NCC Tender File #	AL1745
Project Description	Richmond Landing Shoreline Access - Phase 2, Modified Land Entry
Site Visit	None scheduled
Closing date and time	Wednesday , June 6, 2018 at 3pm Ottawa time

INVITATION TO TENDER & ACCEPTANCE FORM

RETURN TENDERS TO:	National Capital Commission 40 Elgin Street, Security Office on the 2nd floor Ottawa, ON K1P 1C7	**NCC Tender Number** **AL1745**
TENDER CLOSING DATE AND TIME:	Wednesday, June 6, 2018 at 3:00 p.m., Ottawa time	**NCC Contract Number**

DESCRIPTION OF WORK: Richmond Landing Shoreline Access - Phase 2, Modified Land Entry

1. BUSINESS NAME AND ADDRESS OF BIDDER

Name: _____

Address: _____

_____

Telephone number: _____ **Fax number:** _____

E-mail address: _____

2. THE OFFER

The Bidder offers to the National Capital Commission (NCC) to perform and complete the work for the above mentioned project in accordance with the tender documents for the total tender amount (to be expressed in numbers only) of:

Sub Total $ _____

OHST – 13% $ _____

TOTAL $ _____

3. TENDER VALIDITY PERIOD

The tender shall not be withdrawn for a period of 60 days following the date and time of tender closing.

4. CONTRACT DOCUMENTS

1. The following are the contract documents:
   (a) Invitation to Tender & Acceptance Form when signed by the NCC;
   (b) Duly completed Invitation to Tender & Acceptance Form and any Appendices attached thereto;
   (c) Drawings and Specifications;
   (d) General Conditions (GC1 to GC10);
   (e) Supplementary Conditions, if any;
   (f) Insurance Terms;
   (g) Occupational Health and Safety Requirements;
   (h) Addenda
   (i) Any amendments issued or any allowable tender revision received before the date and time set for tender closing;
   (j) Any amendment incorporated by mutual agreement between the NCC and the Contractor before acceptance of the tender; and
   (k) Any amendment or variation of the contract documents that is made in accordance with the General Conditions;
   (l) Security Requirements.

2. The language of the contract documents shall be the language of the Invitation to Tender & Acceptance Form submitted.

NCC Tender Number AL1745	NCC Contract Number

5. APPENDICES

The tender includes Appendix(ces) Nos I and II to the Invitation to Tender & Acceptance Form.

6. ACCEPTANCE AND CONTRACT

Upon acceptance of the Contractor's offer by the NCC, a binding Contract shall be formed between the NCC and the Contractor. The documents forming the Contract shall be the contract documents referred to in 4 – CONTRACT DOCUMENTS.

7. CONSTRUCTION TIME

The Contractor shall perform and complete the Work on or before December 31, 2018.

8. UNIT PRICE TABLE

The Bidder agrees that

(a) the Unit Price Table designates that part of the Work to which a Unit Price Arrangement applies.

(b) the Price per Unit (excluding taxes) and the Estimated Total Price (excluding taxes) must be entered for each item listed;

(c) the Price per Unit (excluding taxes) as tender governs in calculating the Total Estimated Amount, and any errors in the extension of the Price per Unit (excluding taxes) and in the addition of the Estimated Total Prices shall be corrected by the NCC in order to obtain the Total Estimated Amount; and

(d) the following table is the Unit Price Table for the purposes of the tender and the Contract:

UNIT PRICE TABLE

Note: Transfer the Total Estimated Amount from the Unit Price Table to item 2 – THE OFFER of this Invitation to Tender & Acceptance Form

				A	B	C = A x B
	Description / *Description* *(Note: See the 'Summary of Work' section in the tender specifications for a detailed description of each item / Voir la section "Résumé des travaux" dans les spécifications au devis pour une description plus détaillée de chaque item)*	**UOM**	**Unité de mesure**	**Qty / *Qté***	**Unit price / *Prix unitaire***	**Total / *Total***
1.	**Landscape architecture / *Architecture de paysage***					
1.1	**Landscape and earthwork / *Aménagement et terrassement***					
.1	Mobilisation and construction site installations / *Mobilisation et exigences générales*	lump sum	forfaitaire	1		
.2	Erosion and sediment control and environmental procedures / *Contrôle de l'érosion et des sédiments et mesures de protection environnementales*	lump sum	forfaitaire	1		

.3	Tree and vegetation protection / *Protection des arbres et des végétaux*	lump sum	forfaitaire	1		
.4	Clearing and grubbing / *Défrichement et essouchement*	lump sum	forfaitaire	1		
.5	Demolition of surfaces / *Démolition des surfaces*	lump sum	forfaitaire	1		
.6	Excavation and disposal of contaminated soils / *Excavation et évacuation des sols contaminés*	metric ton	tonne métrique	1500		
.7	Fill and rough grading / *Remblai et nivellement brut*	metric ton	tonne métrique	610		
.8	Asphalt pathway / *Sentier de béton bitumineux*	sq. m.	m.carré	1700		
.9	Bench - precast concrete / *Banc - Béton préfabriqué*	metre	mètre	106		
.10	Bench - precast corner module / *Banc – modules de coin*	each	chaque	7		
.11	Wall - cast-in-place concrete / *Muret - béton coulé en place*	metre	mètre	158		
.12	Staircase - cast-in-place concrete / *Escalier - béton coulé en place*	lump sum	forfaitaire	1		
.13	Concrete ramp - cast-in-place / *Rampe - béton coulé en place*	sq. m.	m.carré	66		
.14	Concrete slab - cast-in-place / *Dalle - béton coulé en place*	sq. m.	m.carré	100		
.15	Salvaged granite curb / *Bordure de granit récupérée*	metre	mètre	22		
.16	Granite cobblestone pavers / *Pavés de granit*	sq. m.	m.carré	30		
.17	Individual stone and stone alignment / *Pierres individuelles et alignement de pierres*	each	chaque	35		

1.2 Equipment and furniture / *Équipement et mobilier*

.1	Waste Receptacle / *Panier à rebuts*	each	chaque	3		
.2	Handrail for stairs / *Main courante pour escalier*	metre	mètre	39		
.3	Handrail for ramp / *Main courante pour rampe*	metre	mètre	71		
.4	Armrest for concrete bench / *Accoudoir pour banc de béton*	each	chaque	48		

1.3 Planting / plantation

1.3.1 Shrub planting / *Plantation des arbustes* : Size Taille

.1	Berberis thunbergii	50cm	50cm	25		
.2	Cornus alba 'Little Rebel'	50cm	50cm	33		
.3	Cornus sericea stolonifera	50cm	50cm	6		
.4	Cornus stolonifera 'Artic Fire'	50cm	50cm	21		
.5	Forsythia x intermedia 'Arnold Dwarf'	50cm	50cm	62		

.6	Juniperus ch. 'Mint Julep'	50cm	50cm	2207		
.7	Physocarpus opul. 'Diabolo'	50cm	50cm	65		
.8	Physocarpus opulifolius 'Nanus'	50cm	50cm	62		
.9	Rhus aromatica 'Gro Low'	50cm	50cm	415		
.10	Rosa rugosa 'Champlain'	50cm	50cm	110		
.11	Rosa rugosa 'David Thompson'	50cm	50cm	156		
.12	Stephanandra incisa 'Crispa'	50cm	50cm	330		
.13	Viburnum trilobum	125cm	125cm	11		

1.3.2 Perennial planting / *Plantation des vivaces*: **Size** **Taille**

.1	Calamagrostis acutiflo.'Karl Foerster'	1L	1L	323		
.2	Calamagrostis canadensis	1L	1L	339		
.3	Echinacea 'Cleopatra'	1L	1L	242		
.4	Echinacea 'Mama Mia'	1L	1L	82		
.5	Lysimachia clethroides	1L	1L	1216		
.6	Miscanthus sinensis	1L	1L	122		
.7	Rudbeckia fulgida 'Goldsturm'	1L	1L	786		
.8	Sesleria autumnalis	1L	1L	1488		

1.3.3 Tree planting / Plantation d'arbres: **Size** **Taille**

.1	Acer x freemanii 'Autumn Blaze'	50mm	50mm	5		
.2	Aesculus hippocastanum	50mm	50mm	1		
.3	Catalpa speciosa	50mm	50mm	1		
.4	Celtis occidentalis	50mm	50mm	3		

1.3.4 Bulb planting / *Plantation des bulbes* :

.1	Tulipa acuminate	each	chaque	1814		
.2	Tulipa tarda	each	chaque	1812		
.3	Tulipa saxatilis	each	chaque	651		
1.4 .1	Sodding / *Gazonnement*	sq. m.	m.carré	2750		

2. Lighting Equipment / *Équipement d'éclairage*

2.1 Lighting Fixtures / Luminaires

.1	Type L1 tapelight / Ruban d'éclairage à DÉL de type L1	metre	mètre	52		
.2	Type L2a bollard / Bollard de type L2a	each	chaque	45		
.3	Type L2b bollard / Bollard de type L2b	each	chaque	16		
.4	Type L2c bollard / Bollard de type L2b	each	chaque	7		
.5	Type L2d bollard / Bollard de type L2b	each	chaque	6		

.6	Type L4a tapelight / Ruban d'éclairage à DÉL de type L1	metre	mètre	119		

2.2 Lighting Control Equipment / Équipement de contrôle d'éclairage

.1	NEMA 3R cabinet / un boîtier NEMA 3R	each	chaque	1		
.2	250W strip heater / Bandes chauffantes 250W	each	chaque	1		
.3	Room Controller / Contrôleur de Salle	each	chaque	1		
.4	Timeclock control interface / Commande horaire	each	chaque	1		
.5	Phase adaptive dimmer / Gradateur adaptatif	each	chaque	6		

2.3 Fixture installation / Installation de luminaires

.1	Type L1 tapelight / Ruban d'éclairage à DÉL de type L1	metre	mètre	52		
.2	Type L2a bollard (incl. base) / Bollard de type L2a (avec socle en béton)	each	chaque	45		
.3	Type L2b bollard (incl. base) / Bollard de type L2b (avec socle en béton)	each	chaque	16		
.4	Type L2c bollard (on wall) / Bollard de type L2b (sur le mur)	each	chaque	7		
.5	Type L2d bollard (on stairs) / Bollard de type L2b (avec des escaliers)	each	chaque	6		
.6	Type L4a tapelight / Ruban d'éclairage à DÉL de type L1	metre	mètre	119		
.7	Type L6 relocated core park light / Lampadaire 'core park' relocalisé	each	chaque	7		

2.4 Lighting control equipment installation / Installation d'équipement de contrôle d'éclairage

.1	NEMA 3R cabinet / un boîtier NEMA 3R	each	chaque	1		
.2	250W strip heater / Bandes chauffantes 250W	each	chaque	1		
.3	Room Controller / Contrôleur de Salle	each	chaque	1		
.4	Timeclock control interface / Commande horaire	each	chaque	1		
.5	Phase adaptive dimmer / Gradateur adaptatif	each	chaque	6		

3. Electrical / Électricité

3.1 Hand Hole / Trou d'accès manuel

.1	E27-NCC	each	chaque	13		

3.2 Rigid Duct, Direct Buried / Conduit rigide à enfouissement direct

.1	1 - 25mm	metre	mètre	20		
.2	1 - 50mm	metre	mètre	550		
.3	2 - 50mm	metre	mètre	150		
.4	3 - 50mm	metre	mètre	40		

	.5	4 - 50mm	metre	mètre	30		
	.6	2-50mm & 1-25mm	metre	mètre	30		
	.7	1-100mm & 1-50mm	metre	mètre	65		
	.8	1-100mm	metre	mètre	75		
3.3	**Low Voltage Cables, in Duct / Câbles basse tension, à l'intérieur de conduits**						
	.1	1/C #8 LV AWG	metre	mètre	7250		
	.2	1/C #1/0 LV AWG	metre	mètre	500		
3.4	**Ground Wire / Fil de mise à la terre**						
	.1	1/C #6 AWG Insulated/Isolé	metre	mètre	1400		
	.2	1/C #6 AWG Bare/Nu	metre	mètre	35		
3.5	.1	Ground Electrodes / Électrodes de mise à la terre	each	chaque	35		
3.6	.1	Embedded Electrical Work / Travaux d'électricité noyés dans la masse	lump sum	forfaitaire	1		
3.7	.1	Power Supply Modification / Modification à l'amenée de courant	lump sum	forfaitaire	1		
3.8	.1	Wood Post Mounted PVC Box / Boîte en pvc, de montage sur poteau en bois	lump sum	forfaitaire	1		
3.9	.1	GFCI Duplex Receptacle in Enclosure / Prise de courant duplex, de type « GFCI » et à l'intérieur d'un boîtier	lump sum	forfaitaire	1		
						Subtotal - Total partiel	

9. The basis of award is low total cost to the NCC including all taxes.

10. I/We acknowledge receipt of the following addenda: _____
(Bidder to ender number of addenda issued, if any) and have included for the requirement of it/them in my/our tendered price.

11. TENDER SECURITY

1. The Bidders shall enclose tender security with its tender in accordance with GI08 TENDER SECURITY REQUIREMENTS.

2. If the security furnished does not comply fully with the requirements referred to in paragraph 1) herein, the tender shall be disqualified.

3. If a security deposit is furnished as tender security, it shall be forfeited in the event that the tender is accepted by the NCC and the Contractor fails to provide Contract Security in accordance with GC9 CONTRACT SECURITY, provided that the NCC may, if it is in the public interest, waive the forfeiture of the security deposit.

We hereby offer to supply to the NCC in accordance with the terms and conditions set out herein, the construction work listed above and on any attached sheets at the submitted price(s).

Name and title of person authorized to sign on behalf of Bidder (please print or type)	Signature	Date

Your tender is accepted to supply to the NCC, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the construction services listed herein and on any attached sheets at the price(s) set out therefore.

Name and title of the person authorized to sign on behalf of the NCC (please print or type)	Signature	Date

NCC Tender Number AL1745	NCC Contract Number

INVOICING

Send the original invoice and 1 copy to:

Accounts Payable
National Capital Commission
202-40 Elgin Street
Ottawa, ON K1P 1C7

Or by email at the following address: **payables@ncc-ccn.ca**

To ensure prompt payment, please prepare your invoice in accordance with the prices quoted. Errors in invoicing can cause delay of payment. Submit your invoice to the address shown above and clearly indicate the Purchase Order number.

INVITATION TO TENDER & ACCEPTANCE FORM	APPENDIX 1

1) The Bidder will subcontract the parts of the work listed below to the subcontractor named for each part. The Bidder agrees not to make changes in the list of subcontractors without the written consent of the NCC Representative. The Bidder understands that for each part of the work identified as Mandatory, if more than one subcontractor is named or no subcontractor is named, or, the Bidder fails to state that the work will be done by its own forces where applicable, the tender will be disqualified.

2) The Bidder certifies that tenders for the part(s) of the Work listed below were received from the following sub-contractors:

MANDATORY REQUIREMENT: The subcontractors performing the work listed below must be identified. Failure to disclose the name of the sub-contractor for any work identified will result in the disqualification of your tender.

(a) **XXXX**

Sub-contractor: _____

Address: _____

(b) **XXXX**

Sub-contractor: _____

Address: _____

(c) **XXXX**

Sub-contractor: _____

Address: _____

(d) **XXXX**

Sub-contractor: _____

Address: _____

NON-MANDATORY REQUIREMENT:

(a) Any other work not listed above

Type of work: _____ Sub-contractor: _____

Type of work: _____ Sub-contractor: _____

Type of work: _____ Sub-contractor: _____

Type of work: _____ Sub-contractor: _____

Type of work: _____ Sub-contractor: _____

Type of work: _____ Sub-contractor: _____

NCC CCN Canada

PROTECTED "A" when completed
PROTÉGÉ « A » lorsque rempli

☐ New supplier / Nouveau fournisseur ☐ Update / Mise à jour

Supplier No. / N° du fournisseur

APPENDIX II SUPPLIER–DIRECT DEPOSIT PAYMENT AND TAX INFORMATION FORM
APPENDICE II FOURNISSEUR–FORMULAIRE DE PAIEMENT PAR DÉPÔT DIRECT ET RENSEIGNEMENTS AUX FINS DE L'IMPÔT

For NCC use only / À l'usage de la CCN seulement

PART 'A' – IDENTIFICATION / PARTIE 'A' - IDENTIFICATION

Legal name of entity or individual / Nom légal de l'entité ou du particulier	Operating name of entity or individual (if different from Legal Name) / Nom commercial de l'entité ou du particulier (s'il diffère du nom légal)

Former Public Servant in receipt of a PSSA Pension / Ancien fonctionnaire qui reçoit une pension en vertu de la LPFP	☐ **Yes / Oui**	☐ **No / Non**
An entity, incorporated or sole proprietorship, which was created by a Former Public Servant in receipt of a PSSA pension or a partnership made of former public servants in receipt of PSSA pension or where the affected individual has a controlling or major interest in the entity. / Une entité, constituée en société ou à propriétaire unique, créée par un ancien fonctionnaire touchant une pension en vertu de la LPFP, ou un partenariat formé d'anciens fonctionnaires touchant une pension en vertu de la LPFP, où les entités dans lesquelles ils détiennent le contrôle ou un intérêt majoritaire.	☐ **Yes / Oui**	☐ **No / Non**

Address / Adresse	Telephone No. / N° de téléphone :	Fax No. / N° de télécopieur :
Postal code / Code postal	( )	( )

PART 'B' – STATUS OF SUPPLIER / PARTIE 'B' – STATUT DU FOURNISSEUR

(1) Sole proprietor / Propriétaire unique ☐ — If sole proprietor, provide: / Si propriétaire unique, indiquez : Last Name / Nom de famille | First name / Prénom | Initial / Initiale

(2) Partnership / Société de personnes ☐ — SIN – mandatory for (1) & (2) / NAS – obligatoire pour (1) & (2)

Corporation / Société ☐ — Business No. (BN) / N° de l'entreprise (NE)

GST/HST / TPS et TVH	QST / TVQ (Québec)
Number / Numéro :	Number / Numéro :
Not registered / non inscrit ☐	Not registered / non inscrit ☐

Type of contract / Genre de contrat

Contract for services only / Contrat de services seulement ☐ — Contract for mixed goods & services / Contrat de biens et services ☐ — Contract for goods only / Contrat de biens seulement ☐

Type of goods and/or services offered / Genre de biens et/ou services rendus :

PART 'C' – FINANCIAL INSTITUTION / PARTIE 'C' – RENSEIGNEMENTS SUR L'INSTITUTION FINANCIÈRE

Please send a void cheque with this form / Veuillez, s.v.p., envoyer un spécimen de chèque avec ce formulaire

Branch Number / N° de la succursale _____ Institution No. / N° de l'institution : _____ Account No. / N° de compte : _____

Institution name / Nom de l'institution :

Address / Adresse : _____

Postal Code / Code postal :

PART 'D' – DIRECT DEPOSIT PAYMENT NOTIFICATION / PARTIE 'D' – AVIS DE PAIEMENT PAR DÉPÔT DIRECT

E-mail address / Adresse courriel :

PART 'E' – CERTIFICATION / PARTIE 'E' – CERTIFICATION

I certify that I have examined the information provided above and it is correct and complete, and fully discloses the identification of this supplier.

