 Mount luminaires located where insulation or sound barrier material is being applied, on appropriate spaces, e.g. "Unistrut" to suit thickness of insulation or sound barrier.
- .11 Light leaks around trims of recessed luminaires will not be accepted. Remove and replace with acceptable products.
- .12 Lighting strips shown in coves or valences on drawings are for tendering purposes only. Site measure exact dimensions for louvres, lenses and strip lengths. Where fluorescent striplights are mounted continuously, single bodies with tandem lamps may be used.
- .13 Where existing recessed luminaires are removed from T-bar ceilings as part of this contract, include in tender price a ceiling tile to match existing. Provide sample of proposed ceiling tile for approval prior to ordering. Tiles match existing as close as possible. Obtain from building owner if available.
- .14 For locations that utilize a shared ballast, provide identification of ballast locations. Provide colour coded 80 mm (5/16") diameter stickers, yellow for 120 V, red for 277 V and blue for 347 V. For luminaires located in T-bar ceilings, locate sticker on T-bar adjacent to ballast locations. For surface mounted striplights, industrials, etc. locate stickers as to be visible from floor level.

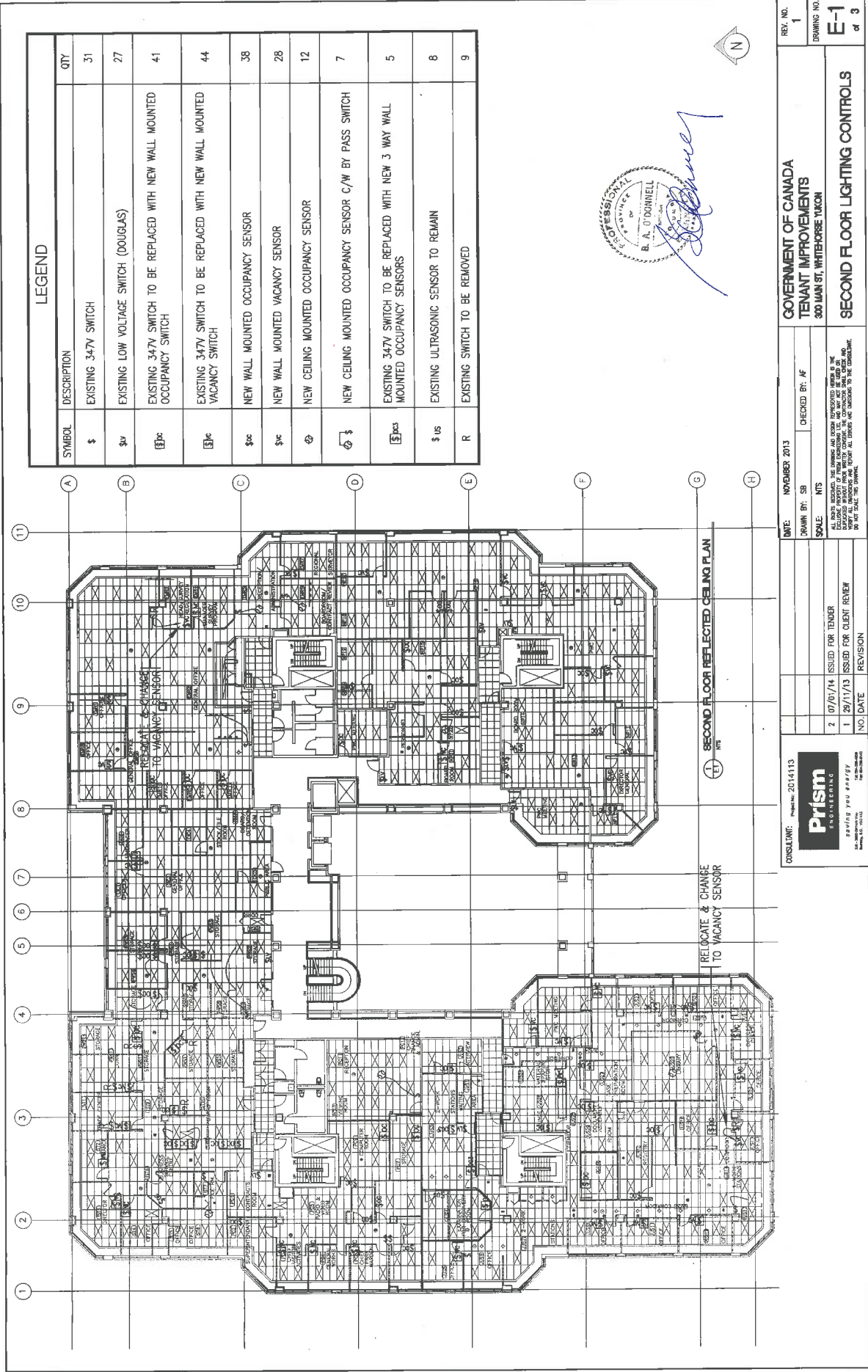
33.2 PROTECTION OF EQUIPMENT

- .1 The Contractor is responsible for protection of all lighting elements during construction. Replace all elements blemished, scratched or damaged at no additional cost.
- .2 Install luminaire trims, baffles, cones, lenses, louvres and aperture plates after all the painting and cleaning has been completed.

33.3 CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

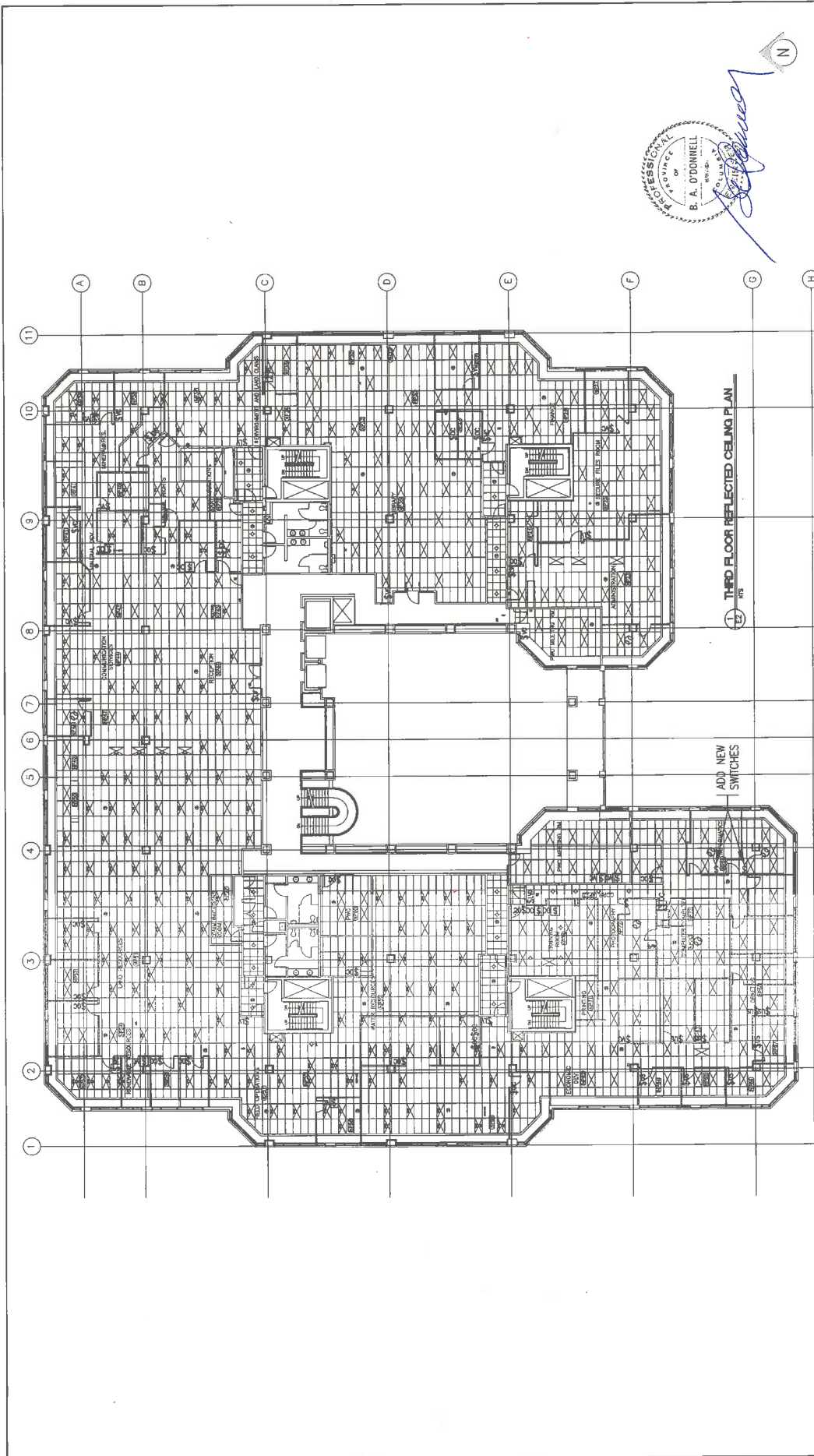
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LEGEND		
SYMBOL	DESCRIPTION	QTY
\$	EXISTING 347V SWITCH	31
\$u	EXISTING LOW VOLTAGE SWITCH (DOUGLAS)	27
\$pc	EXISTING 347V SWITCH TO BE REPLACED WITH NEW WALL MOUNTED OCCUPANCY SWITCH	41
\$pc	EXISTING 347V SWITCH TO BE REPLACED WITH NEW WALL MOUNTED VACANCY SWITCH	44
\$pc	NEW WALL MOUNTED OCCUPANCY SENSOR	38
\$pc	NEW WALL MOUNTED VACANCY SENSOR	28
\$	NEW CEILING MOUNTED OCCUPANCY SENSOR	12
\$	NEW CEILING MOUNTED OCCUPANCY SENSOR C/W BY PASS SWITCH	7
\$pc	EXISTING 347V SWITCH TO BE REPLACED WITH NEW 3 WAY WALL MOUNTED OCCUPANCY SENSORS	5
\$ us	EXISTING ULTRASONIC SENSOR TO REMAIN	8
R	EXISTING SWITCH TO BE REMOVED	9