Where the supplier identified on this form completes part C, he hereby requests and authorizes the National Capital Commission to directly deposit into the bank account identified in part C, all amounts payable to the supplier.

Je déclare avoir examiné les renseignements susmentionnés et j'atteste qu'ils sont exacts et constituent une description complète, claire et véridique de l'identité de ce fournisseur.

Lorsque le fournisseur indiqué sur ce formulaire remplit la partie C, par la présente, il demande et autorise la Commission de la capitale nationale à déposer directement dans le compte bancaire indiqué à la partie C, tous les montants qui lui sont dus.

Name of authorized person / Nom de la personne autorisée _____ Title / Titre _____ Signature _____ Date _____

Telephone number of contact person / Numéro de téléphone de la personne ressource : ( )

IMPORTANT

Please fill in and return to the National Capital Commission with one of <u>your business cheque unsigned and marked « VOID</u> » or a letter from your bank (for verification purposes).

Mail or fax to: Procurement Assistant, Procurement Services
National Capital Commission
202-40 Elgin Street
Ottawa, ON K1P 1C7 Fax: (613) 239-5007

Veuillez remplir ce formulaire et le retourner à la Commission de la capitale nationale avec <u>un spécimen de chèque de votre entreprise non signé et portant la mention « ANNULÉ »</u> ou une lettre de votre banque (à des fins de vérification).

Poster ou télécopier à : Assistant à l'approvisionnement
Services de l'approvisionnement
Commission de la capitale nationale
40, rue Elgin, pièce 202
Ottawa (Ontario) K1P 1C7 Télécopieur : (613) 239-5007

SUPPLIER – DIRECT DEPOSIT PAYMENT AND TAX INFORMATION FORM

FOURNISSEUR – FORMULAIRE DE PAIEMENT PAR DÉPÔT DIRECT ET RENSEIGNEMENTS AUX FINS DE L'IMPÔT

Supplier Tax Information

Pursuant to paragraph 221(1) (d) of the *Income Tax Act*, NCC must declare form T-1204, contractual payments of government for services, all payments made to suppliers during the calendar year in accordance to related service contracts (including contracts for mixed goods and services).

The paragraph 237(1) of the *Income Tax Act* and the article 235 of the Income Tax Regulations require the supplier to provide all necessary information below to the organization who prepares the fiscal information forms.

Questions: Sylvie Monette, Accounts Payable and Receivable Officer – (613) 239-5678, ext. 5156 or sylvie.monette@ncc-ccn.ca

Renseignements sur les fournisseurs aux fins de l'impôt

En vertu de l'alinéa 221(1) (d) de la *Loi de l'impôt sur le revenu*, la CCN est tenu de déclarer, à l'aide du formulaire T-1204, Paiements contractuels de services du gouvernement, tous paiements versés aux fournisseurs pendant une année civile en vertu de marchés de services pertinents (y compris les marchés composés à la fois de biens et de services).

Le paragraphe 237 (1) de la *Loi de l'impôt sur le revenu* et l'article 235 du Règlement de l'impôt sur le revenu obligent les fournisseurs à fournir toutes les informations demandées ci-dessous à l'organisme qui prépare les formulaires de renseignements fiscaux.

Questions : Sylvie Monette, Agent aux comptes fournisseurs et comptes clients – (613) 239-5678, poste 5156 ou sylvie.monette@ncc-ccn.ca

Direct deposit payment information

All amounts payable by NCC to the supplier will be deposited directly into the account you identified in part C. A NCC payment advice notice will also be sent to you by e-mail detailing the particularities of the payment to the address identified in part D.

You must notify the NCC of any changes to your financial institution, branch or account number. You will then have to complete a new form.

The account you identified has to hold Canadian funds at a financial institution in Canada.

Renseignements sur le paiement par dépôt direct

Tous les montants versés par la CCN au fournisseur seront déposés directement dans le compte identifié à la partie C. Un avis de paiement de la CCN détaillant les particularités du paiement par dépôt direct vous sera envoyé par courriel à l'adresse courriel identifiée à la partie D.

Vous devez aviser la CCN de tout changement d'institution financière, de succursale ou de numéro de compte. Vous devrez donc remplir un nouveau formulaire.

Le compte que vous désignez doit être un compte en monnaie canadienne, détenu dans une institution financière au Canada.

The advantages of direct deposit payment

Direct deposit payment is a convenient, dependable, safe and timesaving way to receive your invoice payment. Direct deposit payment is completely confidential.

Funds made by direct deposit payment will be available in your bank account within two (2) days after receiving the NCC payment advice notice.

Avantages du paiement par dépôt direct

Le paiement par dépôt direct est une méthode pratique, fiable et sécuritaire, qui permet de gagner du temps dans la réception de vos paiements de factures. Le paiement par dépôt direct est entièrement confidentiel.

Les paiements effectués par dépôt direct seront disponible dans votre compte bancaire dans un délai de deux (2) jours après que la CCN envoi l'avis paiement.

Revised February 2015 / Révisé février 2015

SPECIAL INSTRUCTIONS TO BIDDERS

SI01 TENDER DOCUMENTS

1) The following are the tender documents:

   (a) Invitation to Tender & Acceptance Form and any Appendices attached thereto;

   (b) Special Instructions to Bidders; and

   (c) General Instructions to Bidders.

   Submission of a tender constitutes acknowledgement that the Bidder has read and agrees to be bound by these documents.

SI02 ENQUIRIES DURING THE SOLICITATION PERIOD

1) Enquiries regarding this tender must be submitted in writing to the following: Sr. Contract Officer, Allan Lapensée e-mail address – allan.lapensee@ncc-ccn.ca as early as possible within the solicitation period. Except for the approval of alternative materials as described in GI15 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 result in an answer not being provided.

2) To ensure consistency and quality of the information provided to Bidders, the Sr. Contract 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 tender sent throughout the solicitation period are to be directed ONLY to the Sr. Contract Officer named above. Non-compliance with this requirement during the solicitation period can, for that reason alone, result in disqualification of a tender.

SI03 [NON MANDATORY] SITE VISIT

1) None scheduled.

SI04 REVISION OF TENDER

1) A tender may be revised by letter or facsimile in accordance with GI10 of the General Instructions to Bidders. The facsimile number for receipt of revisions is 613-239-5012.

SI05 TENDER RESULTS

1) Following solicitation closing, tender results may be obtained by emailing the Sr. Contract Officer, Sr. Contract Officer, Allan Lapensée e-mail address – allan.lapensee@ncc-ccn.ca .

SI06 NEGOTIATIONS

1) In the event that the lowest compliant tender exceeds the amount of funding the NCC has allocated for the construction phase of the work:

   (a) by 15% or less, the NCC, at its sole discretion, shall either:

      (i) cancel the invitation to tender; or

      (ii) obtain additional funding and, subject to the provisions of GI11 and GI09 of the General Instructions to Bidders, award the Contract to the Bidder submitting the lowest compliant tender; or

      (iii) revise the scope of the work accordingly and negotiate, with the Bidder submitting the lowest compliant tender, a corresponding reduction in its tender price.

   (b) by more than 15%, the NCC, at its sole discretion, shall either:

      (i) cancel the invitation to tender; or

      (ii) obtain additional funding and, subject to the provisions of GI11 and GI09 of the General Instructions to Bidders, award the Contract to the Bidder submitting the lowest compliant tender; or

      (iii) revise the scope of the work accordingly and invite those who submitted compliant tenders at the original invitation to tender to re-tender the work.

2) If negotiations or a re-tender are undertaken as is contemplated in subparagraphs 1)(a)(iii) or 1)(b)(iii) above, Bidders shall retain the same subcontractors and suppliers as they carried in their original tenders.

3) If the NCC elects to negotiate a reduction in the tender price as is contemplated in subparagraph 1)(a)(iii) herein and the negotiations fail to reach an agreement, the NCC shall then exercise either of the options referred to subparagraphs 1)(a)(i) or 1)(a)(ii).

SI07 TENDER VALIDITY PERIOD

1) The NCC reserves the right to seek an extension to the tender validity period prescribed in 3 of the Invitation to Tender & Acceptance Form. Upon notification in writing from the NCC, Bidders shall have the option to either accept or reject the proposed extension.

2) If the extension referred to in paragraph 1) of SI07 is accepted, in writing, by all those who submitted tenders, then the NCC shall continue immediately with the evaluation of the tenders and its approvals processes.

3) If the extension referred to in paragraph 1) of SI07 is not accepted in writing by all those who submitted tenders then the NCC shall, at its sole discretion, either:

   (a) continue to evaluate the tenders 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 the NCC's rights in law or under GI11 of the General Instructions to Bidders.

SI08 CONSTRUCTION DOCUMENTS

1) The successful contractor will be provided with one paper copy of the sealed and signed plans, the specifications and the amendments upon acceptance of the offer. Additional copies, may be available free of charge upon request by the contractor. If not, obtaining more copies shall be the responsibility of the contractor including costs.

SI09 PUBLIC TENDER OPENING

1) A public tender opening will be held on June 6, 2018 at 3:00pm Ottawa time at 40 Elgin Street, Ottawa, ON beside the security office on the 2nd floor.

GI01 Completion of Tender

1) The tender shall be:

   (a) submitted on the Invitation to Tender and Acceptance Form provided through the Government Electronic Tendering Service (GETS) or on a clear and legible reproduced copy of such Invitation to Tender and Acceptance Form that must be identical in content and format to the Invitation to Tender and Acceptance Form provided through GETS;

   (b) based on the Tender Documents listed in the Special Instructions to Bidders;

   (c) correctly completed in all respects;

   (d) signed by a duly authorized representative of the Bidder; and

   (e) accompanied by

      (i) tender security as specified in GI08; and

      (ii) any other document or documents specified elsewhere in the solicitation where it is stipulated that said documents are to accompany the tender.

2) Subject to paragraph 6) of GI11, any alteration to the pre-printed or pre-typed sections of the Invitation to Tender and Acceptance Form, or any condition or qualification placed upon the tender shall be cause for disqualification. Alterations, corrections, changes or erasures made to statements or figures entered on the Invitation to Tender and Acceptance Form by the Bidder shall be initialled by the person or persons signing the tender. Initials shall be original(s). Alterations, corrections, changes or erasures that are not initialled shall be deemed void and without effect.

3) Unless otherwise noted elsewhere in the Tender Documents, facsimile copies of tenders are not acceptable.

GI02 Identity or Legal Capacity of the Bidder

1) In order to confirm the authority of the person or persons signing the tender or to establish the legal capacity under which the Bidder proposes to enter into Contract, any Bidder who carries on business in other than its own personal name shall, if requested by the NCC prior to award of contract, provide satisfactory proof of:

(a) such signing authority; and

(b) the legal capacity under which it carries on business.

Proof of signing authority may be in the form of a certified copy of a resolution naming the signatory(ies) that is (are) authorized to sign this tender on behalf of the corporation or partnership. Proof of legal capacity may be in the form of a copy of the articles of incorporation or the registration of the business name of a sole proprietor or partnership.

GI03 Goods and Services Tax / Harmonized Sales Tax

1) The National Capital Commission (NCC) is a Crown Corporation subject to the Goods and Services Tax (GST), the Ontario Provincial Sales Tax (OST) and the Quebec Sales Tax (QST). The rates quoted are exclusive of the GST and the OST/QST. The successful firm will be required to indicate separately, on all invoices or requests for payments, the amount of Goods and Services Sales Tax (GST), the amount of Ontario Sales Tax (OST) and the amount of Quebec Sales Tax (QST), to the extent applicable, that the Commission must pay. These amounts will be paid to the successful Bidder who is required to make the appropriate remittances to Revenue Canada and the respective provincial governments.

Pursuant to paragraph 221 (1)(d) of the Income Tax Act, payments made by Crown Corporations under applicable service contracts (including contracts involving a mix of goods and services) must be reported on a "T1204" slip. To comply with this requirement, the Bidder is required to provide the following information on the "Supplier – Direct Payment and Tax Information Form" (see Appendix 11).

By signing this form, the Bidder/Proponent certifies that he/she has examined the information provided on the form and that it is correct, complete, and fully discloses the identification of the Contractor.

This "Supplier – Direct Payment and Tax Information Form" must be completed and returned to the Commission prior to any contract being awarded to your firm (see Appendix 11).

GI04 Quebec Sales Tax

1) See GI03.

GI05 Capital Developement and Redevelopment Charges

1) For the purposes of GC1.8 LAWS, PERMITS AND TAXES in the General Conditions of the Contract, only fees or charges directly related to the processing and issuing of building permits shall be included. The Bidder shall not include any monies in the tender amount for special municipal development, redevelopment or other fees or charges which a municipal authority may seek as a prerequisite to the issuance of building permits.

GI06 Registry and Pre-qualification of Floating Plant

1) Dredges or other floating plant to be used in the performance of the Work must be on Canadian registry. For dredges or other floating plant that are not of Canadian make or manufacture, the Bidder must obtain a certificate of qualification from Industry Canada, if applicable, and this certificate must accompany the tender. Plant so qualified by Industry Canada may be accepted on this project.

GI07 Listing of Subcontractors and Suppliers

1) Notwithstanding any list of Subcontractors that the Bidder shall be required to submit as part of the tender, the Bidder submitting the lowest acceptable tender shall, within 24 hours of receipt of a notice to do so, submit all information requested in the said notice including the names of Subcontractors and Suppliers for the part or parts of the Work listed. Failure to do so may result in the disqualification of its tender.

GI08 Tender Security Requirements

1) The Bidder shall submit tender security with the tender in the form of a bid bond or a security deposit in an amount that is equal to not less than 10% of the tender amount including all applicable taxes.

   The maximum amount of tender security required with any tender is $2,000,000.00.

2) A bid bond shall be in an approved form, properly completed, with original signature(s) and issued by an approved company whose bonds are acceptable to the NCC either at the time of solicitation closing or as identified on the list displayed at the following Website:

   http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12027

   The approved form for the bid bond is enclosed at the end of this section.

3) A security deposit shall be an original, properly completed, signed where required and be either:

   (a) a bill of exchange, bank draft or money order payable to the NCC;

   (b) bonds of, or unconditionally guaranteed as to principal and interest by, the Government of Canada; or

4) A bill of exchange, bank draft or money order referred to in subparagraph 3)(a) of GI08 shall be certified by or drawn on:

   (a) a corporation or institution that is a member of the Canadian Payments Association;

   (b) a corporation that accepts public deposits and repayment of the deposits is unconditionally guaranteed by Her Majesty in right of a province;

   (c) a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the "Régie de l'assurance-dépôts du Québec" to the maximum permitted by law;

   (d) a corporation, association or federation incorporated or organized as a credit union or co-operative credit society that conforms to the requirements of a credit union which are more particularly described in paragraph 137 (6)(b) of the *Income Tax Act*; or

   (e) Canada Post Corporation.

5) If a bill of exchange, bank draft or money order is drawn on an institution or corporation other than a chartered bank, it must be accompanied by proof that the said institution or corporation meets at least one of the criteria described in paragraph 4) of GI08, either by letter or by a stamped certification on the bill of exchange, bank draft, or money order.

6) For the purposes of this section, a bill of exchange is an unconditional order in writing signed by the Bidder and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable time, a certain sum of money to, or to the order of, the NCC.

7) Bonds referred to in subparagraph 3)(b) of GI08 shall be provided on the basis of their market value current at the date of solicitation closing, and shall be:

(a) payable to bearer;

(b) accompanied by a duly executed instrument of transfer of the bonds to the NCC in the form prescribed by the Domestic Bonds of Canada Regulations; or

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

8) As an alternative to a security deposit an irrevocable standby letter of credit is acceptable to the NCC and the amount shall be determined in the same manner as a security deposit referred to above.

9) An irrevocable standby letter of credit referred to in paragraph 8) of GI08 shall:

(a) be an arrangement, however named or described, whereby a financial institution (the "Issuer") acting at the request and on the instructions of a customer (the "Applicant) or on its own behalf:

(i) is to make a payment to, or to the order of, the NCC as the beneficiary;

(ii) is to accept and pay bills of exchange drawn by the NCC;

(iii) authorizes another financial institution to effect such payment or accept and pay such bills of exchange; or

(iv) authorizes another financial institution to negotiate against written demand(s) for payment provided that the terms and conditions of the letter of credit are complied with.

(b) state the face amount which may be drawn against it;

(c) state its expiry date;

(d) provide for sight payment to the NCC by way of the financial institution's draft against presentation of a written demand for payment signed by the NCC Contract Administrator identified in the letter of credit by his/her office;

(e) provide that more than one written demand for payment may be presented subject to the sum of those demands not exceeding the face value of the letter of credit;

(f) provide that it is subject to the International Chamber of Commerce (ICC) Uniform Customs and Practice for Documentary Credits, 2007 Revision, ICC Publication No. 600;

(g) clearly specify that it is irrevocable or deemed to be irrevocable pursuant to article 6 c) of the International Chamber of Commerce (ICC) Uniform Customs and Practice for Documentary Credits, 2007 Revision, ICC Publication No. 600; and

(h) be issued or confirmed, in either official language, by a financial institution which is a member of the Canadian Payments Association and is on the letterhead of the Issuer or Confirmer. The format is left to the discretion of the Issuer or Confirmer.

10) Tender security shall lapse or be returned as soon as practical following:

(a) the solicitation closing date, for those Bidders submitting non-compliant tenders; and

(b) the administrative tender review, for those Bidders submitting compliant tenders ranked fourth to last on the schedule of tenders; and

(c) the award of contract, for those Bidders submitting the second and third ranked tenders; and

(d) the receipt of contract security for the successful Bidder; or

(e) the cancellation of the solicitation, for all Bidders.

11) Notwithstanding the provisions of paragraph 10) of GI08 and provided more than three (3) compliant tenders have been received, if one or more of the tenders ranked third to first is withdrawn or rejected for whatever reason, then the NCC reserves the right to hold the security of the next highest ranked compliant tender in order to retain the tender security of at least three (3) valid and compliant tenders.

GI09 Submission of Tender

1) The Invitation to Tender and Acceptance Form, duly completed with the bid security, shall be enclosed and sealed in an envelope provided by the Bidder, and shall be addressed and submitted to the office designated on the front page of the Invitation to Tender and Acceptance Form for the receipt of tenders.

2) Unless otherwise specified in the Special Instructions to Bidders:

(a) the tender shall be in Canadian currency;

(b) exchange rate fluctuation protection is not offered; and

(c) any request for exchange rate fluctuation protection shall not be considered.

3) Prior to submitting the tender, the Bidder shall ensure that the following information is clearly printed or typed on the face of the tender envelope:

(a) Solicitation Number;

(b) Name of Bidder.

5) Timely and correct delivery of the tender is the sole responsibility of the Bidder. The tender must be received on or before the date and time set for solicitation closing. Late tenders shall be disqualified.

GI10 Revision of Tender

1) A tender submitted in accordance with these instructions may be revised by letter or facsimile (fax number only 613-239-5012 provided the revision is received at the office designated for the receipt of tenders, on or before the date and time set for the closing of the solicitation. The letter or facsimile shall:

(a) be on the Bidder's letterhead or bear a signature that identifies the Bidder;

(b) for the Total Bid Amount, clearly identify the amount of the current revision. The total aggregate sum of all revisions submitted, including the current revision, shall be shown separately; and

(c) for the Price per unit portion of a tender, clearly identify the current revision(s) to the Price(s) per unit and the specific item(s) to which each revision applies. If a revision is to be applied to a specific Item that was previously amended then, in addition to the amount of the current

revision, the total aggregate sum of all revisions submitted, including the current revision, for that Item shall be shown separately.

2) A letter or facsimile submitted to confirm an earlier revision shall be clearly identified as "CONFIRMATION ONLY", for each contemplated change.

3) Failure to comply with any of the above provisions shall result in the rejection of the non-compliant revision(s) only. The tender shall be evaluated based on the original tender submitted and all other compliant revision(s).

GI11 Acceptance of Tender

1) The NCC may accept any tender, whether it is the lowest or not, or may reject any or all tenders.

2) Without limiting the generality of paragraph 1) of GI11, the NCC may reject a tender if any of the following circumstances are present:

(a) the Bidder, or any employee or subcontractor included as part of the tender, have been convicted under section 121 ("Frauds on the government" & "Contractor subscribing to election fund"), 124 ("Selling or purchasing office"), 380 (Fraud committed against Her Majesty) or 418 ("Selling defective stores to Her Majesty") of the Criminal Code of Canada, or under paragraph 80(1)(d) (False entry, certificate or return), subsection 80(2) (Fraud against her Majesty) or Section 154.01 (Fraud against her Majesty) of the Financial Administration Act;

(b) the Bidder's bidding privileges are suspended or are in the process of being suspended;

(c) the bidding privileges of any employee or subcontractor included as part of the tender are suspended or are in the process of being suspended, which suspension or pending suspension would render that employee or subcontractor ineligible to tender on the Work, or the portion of the Work the employee or subcontractor is to perform;

(d) with respect to current or prior transactions with the NCC

(i) the Bidder is bankrupt or if, for whatever reason, its activities are rendered inoperable for an extended period;

(ii) evidence, satisfactory to the NCC, of fraud, bribery, fraudulent misrepresentation or failure to comply with any law protecting individuals against any manner of discrimination, has been received with respect to the Bidder, any of its employees or any subcontractor included as part of its tender;

(iii) the NCC has exercised, or intends to exercise, the contractual remedy of taking the work out of the contractor's hands with respect to a contract with the Bidder, any of its employees or any subcontractor included as part of its tender; or

(iv) the NCC determines that the Bidder's performance on other contracts is sufficiently poor to jeopardize the successful completion of the requirement being tendered on.

3). In assessing the Bidder's performance on other contracts pursuant to subparagraph 2)(d)(iv) of GI11, the NCC may consider, but not be limited to, such matters as:

(a) the quality of workmanship in performing the Work;

(b) the timeliness of completion of the Work;

(c) the overall management of the Work and its effect on the level of effort demanded of the NCC and its representative; and
(d) the completeness and effectiveness of the Contractor's safety program during the performance of the Work.

4) Without limiting the generality of paragraphs 1), 2) and 3) of GI11, the NCC may reject any based on an unfavourable assessment of the:

(a) adequacy of the tender price to permit the work to be carried out and, in the case of a tender providing prices per unit, whether each such price reasonably reflects the cost of performing the part of the work to which that price applies;

(b) Bidder's ability to provide the necessary management structure, skilled personnel, experience and equipment to perform competently the work under the Contract; and

(c) Bidder's performance on other contracts.

5) If the NCC intends to reject a tender pursuant to a provision of paragraphs 1), 2), 3) or 4) of GI11, other than subparagraph 2)(b)of GI11, the NCC shall so inform the Bidder and provide the Bidder ten (10) days within which to make representation, prior to making a final decision on the tender rejection.

6) The NCC may waive informalities and minor irregularities in tenders received, if the NCC determines that the variation of the tender from the exact requirements set out in the Tender Documents can be corrected or waived without being prejudicial to other Bidders.

GI12 Procurement Business Number

1) Not applicable.

GI13 Bid Depository

1) If the solicitation advertisement states that a Bid Depository shall be used, the Bidder shall obtain bids in accordance with local Bid Depository rules and procedures.

GI14 Compliance with Applicable Laws

1) By submission of a tender, the Bidder certifies that the Bidder has the legal capacity to enter into a contract and is in possession of all valid licences, permits, registrations, certificates, declarations, filings, or other authorizations necessary to comply with all federal, provincial and municipal laws and regulations applicable to the submission of the tender and entry into any ensuing contract for the performance of the work.

2) For the purpose of validating the certification in paragraph 1) of GI14, a Bidder shall, if requested, provide a copy of every valid licence, permit, registration, certificate, declaration, filing or other authorization listed in the request, and shall provide such documentation within the time limit(s) set out in the said request.

3) Failure to comply with the requirements of paragraph 2) of GI14 shall result in the disqualification of the tender.

GI15 Approval of Alternative Materials

1) When materials are specified by trade names or trademarks, or by manufacturers' or suppliers' names, the tender shall be based on use of the named materials. During the solicitation period,

alternative materials may be considered provided full technical data is received in writing by the Contracting Officer at least seven (7) calendar days, unless otherwise noted in the Tender documents, prior to the solicitation closing date. If the alternative materials are approved for the purposes of the tender, an addendum to the tender documents shall be issued.

GI16 Performance Evaluation

1) Bidders shall take note that the performance of the Contractor during and upon completion of the work shall be evaluated by the NCC. The evaluation shall be based on the quality of workmanship, timeliness of completion of the work, project management, contract management and management of health and safety. Should the Contractor's performance be considered unsatisfactory, the Contractor's bidding privileges on future work may be suspended indefinitely. Contractor Evaluation Report Form is enclosed at the end of this section.

BID BOND

Bond Number _____

Amount $ _____

KNOW ALL MEN BY THESE PRESENTS, that _____ as Principal, hereinafter called the Principal, and _____ as Surety, hereinafter called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto the National Capital Commission as Obligee, hereinafter called the NCC, In the amount of _____ dollars ($ _____), lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED AND SEALED this _____ day of _____ , _____ . WHEREAS, the Principal has submitted a written tender to the NCC, dated the _____ day of _____ , _____ , for: _____ .

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if:

(a) The Principal, should his tender be accepted within the period be specified by the NCC, or, if no period be specified, within sixty (60) days after closing date of the tender:

1. does execute within a period specified by the NCC, or, if no period be specified therein, within fourteen (14) days after the prescribed forms are presented to him for signature, execute such further contractual documents, if any, as may be required by the terms of the tender as accepted; and does

2. furnish a Performance Bond and a Labour and Material Payment Bond, each in the amount of 50% of the Contract price and satisfactory to the NCC, or other security acceptable to the NCC; or

(b) the Principal does pay to the NCC the difference between the amount of the Principal's tender and the amount of the Contract entered into by the NCC for the work, supplies and services which were specified in the said tender, if the latter amount be in excess of the former,

then, this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED, HOWEVER, that the Surety and the Principal shall not be liable to the NCC for an amount greater than the amount specified in the bond.

PROVIDED FURTHER that the Surety shall not be subject to any suit or action unless such suit or action is instituted and process therefore served upon the Surety at its Head Office in Canada, within twelve (12) months from the date of this bond.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and first above written.

SIGNED, SEALED AND DELIVERED in the presence of:

Principal _____

Witness _____

Surety _____

Note: Affix Corporate seal if applicable.

NCC CCN Canada

CONTRACTOR PERFORMANCE EVALUATION REPORT FORM
FORMULAIRE - RAPPORT D'ÉVALUATION DU RENDEMENT DE L'ENTREPRENEUR

Date	Contract no. / No du contrat
Description of work / Description des travaux	
Contractor's business name / Nom de l'entreprise de l'entrepreneur	Contractor's site superintendent / Contremaître de l'entrepreneur
Contractor's business address / Adresse de l'entreprise de l'entrepreneur	

NCC representative / Représentant de la CCN

Name / Nom	Telephone no. / N°. de téléphone	E-mail address / Adresse électronique

Contract information / Information sur le contrat

Contract award amount / Montant du marché adjugé	Contract award date / Date de l'adjudication du marché
Final amount / Montant final	Actual contract completion date / Date réelle d'achèvement du contrat
Number of change orders / Nombre d'ordres de changement	Final certificate date / Date du certificat final

Quality of workmanship / Qualité des travaux exécutés	Category / Catégorie	Scale / Échelle	Points / Pointage
This is the rating of the quality of the workmanship. At final completion the quality of the materials and equipment incorporated in the work must meet the requirements set out in the plans and specifications. Il s'agit de l'évaluation de la qualité des travaux exécutés. À l'achèvement des travaux, la qualité des matériaux et de l'équipement doit satisfaire les exigences établies dans les plans et devis.	Unacceptable / Inacceptable Not satisfactory / Non-satisfaisant Satisfactory / Satisfaisant Superior / Supérieur	0 – 5 6 – 10 11 – 16 17 - 20	
Time / Délai d'exécution			
This is the rating of the timeliness of completion considering the actual completion date compared with the original (or amended) contract completion date and allowing for conditions beyond the control of the contractor. Il s'agit de l'évaluation du délai d'exécution des travaux en prenant en considération la date actuelle d'achèvement des travaux par rapport à la date originale (ou modifiée) et en tenant compte des conditions indépendantes de la volonté de l'entrepreneur.	Unacceptable / Inacceptable Late / En retard On time / À temps Ahead of schedule / En avance sur le calendrier	0 – 5 6 – 10 11 – 16 17 - 20	
Project management / Gestion de projet			
This is the rating of how the project, as described in the drawings and specifications, was managed including co-ordination, quality control, effective schedule development and implementation. Voici l'évaluation de la façon dont le projet décrit dans les documents contractuels a été géré, y compris la coordination, le contrôle de la qualité, l'élaboration d'un calendrier efficace et la mise en œuvre.	Unacceptable / Inacceptable Not satisfactory / Non-satisfaisant Satisfactory / Satisfaisant Superior / Supérieur Criteria not applicable / Critère non-applicable	0 – 5 6 – 10 11 – 16 17 - 20	☐ N/A / S/O
Contract management / Gestion de contrat			
This is the rating of how the contract was administered in accordance with the provisions expressed in the "front end" portion of the documents. Voici l'évaluation de la façon dont le contrat a été administré conformément aux dispositions comprises dans la partie « prioritaire » des documents.	Unacceptable / Inacceptable Not satisfactory / Non-satisfaisant Satisfactory / Satisfaisant Superior / Satisfaisant Criteria not applicable / Critère non-applicable	0 – 5 6 – 10 11 – 16 17 - 20	☐ N/A / S/O
Health and safety / Santé et sécurité			
This is the rating of the effectiveness of how the occupational health and safety provisions (whether identified in the contract or those of provincial legislation or those otherwise applicable) were managed and administered. Voici l'évaluation de l'efficacité avec laquelle les dispositions relatives à la santé et à la sécurité au travail (dans le contrat, dans les règlements provinciaux ou dans tout autre document) ont été gérées et administrées.	Unacceptable / Inacceptable Not satisfactory / Non-satisfaisant Satisfactory / Satisfaisant Superior / Satisfaisant	0 – 5 6 – 10 11 – 16 17 - 20	
		Total points / Pointage total	**/100**

Comments / Commentaires

Name / Nom	Title / Titre	Signature	Date

INSTRUCTIONS AND ADDITIONAL INFORMATION (Contractor Performance Evaluation Report)
INSTRUCTIONS ET RENSEIGNEMENTS SUPPLÉMENTAIRES (Rapport d'évaluation du rendement de l'entrepreneur)

QUALITY OF WORKMANSHIP – QUALITÉ DES TRAVAUX EXÉCUTÉS

The NCC representative is to consider how the workmanship compares with:

- the norms in the area in which the work was carried out
- the contractor's compliance with any quality provisions outlined in the drawings and specification
- the quality of workmanship provided by other contractors on similar projects in the same facility/facilities

Le représentant de la CCN doit évaluer la qualité de l'exécution en fonction de ce qui suit :

- le respect des normes s'appliquant aux travaux réalisés
- la conformité de l'entrepreneur aux exigences de qualité comprises dans les dessins et dans les devis
- la qualité de l'exécution des travaux accomplis par d'autres entrepreneurs dans le cadre de projets similaires réalisés dans la même installation ou dans des installations semblables.

TIME / DÉLAIS D'EXÉCUTION

For the purpose of evaluation the contractor's time performance, consideration must be given to conditions beyond the contractor's control including NCC / Consultant / Client performance.

Consider conditions beyond the contractor's control, e.g.,

- availability of, and access to the site
- changes in soil or site conditions
- weather extremes
- strikes
- material / equipment supply problems originating from manufacturers/suppliers
- quality of plans and specifications
- major change(s) in scope
- cumulative effect of changes
- was the NCC able to meet its obligations?
- timely decisions, clarifications, approvals, payments in due time
- delays caused by other contractors in the same facility

Afin d'évaluer le rendement de l'entrepreneur en matière de délai d'exécution, on doit prendre en considération les conditions indépendantes de la volonté de l'entrepreneur, y compris le rendement de la CCN, de l'expert-conseil et du client.

Prendre en considération les conditions indépendantes de la volonté de l'entrepreneur, par exemple :

- disponibilité du chantier et accès au chantier
- modifications des conditions du sol ou du chantier
- température
- grèves
- problèmes d'approvisionnement en matériel et en équipement provenant des manufacturiers/fournisseurs
- qualité des plan et devis
- modifications importantes à l'étendue des travaux
- effets cumulatifs des modifications
- la CCN a-t-elle été capable de remplir ses obligations?
- décisions, clarifications, approbations, paiements en temps opportun
- les retards occasionnés par d'autres entrepreneurs travaillant dans la même installation.

The NCC representative's estimate of a reasonable maximum time allowance resulting from conditions beyond the contractor's control is
L'estimation, par le représentant de la CCN, du temps maximum alloué pour les conditions indépendantes de la volonté de l'entrepreneur est ►

The period of delay attributable to the contractor is
La période de retard attribuable à l'entrepreneur est ►

Did the contractor make an effective effort / Est-ce que l'entrepreneur s'est efforcé :

- to meet the schedule / de respecter l'échéancier des travaux ► ☐ Yes / Oui ☐ No / Non
- to clean up deficiencies in a reasonable time / de corriger les vices dans un délai raisonnable ► ☐ Yes / Oui ☐ No / Non

Have you recommended assessments and damages for late completion under the contract?
Avez-vous recommandé des dédommagements pour retard d'exécution aux termes du marché? ► ☐ Yes / Oui ☐ No / Non

PROJECT MANAGEMENT / GESTION DU PROJET

The extent to which the contractor takes charge of and effectively manages the work has a direct effect on the inputs required of the NCC.

Consideration should be given to: Did the contractor

- employ a knowledgeable site superintendent
- required additional input from the NCC staff above that which is normal for a project of similar size and nature
- promptly commence the work
- provide realistic schedules and updates in accordance with the terms of the contract
- provide a comprehensive work plan and adhere to its milestones
- order material promptly and in such a way as to expedite the progress of the work
- provide shop drawings promptly and were they of sufficient detail

La mesure dans laquelle l'entrepreneur assume efficacement la gestion des travaux a une incidence directe sur les services qu'on attend de la CCN.

Il faut examiner si l'entrepreneur a :

- fait appel aux services d'un surintendant de chantier expérimenté
- demandé au personnel de la CCN une plus grande contribution que ce qui est normal pour un projet de cette importance et de cette nature
- commencé les travaux dans les plus brefs délais
- fourni un calendrier réaliste et des mises à jour conformément aux modalités du contrat
- présenté un plan de travail complet et a respecté les échéances
- commandé le matériel rapidement et de façon à accélérer l'avancement des travaux.
- fourni rapidement des dessins d'atelier comprenant suffisamment de détails

PROJECT MANAGEMENT (cont'd) / GESTION DU PROJET (suite)

- effectively manage and complete all Division 1 work site activities

- promptly provide reasonable quotations for changes to the original scope of work
- cooperate when issued directions by the NCC representative
- interpret the contract documents accurately
- establish effective quality control procedures
- effectively coordinate and manage the work of its subcontractors

- promptly correct defective work as the project progressed
- promptly clean-up all deficiencies and incomplete work after issuance of the Interim Certificate of Completion
- satisfactorily clean the work site periodically and at the completion of the project

- géré et achevé efficacement toutes les activités sur le chantier de la Division 1
- proposé rapidement des prix raisonnables pour les modifications à l'énoncé des travaux initial
- accepté les directives du représentant de la CCN
- interprété les documents contractuels avec exactitude
- mis en place des procédures de contrôle de la qualité efficaces
- coordonné et géré efficacement les travaux confiés à des sous-traitants
- corrigé promptement le travail défectueux en cours de projet
- corrigé rapidement les travaux non acceptables et terminé les travaux incomplets après réception du certificat provisoire d'achèvement
- nettoyé de façon satisfaisante le chantier périodiquement ainsi qu'à la fin du projet.

CONTRACT MANAGEMENT / GESTION DU CONTRAT

The effectiveness of the contractor to administer the contract in accordance with the provisions expressed in the "front end" portion of the contract documents.

Consideration should be given to: Did the contractor

- in the time frame specified, provide its contract security, Insurance Certificate fully executed and WSIB form where applicable
- submit progress claims in the correct format, accurately representing the work successfully completed and material delivered to the site but not yet installed for each payment period
- submit a Statutory Declaration correctly completed with each progress claim
- submit an updated Schedule if so specified
- pay subcontractors and suppliers in a timely fashion in accordance with the terms and conditions of its subcontracts
- promptly appoint a competent site superintendent
- notify the NCC representative of all its subcontracting activities

- apply for, obtain and pay for all necessary permits, licenses and certificates
- cooperate with other contractors sent onto the site of the work

- remove a superintendent or unsuitable worker when requested by the NCC representative to do so
- effectively protect the work and the contract documents provided by the NCC
- comply with all warranty provisions up to the date of the Contractor Performance Evaluation Report Form (CPERF)

- effectively manage the site during a suspension or termination of the work to mitigate any additional costs to the NCC

- deal promptly with any claims from creditors

- maintain complete records of the project
- provide information promptly when requested to do so
- expedite and co-operate in the settlement of all disputes

Efficacité avec laquelle l'entrepreneur a administré le contrat conformément aux dispositions continues dans la partie « prioritaire » des documents contractuels.

Il faut examiner si l'entrepreneur a :

- fourni, dans le délai prescrit, une garantie contractuelle, un certificat d'assurance dûment signés et le formulaire de la CSST, le cas échéant
- présenté des réclamations périodiques dans le bon format, en décrivant avec précision les travaux exécutés et le matériel livré sur le chantier mains non encore installé, pour chaque période de paiement
- présenté une déclaration solennelle correctement remplie avec chaque réclamation périodique
- fourni un calendrier à jour, sur demande
- payé rapidement les sous-traitants et les fournisseurs conformément aux conditions des contrats de sous-traitance
- désigné dans les plus brefs délais un surintendant de chantier qualifié
- tenu au courant le représentant de la CCN de toutes les activités de sous-traitance
- demandé, obtenu et payé tous les permis, licences et certificats nécessaires
- collaboré avec les autres entrepreneurs envoyés sur le lieu des travaux
- remplacé un surintendant ou un travailleur inapte à la demande du représentant de la CCN
- protégé efficacement les travaux et les documents relativement aux travaux et au contrat fournis par la CCN
- respecté toutes les dispositions de garantie jusqu'à la date du Formulaire Rapport d'évaluation du rendement de l'entrepreneur (FRERE)
- géré efficacement le chantier pendant une suspension des travaux ou lors de leur achèvement, afin de limiter tout coût supplémentaire pour la CCN
- traité dans les plus brefs délais les demandes de paiement des créanciers
- tenu des dossiers complets sur le projet
- fourni promptement les renseignements demandés
- accélère et coopère dans le règlement des différends

HEALTH AND SAFETY / SANTÉ ET SÉCURITÉ

The effectiveness to which the contractor managed and administered the occupational health and safety provisions as stipulated in the contract documents and those required by provincial legislation or those that would otherwise be applicable to the site of the work.