GOVERNMENT OF CANADA TENANT IMPROVEMENTS 300 LAM ST. WHITEHORSE YACON		REV. NO. 1 DRAWING NO. E-1 of 3
DATE: NOVEMBER 2013 DRAWN BY: SR SCALE: NTS CHECKED BY: AF	SECOND FLOOR LIGHTING CONTROLS	
2 07/01/14 ISSUED FOR TENDER 1 28/11/13 ISSUED FOR CLIENT REVIEW		
NO. DATE REVISION		
CONSULTANT: Prisma Inc. 2014113 Prisma engineering saving you energy 100-1000-1000 100-1000-1000		



CONSULTANT: Prisma Inc. 2014113		DATE: NOVEMBER 2013	REV. NO. 1
 saving you energy without you knowing it 2014-11-13 Whitehorse, Yukon		DRAWN BY: SR	DRAWING NO. E-2
2 07/01/14 ISSUED FOR TENDER		CHECKED BY: AF	3
1 12/11/13 ISSUED FOR CLIENT REVIEW		SCALE: NTS	
NO. DATE		GOVERNMENT OF CANADA TENANT IMPROVEMENTS 800 MAIN ST, WHITEHORSE YUKON THIRD FLOOR LIGHTING CONTROLS	

ALL WORK SHOWN ON THIS DRAWING IS TO BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL BUILDING CODE OF CANADA (NBC) AND THE NATIONAL ELECTRICAL CODE OF CANADA (NEC). THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE APPROPRIATE AUTHORITIES. THE CONSULTANT IS NOT RESPONSIBLE FOR ANY ERRORS OR OMISSIONS IN THIS DRAWING.