Consideration should be given to: Did the contractor

- provide the NCC with a copy of its health and safety program prior to award of contract
- provide the NCC with a copy of its site specific hazardous assessment prior to award of contract
- apply for and obtain the provincial Notice of Project prior to commencement of the work
- apply for and obtain the Building Permit prior to commencement of the work
- provide a competent superintendent who
  - is qualified in health and safety matters because of her/his knowledge, training and experience
  - is familiar with the OH&S Act and its Regulations that apply to the site of the work
  - remedies any potential or actual danger of health and safety to those employed at the work site
- respond in a timely manner to any non-compliance safety issues noted by the NCC or a representative of the authority having jurisdiction
- implement its safety program in a proactive manner

Efficacité avec laquelle l'entrepreneur a géré et administré les dispositions relatives à la santé et à la sécurité au travail telles que stipulées dans les documents contractuels et dans les règlements provinciaux ou ceux s'appliquant normalement au lieu des travaux.

Il faut examiner si l'entrepreneur a :

- fourni à la CCN une copie de son programme en matière de santé et de sécurité avant l'octroi du contrat
- fourni à la CCN une copie de son évaluation des dangers pouvant survenir sur les lieux avant l'octroi du contrat
- demandé et obtenu l'avis de projet provincial avant le début des travaux
- demandé et obtenu le permis de construction avant le début des travaux
- engagé un surintendant qui :
  - est qualifié en matière de santé et de sécurité de par ses connaissances, sa formation et son expérience
  - connaît bien les dispositions de la Loi sur la santé et la sécurité au travail et de son règlement qui s'applique sur le lieu des travaux
  - remédie à tout danger possible ou réel en matière de santé et de sécurité pouvant toucher toutes les personnes travaillant sur le lieu des travaux
- traité rapidement tous les problèmes de non-conformité à la sécurité relevés par la CCN ou par un représentant de l'autorité qui a juridiction
- mis en œuvre son programme de sécurité de façon proactive

GC1.1 INTERPRETATION

GC1.1.1 Headings and References

1) The headings in the contract documents, other than those in the drawings and specifications, form no part of the Contract but are inserted for convenience of reference only.

2) A reference made to a part of the Contract by means of numbers preceded by letters is a reference to the particular part of the Contract that is identified by that combination of letters and numbers and to any other part of the Contract referred to therein.

3) A reference to a paragraph or subparagraph followed by an identifying number, letter or combination thereof is, unless specifically stated otherwise, a reference to the paragraph or subparagraph that forms part of the clause within which the reference is made.

GC1.1.2 Terminology

1) In the Contract

"Contract" means the contract documents referred to as such therein and every other document specified or referred to in any of them as forming part of the Contract, all as amended by agreement of the parties;

"Contract Amount" means the amount set out in the Contract to be payable to the Contractor for the Work, subject to the terms and conditions of the Contract;

"Contract Security" means any security given by the Contractor to the NCC in accordance with the Contract;

"Contractor" means the person contracting with the NCC to provide or furnish all labour, Material and Plant for the execution of the Work under the Contract, and includes the Contractor's superintendent as designated in writing to the NCC;

"Certificate of Completion" means a certificate issued by the NCC when the Work reaches Completion;

"Certificate of Measurement" means a certificate issued by the NCC certifying the correctness of the final quantities, prices per unit and values of labour, Plant and Material performed, used and supplied by the Contractor for the construction of the part of the Work to which a Unit Price Arrangement applies;

"Certificate of Substantial Performance" means a certificate issued by the NCC when the Work reaches Substantial Performance;

"NCC Representative" means the person designated in the Contract, or by written notice to the Contractor, to act as the NCC Representative for the purposes of the Contract, and includes a person, designated and authorized in writing by the NCC Representative to the Contractor;

"herein", "hereby", "hereof", "hereunder" and similar expressions refer to the Contract as a whole and not to any particular section or part thereof;

"Lump Sum Arrangement" means that part of the Contract that prescribes a lump sum as payment for performance of the Work to which it relates;

"Material" includes all commodities, articles, machinery, equipment, fixtures and things required to be furnished in accordance with the Contract for incorporation into the Work;

"NCC" means the National Capital Commission;

"Person" also includes, unless there is an express stipulation in the Contract to the contrary, any partnership, proprietorship, firm, joint venture, consortium or corporation;

"Plant" includes all tools, implements, machinery, vehicles, structures, equipment, articles and things that are necessary for the performance of the Contract, other than Material and those tools customarily provided by a tradesperson in practicing a trade;

"Security screening" is a generic term that applies to all types and levels of personnel security screening including Reliability Status, Site Access, and CONFIDENTIAL, SECRET and TOP SECRET security clearances conducted by the NCC;

"Sensitive Information and Assets" means information or assets that have been identified by the NCC as TOP SECRET, SECRET, CONFIDENTIAL or protected;

"Subcontractor" means a person having a direct contract with the Contractor, subject to GC3.6 SUBCONTRACTING, to perform a part or parts of the Work, or to supply Material customized for the Work;

"Superintendent" means the employee or representative of the Contractor designated by the Contractor to act pursuant to GC2.6 SUPERINTENDENT;

"Supplementary Conditions" means the part of the Contract that amends or supplements the General Conditions;

"Supplier" means a person having a direct contract with the Contractor to supply Plant or Material not customized for the Work;

"Unit Price Arrangement" means that part of the Contract that prescribes the product of a price per unit of measurement multiplied by a number of units of measurement for performance of the Work to which it relates;

"Unit Price Table" means the table of prices per unit set out in the Contract;

"Work" means, subject only to any express stipulation in the Contract to the contrary, everything that is necessary to be done, furnished or delivered by the Contractor to perform the Contract in accordance with the contract documents; and

"Working Day" means a day other than a Saturday, Sunday, or a statutory holiday that is observed by the construction industry in the area of the place of the Work.

GC1.1.3 Application of Certain Provisions

1) Any provisions of the Contract that are expressly stipulated to be applicable only to a Unit Price Arrangement are not applicable to any part of the Work to which a Lump Sum Arrangement applies.

2) Any provisions of the Contract that are expressly stipulated to be applicable only to a Lump Sum Arrangement are not applicable to any part of the Work to which a Unit Price Arrangement applies.

GC1.1.4 Substantial Performance

1) The Work shall be considered to have reached Substantial Performance when:

   (a) the Work or a substantial part thereof has passed inspection and testing and is, in the opinion of the NCC, ready for use by the NCC or is being used for the intended purposes; and

   (b) the Work is, in the opinion of the NCC, capable of completion or correction at a cost of not more than

      (i) 3% of the first $500,000;

      (ii) 2% of the next $500,000; and

      (iii) 1% of the balance

      of the Contract Amount at the time this cost is calculated.

2) Where the Work or a substantial part thereof is ready for use or is being used for the purposes intended and:

   (a) the remainder of the Work or a part thereof cannot be completed by the time specified in the Contract, or as amended in accordance with GC6.5 DELAYS AND EXTENSION OF TIME, for reasons beyond the control of the Contractor; or

   (b) the NCC and the Contractor agree not to complete a part of the Work within the specified time;

the cost of that part of the Work that was either beyond the control of the Contractor to complete or the NCC and the Contractor have agreed not to complete by the time specified, shall be deducted from the value of the Contract referred to in subparagraph 1)(b) of GC1.1.4, and the said cost shall not form part of the cost of the Work remaining to be done in determining Substantial Performance.

GC1.1.5 Completion

1) The Work shall be deemed to have reached Completion when all labour, Plant and Material required have been performed, used or supplied, and the Contractor has complied with the Contract and all orders and directions made pursuant thereto, all to the satisfaction of the NCC.

GC1.2 CONTRACT DOCUMENTS

GC1.2.1 General

1) The contract documents are complementary, and what is required by any one shall be as binding as if required by all.

2) References in the contract documents to the singular shall be considered to include the plural as the context requires.

3) Nothing contained in the contract documents shall create a contractual relationship between the NCC and any Subcontractor or Supplier, their subcontractors or suppliers, or their agents or employees.

GC1.2.2 Order of Precedence

1) In the event of any discrepancy or conflict in the contents of the following documents, such documents shall take precedence and govern in the following order:

   (a) any amendment or variation of the contract documents that is made in accordance with the General Conditions;

   (b) any amendment issued prior to tender closing;

   (c) Supplementary Conditions;

   (d) General Conditions;

   (e) the duly completed Invitation to Tender and Acceptance Form when accepted;

   (f) drawings and specifications.

   later dates shall govern within each of the above categories of documents.

2) In the event of any discrepancy or conflict in the information contained in the drawings and specifications, the following rules shall apply:

   (a) specifications shall govern over drawings;

   (b) dimensions shown in figures on a drawings shall govern where they differ from dimensions scaled from the same drawing; and

   (c) drawings of larger scale govern over those of smaller scale.

GC1.2.3 Security and Protection of Documents and Work

1) The Contractor shall guard and protect all sensitive contract information (TOP SECRET, SECRET, CONFIDENTIAL and PROTECTED) including printed and digital documents, drawings, information, models, copies thereof and processing systems, whether supplied by the NCC or the Contractor, against loss or compromise and damage from any cause.

2) The Contractor shall limit access to sensitive NCC information only to those with a "need-to-know" and who have been successfully security screened to at least the level of sensitivity of the information.

3) The Contractor shall ensure all contract information indicated in paragraph 1) is guarded and protected by any subcontractors, agents or suppliers and access limited only to those with a "need-to-know" and who have been successfully security screened to at least the level of sensitivity of the information.

4) The Contractor shall keep confidential all information provided to the Contractor by or on behalf of the NCC in connection with the Work, and all information developed by the Contractor as part of the Work, and shall not disclose any such information to any person without the written permission of the NCC, except that the Contractor may disclose to a subcontractor, authorized in accordance with the Contract, information necessary to the performance of a subcontract. This section does not apply to any information that:

   (a) is publicly available from a source other than the Contractor; or

   (b) is or becomes known to the Contractor from a source other than the NCC, except any source that is known to the Contractor to be under an obligation to the NCC not to disclose the information.

5) When the Contract, the Work, or any information referred to in paragraph 4) is identified as TOP SECRET, SECRET, CONFIDENTIAL or PROTECTED by the NCC, the Contractor shall, at all times, take all measures reasonably necessary for the safeguarding of the material so identified, including such measures as may be further specified elsewhere in the Contract or provided, in writing, from time to time by the NCC.

6) Without limiting the generality of paragraphs 4) and 5) of GC1.2.3, when the Contract, the Work, or any information referred to in paragraph 4) is identified as TOP SECRET, SECRET, CONFIDENTIAL or PROTECTED by the NCC, the NCC shall be entitled to inspect the Contractor's premises and the premises of its subcontractors or suppliers and any other person at any tier, for security purposes at any time during the term of the Contract, and the Contractor shall comply with, and ensure that any such subcontractors or suppliers comply with all written instructions issued by the NCC dealing with the material so identified, including any requirement that employees of the Contractor and its subcontractors and suppliers and any other person at any tier execute and deliver declarations relating to reliability status, site access security clearances and other procedures.

7) The Contractor shall report any suspected or actual security incidents immediately to the NCC involving loss, compromise or damage of NCC information or assets.

8) The Contractor shall safeguard the Work and the Contract, the specifications, drawings and any other information provided by the NCC to the Contractor, and shall be liable to the NCC for any loss or damage from any causes.

GC1.3 STATUS OF THE CONTRACTOR

1) The Contractor is engaged under the Contract as an independent contractor.

2) The Contractor, its subcontractors and suppliers and any other person at any tier and their employees are not engaged by the Contract as employees, servants or agents of the NCC.

3) For the purposes of the contract the Contractor shall be solely responsible for any and all payments and deductions required to be made by law including those required for Canada or Quebec Pension Plans, Employment Insurance, Worker's Compensation, provincial health or insurance plans, and Income Tax.

GC1.4 RIGHTS AND REMEDIES

1) Except as expressly provided in the Contract, the duties and obligations imposed by the Contract and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights, and remedies otherwise imposed or available by law.

GC1.5 TIME OF THE ESSENCE

1) Time is of the essence of the Contract.

GC1.6 INDEMNIFICATION BY CONTRACTOR

1) 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 the NCC charging or claiming that the Work or any part thereof provided or furnished by the Contractor to the NCC infringes any patent, industrial design, copyright trademark, trade secret or other proprietary right enforceable in Canada.

2) The Contractor shall indemnify and save the NCC harmless from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings 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, its subcontractors and suppliers and any other person at any tier, in performing the Work.

3) For the purposes of paragraph 2) of GC1.6, "activities" means any act improperly carried out, any omission to carry out an act and any delay in carrying out an act.

GC1.7 INDEMNIFICATION BY THE NCC

1) Subject to the Crown Liability and Proceedings Act, the Patent Act, and any other law that affects the NCC's rights, powers, privileges or obligations, the NCC shall indemnify and save the Contractor harmless from and against all claims, demands, losses, costs, damage, actions, suits or proceedings arising out of the Contractor's activities under the Contract that are directly attributable to:

   (a) a lack of or a defect in the NCC's title to the Work site if owned by the NCC, whether real or alleged; or

   (b) an infringement or an alleged infringement by the Contractor of any patent of invention or any other kind of intellectual property occurring while the Contractor was performing any act for the purposes of the Contract employing a model, plan or design or any other thing related to the Work that was supplied by the NCC to the Contractor.

GC1.8 LAWS, PERMITS AND TAXES

1) The Contractor shall comply with all federal, provincial and municipal laws and regulations applicable to the performance of the Work or any part thereof including, without limitation, all laws concerning health and labour conditions and the protection of the environment, and shall require compliance therewith by all of its subcontractors and suppliers at any tier as if the Work were being performed for an owner other than the NCC. The Contractor shall furnish evidence of compliance with such laws and regulations to the NCC at such times as the NCC may reasonably request.

2) Unless stipulated otherwise in the Contract, the Contractor shall obtain and maintain all permits, certificates, licences, registrations and authorizations required for the lawful performance of the Work.

3) Prior to the commencement of the Work at the site, the Contractor shall tender to a municipal authority an amount equal to all fees and charges that would be lawfully payable to that municipal authority in respect of building permits as if the Work were being performed for an owner other than the NCC.

4) Within 10 days of making a tender pursuant to paragraph 3) of GC1.8, the Contractor shall notify the NCC of the amount properly tendered and whether or not the municipal authority has accepted that amount.

5) If the municipal authority has not accepted the amount tendered, the Contractor shall pay that amount to the NCC within 6 days after the time stipulated in paragraph 4) of GC1.8.

6) For the purposes of this clause, "municipal authority" means any authority that would have jurisdiction respecting permission to perform the Work if the owner were not the NCC.

7) Notwithstanding the residency of the Contractor, the Contractor shall pay any applicable tax arising from or related to the performance of the Work under the Contract.

8) In accordance with the Statutory Declaration referred to in paragraph 4) of GC5.5 SUBSTANTIAL PERFORMANCE OF THE WORK, a Contractor who has neither residence nor place of business in the province or territory in which work under the Contract is being performed shall provide the NCC with proof of registration with the provincial sales tax authorities in the said province.

9) For the purpose of the payment of any applicable tax or the furnishing of security for the payment of any applicable tax arising from or related to the performance of the Work, and notwithstanding the provision that all Material, Plant and interest of the Contractor in all real property, licences, powers and privileges, become the property of the NCC after the time of purchase in accordance with GC3.10 MATERIAL PLANT AND REAL PROPERTY BECOME PROPERTY OF THE NCC, the Contractor shall be liable, as a user or consumer, for the payment or for the furnishing of security for the payment of any applicable tax payable, at the time of the use or consumption of that Material, Plant or interest of the Contractor in accordance with the relevant legislation.

GC1.9 WORKERS' COMPENSATION

1) Prior to award of contract, at the time of submitting its first progress claim, at the time of Substantial Performance of the Work, and prior to issuance of the Certificate of Completion, the Contractor shall provide evidence of compliance with workers' compensation legislation applicable to the place of the Work, including payments due thereunder.

2) At any time during the term of the Contract, when requested by the NCC, the Contractor shall provide such evidence of compliance by the Contractor, its subcontractors and any other person at any tier and any other person performing part of the Work who is required to comply with such legislation.

GC1.10 NATIONAL SECURITY

1) If the NCC determines that the Work is of a class or kind that involves national security, the NCC may order the Contractor to:

(a) provide the NCC with any information concerning persons employed or to be employed by the Contractor for purposes of the Contract; and

(b) remove any person from the site of the Work if, in the opinion of the NCC, that person may be a risk to the national security;

and the Contractor shall comply with the order.

2) In all contracts with persons who are to be employed in the performance of the Contract, the Contractor shall make provision for the performance of any obligation that may be imposed upon the Contractor under paragraph 1) of GC1.10.

GC1.11 UNSUITABLE WORKERS

1) The NCC shall instruct the Contractor to remove from the site of the Work any person employed by the Contractor for purposes of the Contract who, in the opinion of the NCC, is incompetent or is guilty of improper conduct, and the Contractor shall not permit a person who has been removed to return to the site of the Work.

GC1.12 PUBLIC CEREMONIES AND SIGNS

1) The Contractor shall not permit any public ceremony in connection with the Work without the prior consent of the NCC.

2) The Contractor shall not erect nor permit the erection of any sign or advertising on the Work or its site without the prior consent of the NCC.

GC1.13 CONFLICT OF INTEREST

1) It is a term of the Contract that no individual, for whom the post-employment provisions of the Conflict of Interest and Post-Employment Code for Public Office Holders or the Values and Ethics Code for the Public Service apply, shall derive a direct benefit from the Contract unless that individual is in compliance with the applicable post-employment provisions.

GC1.14 AGREEMENTS AND AMENDMENTS

1) The Contract constitutes the entire and sole agreement between the parties with respect to the subject matter of the Contract and supersedes all previous negotiations, communications and other agreements, whether written or oral, relating to it, unless they are incorporated by reference in the Contract. There are no terms, covenants, representations, statements or conditions binding on the parties other than those contained in the Contract.

2) The failure of either party at any time to require performance by the other party of any provision hereof shall not affect the right thereafter to enforce such provision. Nor shall the waiver by either

party of any breach of any covenant, term or condition hereof be taken to be held to be a waiver of any further breach of the same covenant, term or condition.

3) The Contract may be amended only as provided for in the Contract.

GC1.15 SUCCESSION

1) The Contract shall inure to the benefit of and be binding upon the parties hereto and their lawful heirs, executors, administrators, successors and, subject to GC1.16 ASSIGNMENT, permitted assigns.

GC1.16 ASSIGNMENT

1) The Contractor shall not make any assignment of the Contract, either in whole or in part, without the written consent of the NCC.

GC1.17 NO BRIBE

1) The Contractor represents and covenants that no bribe, gift, benefit, nor other inducement has been nor shall be paid, given, promised or offered directly or indirectly to any official or employee of the NCC or to a member of the family of such a person, with a view to influencing the entry into the Contract or the administration of the Contract.

GC1.18 CERTIFICATION - CONTINGENCY FEES

1) In this clause:

(a) "contingency fee" means any payment or other compensation that is contingent upon or is calculated upon the basis of a degree of success in soliciting or obtaining a Government contract or negotiating the whole or any part of its terms;

(b) "employee" means a person with whom the Contractor has an employer/employee relationship; and

(c) "person" includes an individual or a group of individuals, a corporation, a partnership, an organization and an association and, without restricting the generality of the foregoing, includes any individual who is required to file a return with the registrar pursuant to section 5 of the Lobbyists Registration Act R.S.C. 1985 c.44 (4th Supplement) as the same may be amended from time to time.

2) The Contractor certifies that it has not directly or indirectly paid nor agreed to pay and covenants that it shall not directly or indirectly pay nor agree to pay a contingency fee for the solicitation, negotiation or obtaining of the Contract to any person other than an employee acting in the normal course of the employee's duties.

3) All accounts and records pertaining to payments of fees or other compensation for the solicitation, obtaining or negotiation of the Contract shall be subject to the accounts and audit provisions of the Contract.

4) If the Contractor certifies falsely under this section or is in default of the obligations contained therein, the NCC may either take the Work out of the Contractor's hands in accordance with the provisions of the Contract or recover from the Contractor by way of reduction to the Contract Amount or otherwise, the full amount of the contingency fee.

GC1.19 INTERNATIONAL SANCTIONS

1) Persons and companies in Canada, and Canadians outside of Canada are bound by economic sanctions imposed by the Government of Canada. As a result, the the NCC cannot accept delivery of goods or services that originate, either directly or indirectly, from the countries or persons subject to economic sanctions.
Details on existing sanctions can be found at:
http://www.dfait-maeci.gc.ca/trade/sanctions-en.asp.

2) It is a condition of the Contract that the Contractor not supply to the NCC any goods or services which are subject to economic sanctions.

3) By law, the Contractor must comply with changes to the regulations imposed during the life of the Contract. During the performance of the Contract should the imposition of sanctions against a country or person or the addition of a good or service to the list of sanctioned goods or services cause an impossibility of performance for the Contractor, the Contractor may request that the Contract be terminated in accordance with GC7.3 TERMINATION OF CONTRACT.

GC2 ADMINISTRATION OF THE CONTRACT

GC2.1 NCC REPRESENTATIVE'S AUTHORITY

1) The NCC shall designate an NCC Representative and shall notify the Contractor of the name, address and telephone number of the NCC Representative.

2) The NCC Representative shall perform the NCC's duties and functions under the contract.

3) The NCC Representative shall be authorized to issue notices, instructions and directions to the Contractor and to accept on behalf of the NCC any notice, order or other communication from the contractor relating to the Work.

4) The NCC Representative shall, within a reasonable time, review and respond to submissions made by the Contractor in accordance with the requirements of the Contract.

GC2.2 INTERPRETATION OF CONTRACT

1) If, at any time before the NCC has issued a Certificate of Completion, any question arises between the parties about whether anything has been done as required by the Contract or about what the Contractor is required by the Contract to do, and in particular but without limiting the generality of the foregoing, about:

   (a) the meaning of anything in the drawings and specifications;

   (b) the meaning to be given to the drawings and specifications in case of any error therein, omission therefrom, or obscurity or discrepancy in their wording or intention;

   (c) whether or not the quality or quantity of any Material or workmanship supplied or proposed to be supplied by the Contractor meets the requirements of the Contract;

   (d) whether or not the labour, Plant or Material performed, used and supplied by the Contractor for performing the Work and carrying out the Contract are adequate to ensure that the Work shall be performed in accordance with the Contract and that the Contract shall be carried out in accordance with its terms;

   (e) what quantity of any of the Work has been completed by the Contractor; or

   (f) the timing and scheduling of the various phases of the performance of the Work as specified in the Contract;

   the question shall be decided, subject to the provisions of GC8 DISPUTE RESOLUTION, by the NCC.

2) The Contractor shall perform the Work in accordance with any decisions of the NCC that are made under paragraph 1) of GC2.2 and in accordance with any consequential directions given by the NCC.

3) If the Contractor fails to comply with any instruction or direction issued by the NCC pursuant to the Contract, the NCC may employ such methods as the NCC deems advisable to do what the Contractor failed to do, and the Contractor shall, on demand, pay the NCC an amount that is equal to the aggregate of all costs, expenses and damages incurred or sustained by the NCC by reason of the Contractor's failure to comply with such instruction or direction, including the cost of any methods employed by the NCC in doing what the Contractor failed to do.

GC2.3 NOTICES

1) Subject to paragraph 3) of GC2.3, any notice, order or other communication may be given in any manner, and if required to be in writing, shall be addressed to the party to whom it is intended at the address in the Contract or at the last address of which the sender has received written notice in accordance with this section.

2) Any notice, order or other communication given in writing in accordance with paragraph 1) of GC2.3 shall be deemed to have been received by either party:

   (a) if delivered personally, on the day that it was delivered;

   (b) if forwarded by mail, on the earlier of the day it was received or the sixth day after it was mailed; and

   (c) if forwarded by facsimile or electronic mail, 24 hours after it was transmitted.

3) A notice given under GC7.1 TAKING THE WORK OUT OF THE CONTRACTOR'S HANDS, GC7.2 SUSPENSION OF WORK, and GC7.3 TERMINATION OF CONTRACT shall be given in writing and, if delivered personally, shall be delivered, if the Contractor is a sole proprietor, to the Contractor or, if the Contractor is a partnership or corporation, to an officer thereof.

GC2.4 SITE MEETINGS

1) In consultation with the NCC, the Contractor shall arrange site meetings at regular intervals, with all involved parties who are to attend, in order to ensure, among other things, the proper co-ordination of the Work.

GC2.5 REVIEW AND INSPECTION OF WORK

1) The NCC shall review the Work to determine if it is proceeding in conformity with the Contract and to record the necessary data to make an assessment of the value of Work completed. The NCC shall measure and record the quantities of labour, Plant and Material performed, used or supplied by the Contractor in performing the Work or any part thereof that is subject to a Unit Price Arrangement and, on request, shall inform the Contractor of those measurements, and permit the Contractor to inspect any records pertaining thereto.

2) The NCC shall reject Work or Material which in the NCC's opinion does not conform to the requirements of the Contract, and shall require inspection or testing of Work, whether or not such Work is fabricated, installed, or completed. If such Work is not in accordance with the requirements of the Contract, the Contractor shall correct the Work and shall pay the NCC, on demand, all reasonable costs and expenses that were incurred by the NCC in having the examination performed.

3) The Contractor shall provide the NCC with access to the Work and its site at all times, and at all times shall provide sufficient, safe, and proper facilities for the review and inspection of the Work by persons authorized by the NCC and any representatives of those authorities having jurisdiction. If parts of the Work are in preparation at locations other than the site of the Work, the NCC shall be given access to such Work whenever it is in progress.

4) The Contractor shall furnish the NCC with such information respecting the performance of the Contract as the NCC may require, and render every possible assistance to enable the NCC to verify that the Work is performed in accordance with the Contract, carry out any other duties and exercise any powers in accordance with the Contract.

5) If Work is designated for tests, inspections, or approvals in the Contract or by the NCC's instructions, or by laws or ordinances of the place of the Work, the Contractor shall give the NCC reasonable notice of when such Work shall be ready for review and inspection. The Contractor shall arrange for and shall give the NCC reasonable notice of the date and time of inspections, tests or approvals.

6) If the Contractor covers, or permits to be covered, Work that has been designated for tests, inspections or approvals before such tests, inspections or approvals are made, completed or given, the Contractor shall, if so directed by the NCC, uncover such Work, have the inspections, tests or approvals satisfactorily made, completed or given and make good the covering of the Work at the Contractor's expense.

GC2.6 SUPERINTENDENT

1) Prior to commencing the Work, the Contractor shall designate a Superintendent and shall notify the NCC of the name, address and telephone number of the Superintendent. The Contractor shall keep the Superintendent at the Work site during working hours until the Work has reached completion.

2) The Superintendent shall be in full charge of the operations of the Contractor during the performance of the Work and shall be authorized to accept on behalf of the Contractor any notice, order or other communication given to the Superintendent or the Contractor relating to the Work.

3) Upon request of the NCC, the Contractor shall remove any Superintendent who, in the opinion of the NCC, is incompetent or has been guilty of improper conduct, and shall forthwith designate another Superintendent who is acceptable to the NCC.

4) The Contractor shall not substitute a Superintendent without the written consent of the NCC. If a Superintendent is substituted without such consent, the NCC shall be entitled to refuse to issue any documentation or certification relating to progress payments, Substantial Performance or Completion of the Work until the Superintendent has returned to the Work site or another Superintendent who is acceptable to the NCC has been substituted.

GC2.7 NON-DISCRIMINATION IN HIRING AND EMPLOYMENT OF LABOUR

1) For the purposes of this clause, “persons" include the Contractor, its subcontractors and suppliers at any tier and their respective employees, agents, licensees or invitees and any other individual involved in the performance of the Work or granted access to the Work site. A “person” includes any partnership, proprietorship, firm, joint venture, consortium and corporation.

2) Without restricting the provisions of paragraph 3) of GC2.6, SUPERINTENDENT, the Contractor shall not refuse to employ and shall not discriminate in any manner against any person because:

   (a) of that person's race, national origin, colour, religion, age, sex or marital status;

   (b) of the race, national origin, colour, religion, age, sex, or marital status of any person having any relationship or association with that person; or

   (c) a complaint has been made or information has been given by or in respect of that person relating to an alleged failure by the Contractor to comply with subparagraphs 2)(a) and 2)(b) of GC2.7.

3) Within two Working Days immediately following receipt of a written complaint pursuant to paragraph 2) of GC2.7, the Contractor shall:

(a) cause to have issued a written direction to the person or persons named by the complainant to cease all actions that form the basis of the complaint;

(b) forward a copy of the complaint to the NCC by registered mail or courier service; and

(c) when the Labour Conditions are applicable under the circumstances of the complaint, forward a copy of the complaint to HRSDC - Labour to the attention of the appropriate Director as described in the Labour Conditions ("HRSDC - Labour" means the labour component of the federal Department of Human Resources and Skills Development).

4) Within twenty four (24) hours immediately following receipt of a direction from the NCC to do so, the Contractor shall cause to have removed from the site of the Work and from the performance of Work under the Contract, any person or persons whom the NCC believes to be in breach of the provisions of paragraph 2) of GC2.7.

5) No later than thirty (30) days after receipt of the direction referred to in paragraph 4) of GC2.7, the Contractor shall cause the necessary action to be commenced to remedy the breach described in the direction.

6) If a direction is issued pursuant to paragraph 4) of GC2.7, the NCC may withhold from monies that are due and payable to the Contractor or setoff pursuant to GC5.9 RIGHT OF SETOFF, whichever is applicable, an amount representing the sum of the costs and payment referred to in paragraph 8) of GC2.7.

7) If the Contractor fails to proceed in accordance with paragraph 5) of GC2.7, the NCC shall take the necessary action to have the breach remedied, and shall determine all supplementary costs incurred by the NCC as a result.

8) The NCC may make a payment directly to the complainant from monies that are due and payable to the Contractor upon receipt from the complainant of:

(a) a written award issued pursuant to the federal Commercial Arbitration Act, R.S.C. 1985, c. 17 (2nd Supp.);

(b) a written award issued pursuant to the Canadian Human Rights Act, RS.C. 1985, c. H-6;

(c) a written award issued pursuant to provincial or territorial human rights legislation; or

(d) a judgement issued by a court of competent jurisdiction.

9) If the NCC is of the opinion that the Contractor has breached any of the provisions of this clause, the NCC may take the Work out of the Contractor's hands pursuant to GC7.1 TAKING THE WORK OUT OF THE CONTRACTOR'S HANDS.

10) Subject to paragraph 7) of GC3.6 SUBCONTRACTING, the Contractor shall ensure that the provisions of this clause are included in all agreements and contracts entered into as a consequence of the Work.

GC2.8 ACCOUNTS AND AUDITS

1) The Contractor shall, in addition to the requirements expressed in paragraph 6) of GC3.4 EXECUTION OF THE WORK, maintain full records of the Contractor's estimated and actual cost of the Work together with all tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto, and shall make them available on request to audit and inspection by the NCC or by persons designated to act on behalf of the NCC.

2) The Contractor shall allow any of the persons referred to in paragraph 1) of GC2.8 to make copies of and take extracts from any of the records and material, and shall furnish such persons or entities with any information those persons or entities may require from time to time in connection with such records and material.

3) The Contractor shall maintain and keep the records intact until the expiration of two years after the date that a Certificate of Completion has been issued or until the expiration of such other period of time as the NCC may direct.

4) The Contractor shall cause all subcontractors at any tier and all other persons directly or indirectly controlled by or affiliated with the Contractor and all persons directly or indirectly having control of the Contractor to comply with the requirements of this clause as if they were the Contractor.

GC3.1 PROGRESS SCHEDULE

1) The Contractor shall:

   (a) prepare and submit to the NCC, prior to the submission of the Contractor's first progress claim, a progress schedule in accordance with the requirements set out in the Contract;

   (b) monitor the progress of the Work relative to the schedule and update the schedule as stipulated by the contract documents;

   (c) advise the NCC of any revisions to the schedule required as the result of any extension of time for completion of the Contract that was approved by the NCC; and

   (d) prepare and submit to the NCC, at the time of issuance of an Certificate of Substantial Performance, an update of any schedule clearly showing a detailed timetable that is acceptable to the NCC for the completion of any unfinished Work and the correction of all listed defects.

GC3.2 ERRORS AND OMISSIONS

1) The Contractor shall report promptly to the NCC any errors, discrepancies, or omissions the Contractor may discover when reviewing the contract documents. In making a review, the Contractor does not assume any responsibility to the NCC for the accuracy of the review. The Contractor shall not be liable for damage or costs resulting from such errors, discrepancies, or omissions in the contract documents prepared by or on behalf of the NCC that the Contractor did not discover.

GC3.3 CONSTRUCTION SAFETY

1) Subject to GC3.7 CONSTRUCTION BY OTHER CONTRACTORS OR WORKERS, the Contractor shall be solely responsible for construction safety at the place of the Work and for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Work. In any emergency, the Contractor shall either, stop the Work, make changes or order extra work to ensure the safety of life and the protection of the Work and neighbouring property.

2) Prior to commencing the Work, the Contractor shall notify the authorities having jurisdiction for construction safety at the site of the Work with respect to the intended commencement of the Work, and shall provide such authority with whatever additional information may be required by that authority.

GC3.4 EXECUTION OF THE WORK

1) The Contractor shall perform, use or supply and pay for, all labour, Plant, Material, tools, construction machinery and equipment, water, heat, light, power, transportation and other facilities and services necessary for the performance of the Work in accordance with the Contract.

2) The Contractor shall, at all times, perform the Work in a proper, diligent and expeditious manner as is consistent with construction industry standards and in accordance with the progress schedule prepared pursuant to GC3.1 PROGRESS SCHEDULE and shall provide sufficient personnel to fulfil the Contractor's obligations in accordance with that schedule.

3) Subject to paragraph 4) of GC3.4, the Contractor shall have complete care, custody and control of the Work and shall direct and supervise the Work so as to ensure compliance with the Contract. The Contractor shall be responsible for construction means, methods, techniques, sequences and procedures and for co-ordinating the various parts of the Work.

4) When requested in writing by the NCC, the Contractor shall make appropriate alterations in the method, Plant or workforce at any time the NCC considers the Contractor's actions to be unsafe or damaging to either the Work, existing facilities, persons at the site of the Work or the environment.

5) The Contractor shall have sole responsibility for the design, erection, operation, maintenance and removal of temporary structures and other temporary facilities and for the construction methods used in their erection, operation, maintenance and removal. The Contractor shall engage and pay for registered professional engineering personnel, skilled in the appropriate discipline to perform these functions if required by law or by the Contract, and in all cases when such temporary facilities and their methods of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.

6) The Contractor shall keep at least one copy of current contract documents, submittals, reports, and records of meetings at the site of the Work, in good order and available to the NCC.

7) Except for any part of the Work that is necessarily performed away from or off the site of the Work, the Contractor shall confine Plant, storage of Material, and operations of employees to limits indicated by laws, ordinances, permits or the contract documents.

GC3.5 MATERIAL

1) Unless otherwise specified in the Contract, all Material incorporated in the Work shall be new.

2) Subject to paragraph 3) of GC3.5, if a specified reused, refurbished, or recycled item of Material is not available, the Contractor shall apply to the NCC to substitute a similar item for the one specified.

3) If the NCC agrees that the Contractor's application for substitution of a reused, refurbished or recycled item is warranted, and that the substitute item is of acceptable quality and value to that specified and is suitable for the intended purpose, the NCC may approve the substitution, subject to the following:

   (a) the request for substitution shall be made in writing to the NCC and shall be substantiated by information in the form of the manufacturer's literature, samples and other data that may be required by the NCC;

   (b) the Contractor shall make the request for substitution in a manner that shall not negatively affect the progress schedule of the Contract and well in advance of the time the item of Material must be ordered;

(c) substitution of Material shall be permitted only with the prior written approval of the NCC, and any substituted items that are supplied or installed without such approval shall be removed from the site of the Work at the expense of the Contractor, and specified items installed at no additional cost to the NCC; and

(d) the Contractor shall be responsible for all additional expenses incurred by the NCC, the Contractor, its subcontractors and suppliers at any tier due to the Contractor's use of the substitute.

GC3.6 SUBCONTRACTING

1) Subject to the provisions of this clause, the Contractor may subcontract any part of the Work but not the whole of the Work.

2) The Contractor shall notify the NCC in writing of the Contractor's intention to subcontract.

3) A notification referred to in paragraph 2) of GC3.6 shall identify the part of the Work and the Subcontractor with whom the Contractor intends to subcontract.

4) The NCC may for reasonable cause, object to the intended subcontracting by notifying the Contractor in writing within six (6) days of receipt by the NCC of a notification referred to in paragraph 2) of GC3.6.

5) If the NCC objects to a subcontracting, the Contractor shall not enter into the intended subcontract.

6) The Contractor shall not change, nor permit to be changed, a Subcontractor engaged by the Contractor, in accordance with this clause, without the written consent of the NCC.

7) The Contractor shall ensure that all the terms and conditions of the Contract that are of general application shall be incorporated in every other contract issued as a consequence of the Contract, at whatever tier, except those contracts issued solely to suppliers at any tier for the supply of Plant or Material.

8) Neither a subcontracting nor the NCC's consent to a subcontracting shall be construed to relieve the Contractor from any obligation under the Contract or to impose any liability upon the NCC.

GC3.7 CONSTRUCTION BY OTHER CONTRACTORS OR WORKERS

1) The NCC reserves the right to send other contractors or workers, with or without Plant and Material, onto the site of the Work.

2) When other contractors or workers are sent on to the site of the Work, the NCC shall:

(a) enter into separate contracts, to the extent it is possible, with the other contractors under conditions of contract that are compatible with the conditions of the Contract;

(b) ensure that the insurance coverage provided by the other contractors is co-ordinated with the insurance coverage of the Contractor as it affects the Work; and

(c) take all reasonable precautions to avoid labour disputes or other disputes arising from the work of the other contractors or workers.

3) When other contractors or workers are sent on to the site of the Work, the Contractor shall:

(a) co-operate with them in the carrying out of their duties and obligations;

(b) co-ordinate and schedule the Work with the work of the other contractors and workers;

(c) participate with other contractors and workers in reviewing their construction schedules when directed to do so;

(d) where part of the Work is affected by or depends upon the work of other contractors or workers for its proper execution, promptly report to the NCC in writing and prior to proceeding with that part of the Work, any apparent deficiencies in such work. Failure by the Contractor to so report shall invalidate any claims against the NCC by reason of the deficiencies in the work of other contractors or workers except those deficiencies that are not then reasonably discoverable; and

(e) when designated as being responsible for construction safety at the place for work, in accordance with the applicable provincial or territorial laws, carry out its duties in that role and in accordance with those laws.

4) If, when entering into the Contract, the Contractor could not have reasonably foreseen nor anticipated the sending of other contractors or workers on to the site of the Work and provided the Contractor:

(a) incurs extra expense in complying with the requirements of paragraph 3) of GC3.7; and

(b) gives the NCC written notice of a claim for that extra expense within thirty (30) days of the date that the other contractors or workers were sent onto the Work or its site,

the NCC shall pay the Contractor the cost of the extra labour, Plant and Material that was necessarily incurred, calculated in accordance with GC6.4 DETERMINATION OF PRICE.

GC3.8 LABOUR

1) The Contractor shall maintain good order and discipline among the Contractor's employees and workers engaged in the Work shall not employ, on the site of the Work, anyone not skilled in the tasks assigned.

GC3.9 TRUCK HAULAGE RATES

CANCELLED

GC3.10 MATERIAL, PLANT AND REAL PROPERTY BECOME PROPERTY OF THE NCC

1) Subject to paragraph 9) of GC1.8 LAWS PERMITS AND TAXES, all Material and Plant and the interest of the Contractor in all real property, licences, powers and privileges purchased, used or consumed by the Contractor for the Work shall, immediately after the time of their purchase, use or consumption be the property of the NCC for the purposes of the Work and they shall continue to be the property of the NCC:

(a) in the case of Material, until the NCC indicates that the Materials shall not be required for the Work; and

(b) in the case of Plant, real property, licences, powers and privileges, until the NCC indicates that the interest vested in the NCC therein is no longer required for the purposes of the Work.

2) Material or Plant, that is the property of the NCC by virtue of paragraph 1) of GC3.10, shall not be taken away from the site of the Work nor used nor disposed of except for the purposes of the Work without the written consent of the NCC.

3) The NCC is not liable for loss of nor damage from any cause to the Material or Plant referred to in paragraph 1) of GC3.10, and the Contractor is liable for such loss or damage notwithstanding that the Material or Plant is the property of the NCC.

GC3.11 DEFECTIVE WORK

1) The Contractor shall promptly remove from the site of the Work and replace or re-execute defective Work whether or not the defective Work has been incorporated in the Work and whether or not the defect is the result of poor workmanship, use of defective Material, or damage through carelessness or other act or omission of the Contractor.

2) The Contractor, at the Contractor's expense, shall promptly make good other work destroyed or damaged by such removals or replacements.

3) If, in the opinion of the NCC, it is not expedient to correct defective Work or Work not performed as provided for in the Contract documents, the NCC may deduct from the amount otherwise due to the Contractor the difference in value between the Work as performed and that called for by the Contract documents.

4) The failure of the NCC to reject any defective Work or Material shall not constitute acceptance of the defective Work or Material.

GC3.12 CLEANUP OF SITE

1) The Contractor shall maintain the Work and its site in a tidy condition and free from an accumulation of waste material and debris.

2) Before the issue of a Certificate of Substantial Performance, the Contractor shall remove waste material and debris, and all Plant and Material not required for the performance of the remaining Work and, unless otherwise stipulated in the Contract Documents, shall cause the Work and its site to be clean and suitable for occupancy by the NCC.

3) Before the issue of a Certificate of Completion, the Contractor shall remove all surplus Plant and Materials and any waste products and debris from the site of the Work.

4) The Contractor's obligations described in paragraphs 1) to 3) of GC3.12 do not extend to waste products and other debris caused by the NCC's servants, or by other contractors and workers referred to in GC3.7 CONSTRUCTION BY OTHER CONTRACTORS OR WORKERS.

GC3.13 WARRANTY AND RECTIFICATION OF DEFECTS IN WORK

1) Without restricting any warranty or guarantee implied or imposed by law or contained in the Contract, the Contractor shall, at the Contractor's expense:

   (a) rectify and make good any defect or fault that appears in the Work or comes to the attention of the NCC with respect to those parts of the Work accepted in connection with the Certificate of Substantial Performance within 12 months from the date of Substantial Performance; and

   (b) rectify and make good any defect or fault that appears in or comes to the attention of the NCC in connection with those parts of the Work described in the Certificate of Substantial Performance within 12 months from the date of the Certificate of Completion;

   (c) transfer and assign, to the NCC, any subcontractor, manufacturer or supplier extended warranties or guarantees implied or imposed by law or contained in the Contract covering periods beyond the 12 months stipulated above. Extended warranties or guarantees referred to

herein shall not extend the 12-month period whereby the Contractor, except as may be provided elsewhere in the Contract, must rectify and make good any defect or fault that appears in the Work or comes to the attention of the NCC;

(d) provide, to the NCC prior to the issuance of the Certificate of Completion, a list of all extended warranties and guarantees referred to in paragraph (c) above.

2) The NCC may direct the Contractor to rectify and make good any defect or fault referred to in paragraph 1) of GC3.13 or covered by any other expressed or implied warranty or guarantee and the Contractor shall rectify and make good such defect within the time stipulated in the direction.

3) A direction referred to in paragraph 2) GC3.13 shall be in writing and shall be given to the Contractor in accordance with GC2.3 NOTICES.

GC4.1 PROTECTION OF WORK AND PROPERTY

1) The Contractor shall protect the Work and its site against loss or damage from any cause and shall similarly protect all Material, Plant and real property under the Contractor's care, custody and control whether or not such Material, Plant and real property are supplied by the NCC to the Contractor.

2) The Contractor shall provide all facilities necessary for the purpose of maintaining security, and shall assist any person authorized by the NCC to inspect or to take security measures in respect of the Work and its site.

3) The NCC may direct the Contractor to do such things and to perform such work as the NCC considers reasonable and necessary to ensure compliance with or to remedy a breach of paragraphs 1) or 2) of GC4.1, and the Contractor, shall comply with such direction.

GC4.2 PRECAUTIONS AGAINST DAMAGE, INFRINGEMENT OF RIGHTS, FIRE AND OTHER HAZARDS

1) The Contractor shall do whatever is necessary to ensure that:

   (a) no person, property, right, easement nor privilege is injured, damaged or infringed upon by reasons of the Contractor's activities in performing the Work;

   (b) pedestrian and other traffic on any public or private road or waterway is not unduly impeded, interrupted nor endangered by the performance or existence of the Work, Material or Plant;

   (c) fire hazards in or about the site of the Work are eliminated and any fire is promptly extinguished;

   (d) the health and safety of all persons employed in the performance of the Work is not endangered by the methods nor means of their performance;

   (e) adequate medical services are available to all persons employed on the Work or its site at all times during the performance of the Work;

   (f) adequate sanitation measures are taken in respect of the Work and its site; and

   (g) all stakes, buoys and marks placed on the Work or its site by the NCC are protected and are not removed, defaced, altered nor destroyed.

2) The NCC may direct the Contractor to do such things and to perform such work as the NCC considers reasonable and necessary to ensure compliance with or to remedy a breach of paragraph 1) of GC4.2, and the Contractor shall comply with the direction of the NCC.

GC4.3 MATERIAL, PLANT AND REAL PROPERTY SUPPLIED BY THE NCC

1) Subject to paragraph 2) of GC4.3, the Contractor is liable to the NCC for any loss of or damage to Material, Plant or real property that is supplied or placed in the care, custody and control of the Contractor by the NCC for use in connection with the Contract, whether or not that loss or damage is attributable to causes beyond the Contractor's control.

2) The Contractor is not liable to the NCC for any loss or damage to Material, Plant or real property referred to in paragraph 1) of GC4.3 if that loss or damage results from and is directly attributable to reasonable wear and tear.

3) The Contractor shall not use any Material, Plant or real property supplied by the NCC except for the purpose of performing the Contract.

4) When the Contractor fails to make good any loss or damage for which the Contractor is liable under paragraph 1) within a reasonable time, the NCC may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to the NCC for the cost thereof and shall, on demand, pay to the NCC an amount equal to that cost.

5) The Contractor shall keep records of all Material, Plant and real property supplied by the NCC as the NCC requires and shall satisfy the NCC, when requested, that such Material, Plant and real property are at the place and in the condition in which they ought to be.

GC4.4 CONTAMINATED SITE CONDITIONS

1) For the purposes of GC4.4, a contaminated site condition exists when a solid, liquid, gaseous, thermal or radioactive irritant or contaminant, or other hazardous or toxic substance or material, including moulds and other forms of fungi, is present at the site of the Work to an extent that constitutes a hazard, or potential hazard, to the environment, property, or the health or safety of any person.

2) If the Contractor encounters a contaminated site condition of which the Contractor is not aware or about which the Contractor has not been advised, or if the Contractor has reasonable grounds to believe that such a site condition exists at the site of the Work, the Contractor shall:

   (a) take all reasonable steps, including stopping the Work, to ensure that no person suffers injury, sickness or death, and that neither property nor the environment is injured or destroyed as a result of the contaminated site condition;

   (b) immediately notify the NCC of the circumstances in writing; and

   (c) take all reasonable steps to minimize additional costs that may accrue as a result of any work stoppage.

3) Upon receipt of a notification from the Contractor, the NCC shall promptly determine whether a contaminated site condition exists, and shall notify the Contractor in writing of any action to be taken, or work to be performed, by the Contractor as a result of the NCC's determination.

4) If the Contractor's services are required by the NCC, the Contractor shall follow the direction of the NCC with regard to any excavation, treatment, removal and disposal of any polluting substance or material.

5) The NCC, at the NCC's sole discretion, may enlist the services of experts and specialty contractors to assist in determining the existence of, and the extent and treatment of contaminated site conditions, and the Contractor shall allow them access and co-operate with them in the carrying out of their duties and obligations.

6) Except as may be otherwise provided for in the Contract, the provisions of GC6.4 DETERMINATION OF PRICE shall apply to any additional work made necessary because of a contaminated site condition.

GC5.1 INTERPRETATION

In these Terms of Payment

1) The "payment period" means a period of 30 consecutive days or such other longer period as may be agreed between the Contractor and the NCC.

2) An amount is "due and payable" when it is due and payable by the NCC to the Contractor according to GC5.4 PROGRESS PAYMENT, GC5.5 SUBSTANTIAL PERFORMANCE OF THE WORK or GC5.6 FINAL COMPLETION.

3) An amount is overdue when it remains unpaid on the first day following the day upon which it is due and payable.

4) The "date of payment" means the date of the negotiable instrument of an amount due and payable by the NCC.

5) The "Bank Rate" means the rate of interest established by the Bank of Canada as the minimum rate at which it makes short term advances to members of the Canadian Payments Association.

6) The "Average Bank Rate" means the simple arithmetic mean of the Bank Rate in effect at 4:00 p.m. Ottawa Time each day during the calendar month which immediately precedes the calendar month in which payment is made.

GC5.2 AMOUNT PAYABLE

1) Subject to any other provisions of the Contract, the NCC shall pay the Contractor, at the times and in the manner hereinafter set out, the amount by which the amounts payable by the NCC to the Contractor in accordance with the Contract exceed the amounts payable by the Contractor to the NCC, and the Contractor shall accept that amount as payment in full satisfaction for everything furnished and done by the Contractor in respect of the Work to which the payment relates.

2) When making any payment to the Contractor, the failure of the NCC to deduct an amount payable to the NCC by the Contractor shall not constitute a waiver of the right to do so, or an admission of lack of entitlement to do so in any subsequent payment to the Contractor.

3) No payment other than a payment that is expressly stipulated in the Contract, shall be made by the NCC to the Contractor for any extra expense or any loss or damage incurred or sustained by the Contractor.

GC5.3 INCREASED OR DECREASED COSTS

1) The Contract Amount shall not be increased nor decreased by reason of any increase or decrease in the cost of the Work that is brought about by an increase or decrease in the cost of labour, Plant, Material or any wage adjustment arising pursuant to the Labour Conditions.

2) Notwithstanding paragraph 1) of GC5.3, if any change, including a new imposition or repeal, of any tax, customs or other duty, charge, or any similar imposition that is imposed under sales, customs or excise tax legislation of the Government of Canada or any Provincial or Territorial legislation, affects the cost of the Work to the Contractor, and occurs:

   (a) after the date of submission by the Contractor of its tender; or

   (b) after the date of submission of the last revision, if the Contractor's tender was revised,

   the Contract Amount shall be adjusted in the manner provided in paragraph 3) of GC5.3.

3) If a change referred to in paragraph 2) of GC5.3 occurs, the Contract Amount shall be increased or decreased by an amount established by an examination by the NCC of the relevant records of the Contractor referred to in GC2.8 ACCOUNTS AND AUDITS to be the increase or decrease in the cost incurred by the Contractor that is directly attributable to that change.

4) For the purpose of paragraph 2) of GC5.3, if a tax is changed after the tender closing, but public notice of the change has been given by the Minister of Finance or the corresponding Provincial or Territorial authority before that closing, the change shall be deemed to have occurred before the solicitation closing.

5) Notwithstanding paragraphs 2) to 4) of GC5.3, no adjustment to the Contract Amount in respect of the Work or a part thereof shall be made for a change in any imposition referred to in this section that occurs after the date required by the Contract for completion of the Work or that part of the Work.

GC5.4 PROGRESS PAYMENT

1) On the expiration of a payment period, the Contractor shall deliver to the NCC:

   (a) a written progress claim in a form acceptable to the NCC that fully describes any part of the Work that has been completed, and any Material that was delivered to the Work site but not incorporated into the Work, during that payment period: and

   (b) a completed and signed statutory declaration containing a declaration that, up to the date of the progress claim, the Contractor has complied with all lawful obligations with respect to the Labour Conditions and that, in respect of the Work, all lawful obligations of the Contractor to its Subcontractors and Suppliers, referred to collectively in the declaration as "subcontractors and suppliers", have been fully discharged.

2) Within 10 days of receipt of a progress claim and statutory declaration from the Contractor, the NCC shall inspect, or cause to have inspected, the part of the Work and the Material described in the progress claim, and shall issue a progress report to the Contractor, that indicates the value of the part of the Work and the Material described in the progress claim that, in the opinion of the NCC:

   (a) is in accordance with the Contract; and

   (b) was not included in any other progress report relating to the Contract.

3) Subject to GC5.2 AMOUNT PAYABLE, and paragraph 5) of GC5.4, the NCC shall pay the Contractor an amount that is equal to:

   (a) 95% of the value that is indicated in the NCC's progress report if a labour and material payment bond has been furnished by the Contractor; or

   (b) 90% of the value that is indicated in the NCC's progress report if a labour and material payment bond has not been furnished by the Contractor.

4) Subject to GC5.2, "Amount Payable", and paragraph 5) of GC5.4, the NCC shall pay the Contractor an amount that is equal to 90% of the value that is indicated in the NCC's progress report

5) In the case of the Contractor's first progress claim, it is a condition precedent to the NCC's obligation under paragraph 3) of GC5.4 that the Contractor has provided all necessary documentation required by the Contract for the first progress claim and has provided evidence of compliance with workers' compensation legislation applicable to the place of the Work in accordance with GC1.9 WORKERS' COMPENSATION.

GC5.5 SUBSTANTIAL PERFORMANCE OF THE WORK

1) If, at any time before the issuance of a Certificate of Completion, the NCC determines that the Work has reached Substantial Performance as described in subparagraph 1) (b) of GC1.1.4 SUBSTANTIAL PERFORMANCE, the NCC shall issue a Certificate of Substantial Performance to the Contractor. The Certificate of Substantial Performance shall state or describe:

   (a) the date of Substantial Performance;

   (b) the parts of the Work not completed to the satisfaction of the NCC; and

   (c) all things that must be done by the Contractor before a Certificate of Completion is issued and before the 12-month warranty period referred to in GC3.13 WARRANTY AND RECTIFICATION OF DEFECTS IN WORK commences for the said parts and all the said things.

2) The issuance of a Certificate of Substantial Performance does not relieve the Contractor from the Contractor's obligations under GC3.11 DEFECTIVE WORK.

3) Subject to GC5.2 AMOUNT PAYABLE and paragraph 4) of GC5.5, the NCC shall pay the Contractor the amount referred to in paragraph 1) of GC5.2 AMOUNT PAYABLE, less the aggregate of:

   (a) the sum of all payments that were made pursuant to GC5.4 PROGRESS PAYMENT;

   (b) an amount that is equal to the NCC's estimate of the cost to the NCC of rectifying defects described in the Certificate of Substantial Performance; and

   (c) an amount that is equal to the NCC's estimate of the cost to the NCC of completing the parts of the Work described in the Certificate of Substantial Performance other than defects listed therein.

4) The NCC shall pay the amount referred to in paragraph 3) of GC5.5 not later than:

   (a) 30 days after the date of issue of a Certificate of Substantial Performance, or

   (b) 15 days after the Contractor has delivered to the NCC:

(i) a statutory declaration containing a declaration by the Contractor that up to the date of the Certificate of Substantial Performance, the Contractor has complied with all lawful obligations with respect to the Labour Conditions, discharged all its lawful obligations to its Subcontractors and Suppliers in respect of the work under the Contract, and discharged its lawful obligations referred to in GC1.8 LAWS, PERMITS AND TAXES;

(ii) evidence of compliance with workers' compensation legislation in accordance with GC1.9 WORKERS' COMPENSATION; and

(iii) an update of the progress schedule in accordance with the requirements of GC3.1 PROGRESS SCHEDULE;

whichever is later.

GC5.6 FINAL COMPLETION

1) When the NCC is of the opinion that the Contractor has complied with the Contract and all orders and directions made pursuant thereto, and that the Work has been completed as described in GC1.1.5 COMPLETION, the NCC shall issue a Certificate of Completion to the Contractor and, if the Work or a portion of the Work is subject to a Unit Price Arrangement, the NCC shall issue a Certificate of Measurement that shall, subject to GC8, be binding upon and conclusive between the NCC and the Contractor as to the quantities referred to therein.

2) Subject to GC5.2 AMOUNT PAYABLE and paragraph 3) of GC5.6, the NCC shall pay the Contractor the amount referred to in GC5.2 AMOUNT PAYABLE, less the aggregate of the sum of all payments that were made pursuant to GC5.4 PROGRESS PAYMENT and GC5.5 SUBSTANTIAL PERFORMANCE OF WORK.

3) The NCC shall pay the amount referred to in paragraph 2) of GC5.6 not later than:

(a) 60 days after the date of issue of a Certificate of Completion; or

(b) 15 days after the Contractor has delivered to the NCC:

(i) a statutory declaration which contains a declaration by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contractor that arose out of the performance of the Contract have been discharged and satisfied; and

(ii) evidence of compliance with workers' compensation legislation in accordance with GC1.9 WORKERS' COMPENSATION;

whichever is later.

GC5.7 PAYMENT NOT BINDING ON NCC

1) Neither acceptance of a progress claim or progress report, nor any payment made by the NCC under the Contract, nor partial or entire use or occupancy of the Work by the NCC shall constitute an acceptance by the NCC of any portion of the Work or Material that is not in accordance with the requirements of the Contract.

GC5.8 CLAIMS AND OBLIGATIONS

1) The Contractor shall discharge all the Contractor's lawful obligations and shall satisfy all lawful claims against the Contractor arising out of the performance of the Work at least as often as the Contract requires the NCC to pay the Contractor.

2) Whenever requested to do so by the NCC, the Contractor shall make a statutory declaration declaring to the existence and condition of any obligations and claims against the Contractor arising out of the performance of the Work.

3) In order to discharge lawful obligations of and satisfy lawful claims against the Contractor or its Subcontractors arising out of the performance of the Contract, the NCC may pay an amount that is due and payable to the Contractor directly to the claimant. Such payment is, to the extent of the payment, a discharge of the NCC's liability to the Contractor under the Contract and may be deducted from any amount payable to the Contractor under the Contract.

4) For the purposes of paragraph 3) of GC5.8, and subject to paragraph 6) of GC5.8, a claim or obligation shall be considered lawful when it is so determined by:

   (a) a court of legal jurisdiction;

   (b) an arbitrator duly appointed to arbitrate the claim; or

   (c) the written consent of the Contractor authorizing payment of the claim or obligation.

5) If a claim or obligation would have been subject to the provisions of Provincial or Territorial lien legislation or, in the Province of Quebec, the law relating to legal hypothecs had the Contractor been performing the Work for an entity other than the NCC:

   (a) such amount as may be paid by the NCC pursuant to paragraphs 3) and 4) of GC5.8 shall not exceed the amount that the Contractor would have been obliged to pay had the provisions of such legislation or law been applicable to the Work;

   (b) a claimant need not comply with the provisions of such legislation, setting out the steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which the claimant might have had; and

   (c) for the purposes of determining the entitlement of a claimant, the notice required by paragraph 8) of GC5.8 shall be deemed to replace the registration or provision of notice after the performance of work as required by any applicable legislation and no claim shall be deemed to have expired, become void or unenforceable by reason of the claimant not commencing any action within the time prescribed by such legislation.

6) The Contractor shall, at the request of any claimant, submit to binding arbitration those questions that need to be answered to establish the entitlement of the claimant to payment. The arbitration shall have as parties to it any Subcontractor or Supplier to whom the claimant supplied Material, performed work or rented equipment should such Subcontractor or Supplier wish to be adjoined, and the NCC shall not be a party to such arbitration. Subject to any agreement between the Contractor and the claimant, the arbitration shall be conducted in accordance with the governing Provincial or Territorial legislation applicable to the site of the Work.

7) Paragraph 3) of GC5.8 shall apply only to claims and obligations:

   (a) the notification of which has set forth the amount claimed to be owing and the person who by contract is primarily liable and has been received by the NCC in writing before final payment is made to the Contractor pursuant to GC5.6 FINAL COMPLETION, and within 120 days of the date on which the claimant:

(i) should have been paid in full under the claimant's contract with the Contractor, its Subcontractor or Supplier if the claim is for money that was lawfully required to be held back from the claimant; or

(ii) performed the last of the services, work or labour, or furnished the last of the Material pursuant to the claimant's contract with the Contractor or its Subcontractor or Supplier where the claim is for money not lawfully required to be held back from the claimant; and

(b) the proceedings to determine the right to payment of which, pursuant to paragraph 5) of GC5.8, shall have commenced within one year from the date that the notification required by subparagraph 7)(a) of GC5.8 was received by the NCC.

8) Upon receipt of a notice of claim, the NCC may withhold, from any amount that is due and payable to the Contractor pursuant to the Contract, the full amount of the claim or any portion thereof.

9) The NCC shall notify the Contractor in writing in a timely manner of receipt of any claim and of the intention of the NCC to withhold funds. At any time thereafter and until payment is made to the claimant, the Contractor may be entitled to post, with the NCC, security in a form acceptable to the NCC in an amount equal to the value of the claim, and upon receipt of such security the NCC shall release to the Contractor any funds that would be otherwise payable to the Contractor, that were withheld pursuant to the provisions of this clause in respect of the claim of any claimant for whom the security stands.

GC5.9 RIGHT OF SETOFF

1) Without limiting any right of setoff or deduction given or implied by law or elsewhere in the Contract, the NCC may set off any amount payable to the NCC by the Contractor under the Contract, or under any current contract, against any amount payable to the Contractor under the Contract.

2) For the purposes of paragraph 1) of GC5.9, "current contract" means a contract between the NCC and the Contractor:

(a) under which the Contractor has an undischarged obligation to perform or supply work, labour or material; or

(b) in respect of which the NCC has, since the date of the Contract, exercised any right to take the work that is the subject of that contract out of the Contractor's hands.

GC5.10 ASSESSMENTS AND DAMAGES FOR LATE COMPLETION

1) For the purposes of this clause:

(a) the Work shall be deemed to be completed on the date of the Certificate of Completion; and

(b) the "period of delay" means the number of days commencing on the day fixed for completion of the Work and ending on the day immediately preceding the day on which the Work is completed but does not include any day within a period of extension granted pursuant to GC6.5 DELAYS AND EXTENSION OF TIME and any other day on which, in the opinion of the NCC, completion of the Work was delayed for reasons beyond the control of the Contractor.

2) If the Contractor does not complete the Work by the day fixed for its completion but completes it thereafter, the Contractor shall pay the NCC an amount equal to the aggregate of:

(a) all salaries, wages and travelling expenses incurred by the NCC in respect of persons overseeing the performance of the Work during the period of delay;

(b) the cost incurred by the NCC as a result of the inability to use the completed Work for the period of delay; and

(c) all other expenses and damages incurred or sustained by the NCC during the period of delay as a result of the Work not being completed by the day fixed for its completion.

3) The NCC may waive the right of the NCC to the whole or any part of the amount payable by the Contractor pursuant to paragraph 2) of GC5.10 if, in the opinion of the NCC, it is in the public interest to do so.

GC5.11 DELAY IN MAKING PAYMENT

1) Notwithstanding GC1.5 TIME OF THE ESSENCE, any delay by the NCC in making any payment when it is due pursuant to GC5 TERMS OF PAYMENT, shall not be a breach of the Contract by the NCC.

2) Subject to paragraph 3) of GC5.11, the NCC shall pay to the Contractor simple interest at the Average Bank Rate plus 3 percent per annum on any amount that is overdue pursuant to paragraph 3) of GC5.1 INTERPRETATION, and the interest shall apply from and include the day such amount became overdue until the day prior to the date of payment.

3) Interest shall be paid, on demand by the Contractor, except that:

(a) in respect of amounts that are less than 15 days overdue, no interest shall be paid in respect of payment made within such 15 days; and

(b) interest shall not be payable or paid on overdue advance payments, if any.

GC5.12 INTEREST ON SETTLED CLAIMS

1) For the purposes of this clause, a claim means a disputed amount subject to negotiation between the NCC and the Contractor under the Contract.

2) A claim is deemed to have been settled when an agreement in writing is signed by the NCC and the Contractor setting out the amount of the claim to be paid by the NCC and the items of work for which the said amount is to be paid.

3) A settled claim is deemed to be outstanding from the day immediately following the date the said claim would have been due and payable under the Contract had it not been disputed.

4) The NCC shall pay to the Contractor simple interest on the amount of a settled claim at the Average Bank Rate plus 3 per cent per annum from the date the settled claim was deemed to be outstanding until the day prior to the date of payment.

GC5.13 RETURN OF SECURITY DEPOSIT

1) After a Certificate of Substantial Performance has been issued, and if the Contractor is not in breach of nor in default under the Contract, the NCC shall return to the Contractor all or any part of a Security Deposit that, in the opinion of the NCC, is not required for the purposes of the Contract.

2) After a Certificate of Completion has been issued, the NCC shall return to the Contractor the remainder of any security deposit unless the Contract stipulates otherwise.

3) If the security deposit was paid to the NCC, the NCC shall pay interest thereon to the Contractor at a rate established pursuant to section 21(2) of the Financial Administration Act.

GC6.1 CHANGES IN THE WORK

1) At any time before issuance of a Certificate of Completion, Canada may issue orders for additions, deletions or other changes to the Work, or changes in the location or position of the whole or any part of the Work, if the addition, deletion, change or other revision is deemed by Canada to be consistent with the general intent of the Contract.

2) An order referred to in paragraph 1) of GC6.1 shall be in writing and given to the Contractor in accordance with GC2.3 NOTICES.

3) Upon receipt of an order, the Contractor shall promptly perform the work in accordance with the order as if the order had appeared in and been part of the original Contract.

4) If anything done or omitted by the Contractor pursuant to an order increases or decreases the cost of the Work to the Contractor, payment for the work shall be made in accordance with GC6.4 DETERMINATION OF PRICE.

GC6.2 CHANGES IN SUBSURFACE CONDITIONS

1) If, during the performance of the Work, the Contractor encounters subsurface conditions that are substantially different from the subsurface conditions described in the tender documents supplied to the Contractor, or a reasonable assumption of fact based thereon, the Contractor shall give notice to Canada immediately upon becoming aware of the situation.

2) If the Contractor is of the opinion that the Contractor may incur or sustain any extra expense or any loss or damage that is directly attributable to the changed subsurface conditions, the Contractor shall within 10 days of the date the changed subsurface conditions were encountered, give Canada written notice of intention to claim for that extra expense, loss or damage.

3) If the Contractor has given a notice referred to in paragraph 2) of GC6.2, the Contractor shall give Canada a written claim for extra expense, loss or damage no later than 30 days after the date that a Certificate of Substantial Performance is issued.

4) A written claim referred to in paragraph 3) of GC6.2 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable Canada to determine whether or not the claim is justified, and the Contractor shall supply such further and other information for that purpose as Canada requires.

5) If Canada determines that a claim referred to in paragraph 3) of GC6.2 is justified, Canada shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC6.4 DETERMINATION OF PRICE.

6) If, in the opinion of Canada, the Contractor effects a saving of expenditure that is directly attributable to a substantial difference between the information relating to subsurface conditions at the site of the Work that is contained in the tender documents, or a reasonable assumption of fact based thereon, and the actual subsurface conditions encountered by the Contractor, the Contract Amount shall be reduced by the amount of the saving of expenditure determined in accordance with GC6.4 DETERMINATION OF PRICE.

7) If the Contractor fails to give a notice referred to in paragraph 2) of GC6.2 and a claim referred to in paragraph 3) of GC6.2 within the times stipulated, an extra payment shall not be made to the Contractor in respect of the occurrence.

8) Canada does not warrant the content expressed in any subsurface report available for the perusal of the Contractor that does not form part of the tender and contract documents.

GC6.3 HUMAN REMAINS, ARCHAEOLOGICAL REMAINS AND ITEMS OF HISTORICAL OR SCIENTIFIC INTEREST

1) For the purposes of this clause

   (a) "human remains" means the whole or any part of a deceased human being, irrespective of the time of death;

   (b) "archaeological remains" are items, artefacts or things made, modified or used by human beings in antiquity and may include, but not be limited to, stone, wood or iron structures or monuments, dump deposits, bone artefacts, weapons, tools, coins, and pottery; and

   (c) "items of historical or scientific interest" are naturally occurring or manufactured objects or things of any age that are not archaeological remains but may be of interest to society because of their historical or scientific significance, value, rarity, natural beauty, or other quality.

2) If, during the course of the Work, the Contractor encounters any object, item or thing which is described in paragraph 1) of GC6.3 or which resembles any object, item or thing described in paragraph 1) of GC6.3, the Contractor shall

   (a) take all reasonable steps, including stopping work in the affected area, to protect and preserve the object, item or thing;

   (b) immediately notify Canada of the circumstances in writing; and

   (c) take all reasonable steps to minimize additional costs that may accrue as a result of any work stoppage.

3) Upon receipt of a notification in accordance with subparagraph 2)(b) of GC6.3, Canada shall promptly determine whether the object, item or thing is one described in, or contemplated by paragraph 1) of GC6.3, and shall notify the Contractor in writing of any action to be performed, or work to be carried out, by the Contractor as a result of Canada's determination.

4) Canada may, at any time, enlist the services of experts to assist in the investigation, examination, taking of measurements or other such recordings, placing of permanent protection around or removing of the object, item or thing encountered by the Contractor, and the Contractor shall, to the satisfaction

of Canada, allow them access and co-operate with them in the carrying out of their duties and obligations.

5) Human remains, archaeological remains and items of historical or scientific interest encountered at the site of the Work shall be deemed to be the property of Canada.

6) Except as may be otherwise provided for in the Contract, the provisions of GC6.4 DETERMINATION OF PRICE and GC6.5 DELAYS AND EXTENSION OF TIME shall apply.

GC6.4 DETERMINATION OF PRICE

GC6.4.1 Price Determination Prior to Undertaking Changes

1) If a Lump Sum Arrangement applies to the Contract or a part thereof, the price of any change shall be the aggregate estimated cost of labour, Plant and Material that is required for the change as agreed upon in writing by the Contractor and Canada plus an allowance for supervision, co-ordination, administration, overhead, margin and the risk of undertaking the work within the stipulated amount, which allowance shall be equal to

   (a) 20% of the aggregate costs referred to herein for that portion of the Work done by the Contractor's own forces, if the aggregate cost of the Work does not exceed $50,000;

   (b) 15% of the aggregate costs referred to herein for that portion of the Work that is done by subcontract, if the aggregate cost of the Work does not exceed $50,000; or

   (c) a negotiated percentage of the aggregate costs referred to herein or a negotiated amount

      (i) if the aggregate cost of the Work exceeds $50,000; or

      (ii) if the Contractor and Canada agree in writing.

2) If a Unit Price Arrangement applies to the Contract or a part thereof, the Contractor and Canada may, by agreement in writing, add items, units of measurement, estimated quantities and prices per unit to the Unit Price Table.

3) A price per unit referred to in paragraph 2) of GC6.4.1 shall be determined on the basis of the aggregate estimated cost of labour, Plant and Material that is required for the additional item as agreed upon by the Contractor and Canada, plus an allowance determined in accordance with paragraph 1) of GC6.4.1.

4) To facilitate approval of the price of the change or the additional price per unit as applicable, the Contractor shall submit a cost estimate breakdown identifying, as a minimum, the estimated cost of labour, Plant, Material, each subcontract amount, and the amount of the allowance.

5) If no agreement is reached as contemplated in paragraph 1) of GC6.4.1, the price shall be determined in accordance with GC6.4.2.

6) If no agreement is reached, as contemplated in paragraphs 2) and 3) of GC6.4.1, Canada shall determine the class and the unit of measurement of the item of labour, Plant or Material and the price per unit shall be determined in accordance with GC6.4.2.

GC6.4.2 Price Determination Following Completion of Changes

1) If it is not possible to predetermine, or if there is failure to agree upon the price of a change in the Work, the price of the change shall be equal to the aggregate of

(a) all reasonable and proper amounts actually expended or legally payable by the Contractor in respect of the labour, Plant and Material that fall within one of the classes of expenditure described in paragraph 2) of GC6.4.2, that are directly attributable to the performance of the Contract;

(b) an allowance for profit and all other expenditures or costs, including overhead, general administration costs, financing and interest charges, in an amount that is equal to 10% of the sum of the expenses referred to in subparagraph 1)(a) of GC6.4.2; and

(c) interest on the amounts determined under subparagraphs 1)(a) and 1)(b) of GC6.4.2 calculated in accordance with GC5.12 INTEREST ON SETTLED CLAIMS;

2) The cost of labour, Plant and Material referred to in subparagraph 1)(a) of GC6.4.2 shall be limited to the following categories of expenditure:

(a) payments to Subcontractors and Suppliers;

(b) wages, salaries, bonuses and, if applicable, travel and lodging expenses of employees of the Contractor located at the site of the Work and that portion of wages, salaries, bonuses and, if applicable, travel and lodging expenses of personnel of the Contractor generally employed at the head office or at a general office of the Contractor provided they are actually and properly engaged on the Work under the Contract;

(c) assessments payable under any statutory authority relating to workers' compensation, employment insurance, pension plan or holidays with pay, provincial health or insurance plans, environmental reviews, and GST / HST collection costs;

(d) rent that is paid for Plant, or an amount equivalent to the said rent if the Plant is owned by the Contractor, that is necessary for and used in the performance of the Work, if the rent or the equivalent amount is reasonable and use of that Plant has been approved by Canada;

(e) payments for maintaining and operating Plant necessary for and used in the performance of the Work, and payments for effecting repairs thereto that, in the opinion of Canada, are necessary for the proper performance of the Contract, other than payments for any repairs to the Plant arising out of defects existing before its allocation to the Work;

(f) payments for Material that is necessary for and incorporated in the Work, or that is necessary for and consumed in the performance of the Contract;

(g) payments for preparation, delivery, handling, erection, installation, inspection, protection and removal of the Plant and Material necessary for and used in the performance of the Contract; and

(h) any other payments made by the Contractor with the approval Canada that are necessary for the performance of the Contract in accordance with the Contract Documents.

GC6.4.3 Price Determination - Variations in Tendered Quantities

1) Except as provided in paragraphs 2), 3), 4) and 5) of GC6.4.3, if it appears that the final quantity of labour, Plant and Material under a price per unit item shall exceed or be less than the estimated tendered quantity, the Contractor shall perform the Work or supply the Plant and Material required to complete the item and payment shall be made for the actual Work performed or Plant and Material supplied at the price per unit set out in the Contract.

2) If the final quantity of the price per unit item exceeds the estimated tendered quantity by more than 15%, either party to the Contract may make a written request to the other party to negotiate an

amended price per unit for that portion of the item which exceeds 115% of the estimated tendered quantity, and to facilitate approval of any amended price per unit, the Contractor shall, on request, provide Canada with

(a) detailed records of the actual cost to the Contractor of performing or supplying the tendered quantity for the price per unit item up to the time the negotiation was requested; and

(b) the estimated unit cost of labour, Plant and Material required for the portion of the item that is in excess of 115% of the tendered quantity.

3) If agreement is not reached as contemplated in paragraph 2) of GC6.4.3, the price per unit shall be determined in accordance with GC6.4.2.

4) If it appears that the final quantity of labour, Plant and Material under a price per unit item shall be less than 85% of the estimated tendered quantity, either party to the Contract may make a written request to the other party to negotiate a change to the price per unit for the item if

(a) there is a demonstrable difference between the unit cost to the Contractor of performing or supplying the estimated tendered quantity and the unit cost to the Contractor for performing or supplying the final quantity; and

(b) the difference in unit cost is due solely to the decrease in quantity and not to any other cause.

5) For the purposes of the negotiation referred to in paragraph 4) of GC6.4.3

(a) the onus of establishing, justifying and quantifying a proposed change lies with the party making the request for negotiation; and

(b) in no event shall the total price for an item that has been amended as a result of a reduction in quantity pursuant to paragraph 4) of GC6.4.3 exceed the amount that would have been payable to the Contractor had 85% of the tendered quantity actually been performed or supplied.

GC6.5 DELAYS AND EXTENSION OF TIME

1) Upon application of the Contractor made before the date first fixed for completion of the Work or before any other date previously fixed under this clause, Canada may extend the time for completion of the Work by fixing a new date if Canada determines that causes beyond the control of the Contractor have delayed its completion.

2) The Contractor's application shall be accompanied by the written consent of the bonding company whose bond forms part of the Contract Security.

3) Subject to paragraph 4) of GC6.5, no payment, other than a payment that is expressly stipulated in the Contract, shall be made by Canada to the Contractor for any extra expense, loss or damage incurred or sustained by the Contractor due to delay, whether or not the delay is caused by circumstances beyond the control of the Contractor.

4) If the Contractor incurs or sustains any extra expense or any loss or damage that is directly attributable to any neglect or delay that occurs after the date of the Contract on the part of Canada in providing any information or in doing any act that the Contract either expressly requires Canada to do or that would ordinarily be done by an owner in accordance with the practice of the trade, the Contractor shall give Canada written notice of intention to claim for that extra expense or loss or damage within ten working days of the date the neglect or delay first occurred.

5) When the Contractor has given a notice referred to in paragraph 4) of GC6.5, the Contractor shall give Canada a written claim for the extra expense, loss or damage no later than 30 days after the date that a Certificate of Completion is issued and not afterwards.

6) A written claim referred to in paragraph 5) of GC6.5 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable Canada to determine whether or not the claim is justified and the Contractor shall supply such further and other information for that purpose as Canada may require.

7) If Canada determines that a claim referred to in paragraph 5) of GC6.5 is justified, Canada shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC6.4 DETERMINATION OF PRICE.

8) If the Contractor fails to give a notice referred to in paragraph 4) and a claim referred to in paragraph 5) of GC6.5 within the times stipulated, an extra payment shall not be made to the Contractor in respect of the occurrence.

GC6.6 ALLOWABLE COSTS FOR CONTRACT CHANGES UNDER GC6.4.1

GC6.6.1 General

1) The Contractor shall submit a cost estimate breakdown for each contemplated change, in accordance with paragraph 4) of GC6.4.1 PRICE DETERMINATION PRIOR TO UNDERTAKING CHANGES. The breakdown shall itemize all labour, material, plant and equipment costs estimated by the Contractor and subcontractors, and the amount of each allowance.

2) It is the responsibility of the Contractor to ensure that all prices included in the Contractor's breakdown to the NCC, including those of subcontractors, are fair and reasonable in view of the terms expressed herein.

3) The labour hours required for the contemplated change shall be based on the estimated number of hours to perform the work.

4) Time spent by a working foreman may be included in the number of labour hours, at a rate agreed to in writing by the Contractor and the NCC.

5) Time attributable to material handling, productivity factors and approved rest periods is to be included in the number of hours required by the contemplated change and will not be paid as a separate item under hourly rates.

6) Allowances referred to in section 04 below are not to be included in the hourly labour rates.

7) Credit for work deleted will only be for the work directly associated with the change.

8) When a change deletes work which has not yet been performed, the NCC is entitled to an adjustment in the Contract Amount equal to the cost the Contractor would have incurred had the work not been deleted.

9) Allowances referred to in Section 04 below shall not be applied to any credit amounts for deleted work.

10) In those cases where the change involves additions and deletions to the work, the allowances referred to in section 04 below shall apply only when the cost of the additions minus the cost of the deletions would result in an increase in the Contract Amount. The percentage allowance shall only be applied to that portion of the costs of the additions that is in excess of the cost of the deletions.

11) If the contemplated change in the work necessitates a change in the contract completion date, or has an impact on the work, the Contractor shall identify and include the resulting cost in the breakdown.

GC6.6.2 Hourly Labour Rates

1) The hourly labour rates listed in the Contractor's breakdown shall be determined in accordance with the collective agreements that are applicable at the site of the work and shall include:

   (a) the base rate of pay;

   (b) vacation pay:

   (c) benefits which includes:

      (i) welfare contributions;

      (ii) pension contributions;

      (iii) union dues;

      (iv) training and industry funds contributions; and

      (v) other applicable benefits, if any, that can be substantiated by the Contractor.

   (d) statutory and legislated requirements, assessed and payable under statutory authority, which includes:

      (i) Employment Insurance contributions;

      (ii) Canada Pension Plan or Québec Pension Plan contributions;

      (ii) Worker's Compensation Board or Commission de la santé et de la sécurité du travail premiums;

      (iv) Public Liability and Property Damage insurance premiums; and

      (v) health tax premiums.

2) In the case of nonunion labour, all rates claimed shall be in accordance with the terms of the Labour Conditions forming part of this contract and the Contractor must provide satisfactory proof of the rates actually paid.

GC6.6.3 Material, Plant and Equipment Costs

1) The costs of all purchases and rentals must be based on the actual amount paid to the suppliers by the Contractor or subcontractor and said costs are to include all applicable discounts.

GC6.6.4 Allowance to the Contractor or Subcontractor

1) The allowances determined in accordance with paragraph 1) of GC6.4.1 PRICE DETERMINATION PRIOR TO UNDERTAKING CHANGES shall be considered as full compensation for:

   (a) supervision, co-ordination, administration, overhead, margin and the risk of undertaking the work within the stipulated amount; and

(b) miscellaneous additional costs related to:

(i) the purchase or rental of material, plant and equipment;

(ii) the purchase of small tools and supplies;

(iii) safety and protection measures; and

(iv) permits, bonds, insurance, engineering, as built drawings, commissioning and site office.

GC7.1 TAKING THE WORK OUT OF THE CONTRACTOR'S HANDS

1) By giving notice in writing to the Contractor in accordance with GC2.3 NOTICES, the NCC, without any other authorization, may take all or any part of the Work out of the Contractor's hands, and may employ such means as the NCC sees fit to have the Work completed if the Contractor:

   (a) fails to remedy any delay in the commencement or default in the diligent performance of the Work to the satisfaction of the NCC within six days of the NCC giving notice to the Contractor in writing in accordance with GC2.3 NOTICES;

   (b) defaults in the completion of any part of the Work within the time fixed for its completion by the Contract;

   (c) becomes insolvent, or has committed an act of bankruptcy, and has neither made a proposal to its creditors nor filed a notice of intention to make such a proposal, pursuant to the Bankruptcy and Insolvency Act;

   (d) abandons the work;

   (e) makes an assignment of the Contract without the consent required by GC1.16 ASSIGNMENT; or

   (f) otherwise fails to observe or perform any of the provisions of the Contract.

2) If the whole or any part of the Work is taken out of the Contractor's hands, the Contractor's right to any further payment that is due or accruing due under the Contract is, subject only to paragraph 3) of GC7.1, extinguished, and the Contractor is liable to pay the NCC, upon demand, an amount that is equal to the amount of all loss and damage incurred or sustained by the NCC in respect of the Contractor's failure to complete the Work.

3) If the whole or any part of the Work that is taken out of the Contractor's hands is completed by the NCC, the NCC may pay the Contractor the amount, if any, of the holdback or a progress claim as determined by the NCC that had accrued and was due prior to the date on which the Work was taken out of the Contractor's hands and that is not required for the purposes of having the Work performed or of compensating the NCC for any other loss or damage incurred or sustained by reason of the Contractor's default.

4) The taking of the Work or any part thereof out of the Contractor's hands does not relieve the Contractor from any obligation under the Contract or imposed by law except the obligation to complete the performance of that part of the Work that was taken out of the Contractor's hands.

5) If the Work or any part thereof is taken out of the Contractor's hands, all Plant and Material and the interest of the Contractor, or its suppliers or subcontractors at any tier, in all real property, licences, powers and privileges acquired, used or provided by the Contractor, or its suppliers or subcontractors at any tier, under the Contract shall continue to be the property of the NCC without compensation.

6) When the NCC certifies that any Plant, Material, or any interest of the Contractor is no longer required for the purposes of the Work, or that it is not in the interests of the NCC to retain that Plant, Material, or interest, it shall revert to the Contractor.

7) If the Contractor has become insolvent or has committed an act of bankruptcy, and has either made a proposal to its creditors or filed a notice of intention to make such a proposal, pursuant to the Bankruptcy and Insolvency Act, the Contractor shall immediately forward a copy of the proposal or the notice of intention to the NCC.

GC7.2 SUSPENSION OF WORK

1) When, in the NCC's opinion, it is in the public interest to do so, the NCC may require the Contractor to suspend performance of the Work either for a specified or an unspecified period, by giving a notice of suspension in writing to the Contractor in accordance with GC2.3 NOTICES.

2) When a notice of suspension is received by the Contractor, the Contractor shall suspend all operations in respect of the Work except those that the NCC determines are necessary for the care and preservation of the Work, Plant and Material.

3) During a period of suspension, the Contractor shall not remove any part of the Work, Plant or Material from its site without the consent of the NCC.

4) If a period of suspension is 60 days or less, the Contractor shall resume the performance of the Work on the expiration of that period, and the Contractor is entitled to be paid the extra costs necessarily incurred by the Contractor as a result of the suspension, determined in accordance with GC6.4 DETERMINATION OF PRICE.

5) If a period of suspension is more than 60 days, the NCC and the Contractor may agree that the performance of the Work shall be continued by the Contractor, and the Contractor shall resume performance of the Work subject to any terms and conditions agreed upon by the NCC and the Contractor. If the NCC and the Contractor do not agree that performance of the Work shall be continued by the Contractor, or upon the terms and conditions under which the Contractor shall continue the Work, the notice of suspension shall be deemed to be a notice of termination pursuant to GC7.3 TERMINATION OF CONTRACT.

GC7.3 TERMINATION OF CONTRACT

1) The NCC may terminate the Contract at any time by giving a notice of termination in writing to the Contractor in accordance with GC2.3 NOTICES.

2) If the Contractor receives a notice of termination, the Contractor shall forthwith cease all operations in performance of the Contract, subject to any conditions stipulated in the notice.

3) Subject to paragraph 4) of GC7.3, if the Contract is terminated, the NCC shall pay the Contractor an amount determined to be due to the Contractor pursuant to GC6.4 DETERMINATION OF PRICE less the aggregate of all amounts that were paid to the Contractor by the NCC and all amounts that are due to the NCC from the Contractor pursuant to the Contract.

4) In no event shall the total amount payable by the NCC to the Contractor exceed the amount, calculated in accordance with GC5 TERMS OF PAYMENT, that would have been payable to the Contractor had the Contractor completed the Work.

5) Payment to the Contractor, if any, shall be made as soon as practicable under the circumstances.

GC7.4 SECURITY DEPOSIT - FORFEITURE OR RETURN

1) If the Work is taken out of the Contractor's hands, or the Contractor is in breach of, or in default under, the Contract, the NCC may convert a security deposit to the NCC's own use.

2) If the NCC converts a security deposit, the amount realized shall be deemed to be an amount due from the NCC to the Contractor under the Contract.

3) Any balance of the amount realized that remains after payment of all losses, damage and claims of the NCC and others shall be paid by the NCC to the Contractor if, in the opinion of the NCC, it is not required for the purposes of the Contract.

GC8 DISPUTE RESOLUTION

1) The Contractor may, within 10 days after the communication to the Contractor of any decision or direction referred to in GC6.1 CHANGES IN THE WORK and GC2.2 INTERPRETATION OF CONTRACT, protest that decision or direction.

2) A protest referred to in paragraph 1) of GC8 shall be in writing, contain full reasons for the protest, be signed by the Contractor and be given to the NCC.

3) If the Contractor gives a protest pursuant to paragraph 2) of GC8, any compliance by the Contractor with the decision or direction that was protested shall not be construed as an admission by the Contractor of the correctness of that decision or direction, or prevent the Contractor from taking whatever action the Contractor considers appropriate in the circumstances.

4) The giving of a protest by the Contractor pursuant to paragraph 2) of GC8 shall not relieve the Contractor from complying with the decision or direction that is the subject of the protest.

5) Subject to paragraph 6) of GC8, the Contractor shall take any action referred to in paragraph 3) of GC8 within 3 months after the date of the Certificate of Completion referred to in GC5.6 FINAL COMPLETION and not afterwards, except where it is otherwise provided by law.

6) The Contractor shall take any action referred to in paragraph 3) of GC8 resulting from a direction under GC3.13 WARRANTY AND RECTIFICATION OF DEFECTS IN WORK, within 3 months after the expiry of a warranty or guarantee period and not afterwards, except where it is otherwise provided by law.

7) Subject to paragraph 8) of GC8, if the NCC determines that the Contractor's protest is justified, the NCC shall pay the Contractor the cost of the additional labour, Plant and Material necessarily incurred by the Contractor in carrying out the protested decision or direction.

8) Costs referred to in paragraph 7) of GC8 shall be calculated in accordance with GC6.4 DETERMINATION OF PRICE.

GC9.1 OBLIGATION TO PROVIDE CONTRACT SECURITY

1) The Contractor shall, at the Contractor's expense and within 7 days after the date that the Contractor receives notice that the Contractor's bid was accepted by the NCC, obtain and deliver Contract Security to the NCC in one or more of the forms prescribed in GC9.2 TYPES AND AMOUNTS OF CONTRACT SECURITY.

2) If the whole or a part of the Contract Security provided is in the form of a security deposit, it shall be held and disposed of in accordance with GC5.13 RETURN OF SECURITY DEPOSIT and GC7.4 SECURITY DEPOSIT - FORFEITURE OR RETURN.

3) If a part of the Contract Security provided is in the form of a labour and material payment bond, the Contractor shall post a copy of that bond at the site of the Work.

4) It is a condition precedent to the release of the first progress payment that the Contractor has provided the Contract Security as specified herein.

5) In addition to the limitation imposed in paragraph 4) of GC9.1, the Contractor further acknowledges and agrees that it will not be entitled to have access to the site, nor to commence work pursuant to this contract until it has delivered the Contract Security as specified herein.

GC9.2 TYPES AND AMOUNTS OF CONTRACT SECURITY

1) The Contractor shall deliver to the NCC (a), (b) or (c):

   (a) A performance bond and a labour and material payment bond each in an amount that is equal to not less than 50% of the Contract Amount including taxes

   (b) A labour and material payment bond in an amount that is equal to not less than 50% of the Contract Amount including taxes, and a security deposit in an amount that is equal to not less than 10% of the Contract Amount including taxes.

   (c) A security deposit in an amount prescribed by subparagraph 1)(b) of GC9.2, plus an additional amount that is equal to 10% of the Contract Amount including taxes.

2) The amount of a security deposit referred to in subparagraph 1)(b) of GC9.2 shall not exceed $2,000,000 regardless of the Contract Amount including taxes.

3) A performance bond and a labour and material payment bond referred to in paragraph 1) of GC9.2 shall be in a form and be issued by a bonding or surety company that is approved by the NCC.

   (a) The approved form for the performance bond is enclosed at the end of GC9.

   (b) The approved form for the labour and material payment bond is enclosed at the end of GC9

   (c) The list of approved bonding or surety companies is displayed at the following Website:

   http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=12027 .

4) A security deposit referred to in subparagraphs 1)(b) and 1)(c) of GC9.2 shall be in the form of:

(a) a bill of exchange, bank draft or money order made payable to the NCC and certified by an approved financial institution or drawn by an approved financial institution on itself; or

(b) bonds of, or unconditionally guaranteed as to principal and interest by, the Government of Canada.

5) For the purposes of subparagraph 4)(a) of GC9.2:

(a) a bill of exchange is an unconditional order in writing signed by the Contractor and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable future time a certain sum of money to, or to the order of, the NCC;

(b) if a bill of exchange, bank draft or money order is certified by or drawn on an institution or corporation other than a chartered bank, it must be accompanied by proof that the said institution or corporation meets at least one of the criteria described in subparagraph 5)(c) of GC9.2, either by letter or by a stamped certification on the bill of exchange, bank draft or money; and

(c) An approved financial institution is:

(i) a corporation or institution that is a member of the Canadian Payments Association as defined in the Canadian Payments Act;

(ii) a corporation that accepts deposits that are insured, to the maximum permitted by law, by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec;

(iii) a corporation that accepts deposits from the public if repayment of the deposit is guaranteed by Her Majesty the Queen in right of a province;

(iv) a corporation, association or federation incorporated or organized as a credit union or co-operative credit society that conforms to the requirements of a credit union which are more particularly described in paragraph 137(6) of the Income Tax Act; or

(v) Canada Post Corporation.

6) Bonds referred to in subparagraph 4)(b) of GC9.2 shall be provided on the basis of their market value current at the date of the Contract, and shall be:

(a) made payable to bearer; or

(b) accompanied by a duly executed instrument of transfer of the bonds to the NCC in the form prescribed by the Domestic Bonds of Canada Regulations; or

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

GC9.3 IRREVOCABLE STANDBY LETTER OF CREDIT

1) As an alternative to a security deposit, an irrevocable standby letter of credit is acceptable to the NCC, the amount of which shall be determined in the same manner as a security deposit referred to in GC9.2 TYPES AND AMOUNTS OF CONTRACT SECURITY.

2) An irrevocable standby letter of credit shall:

(a) be an arrangement, however named or described, whereby a financial institution (the “Issuer”) acting at the request and on the instructions of a customer (the “Applicant”) or on its own behalf:

(i) is to make a payment to, or to the order of, the NCC as the beneficiary;

(ii) is to accept and pay bills of exchange drawn by the NCC;

(ii) authorizes another financial institution to effect such payment or accept and pay such bills of exchange; or

(iv) authorizes another financial institution to negotiate against written demand(s) for payment provided that the terms and conditions of the letter of credit are complied with;

(b) state the face amount that may be drawn against it;

(c) state its expiry date;

(d) provide for sight payment to the NCC by way of the financial institution's draft against presentation of a written demand for payment signed by the NCC;

(e) provide that more than one written demand for payment may be presented subject to the sum of those demands not exceeding the face value of the letter of credit;

(f) provide that it is subject to the International Chamber of Commerce (ICC) Uniform Customs and Practice for Documentary Credits, 2007 Revision, ICC Publication No. 600;

(g) clearly specify that it is irrevocable or deemed to be irrevocable pursuant to article 6 c) of the International Chamber of Commerce (ICC) Uniform Customs and Practice for Documentary Credits, 2007 Revision, ICC Publication No. 600; and

(h) be issued or confirmed, in either official language in a format left to the discretion of the issuer or confirmer, by an approved financial institution on its letterhead.

PERFORMANCE BOND

Bond Number _____

Amount $ _____

KNOW ALL MEN BY THESE PRESENTS, that _____ as Principal, hereinafter called the Principal, and _____ as Surety, hereinafter called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto the National Capital Commission as Obligee, hereinafter called the NCC, In the amount of _____ dollars ($ _____), lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED AND SEALED this _____ day of _____ , _____ . WHEREAS, the Principal has entered into a Contract with the NCC, dated the _____ day of _____ , _____ , for: _____ .

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if the Principal shall well and faithfully observe and perform all the obligations on the part of the Principal to be observed and performed in connection with the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. Whenever the Principal shall be, and declared by the NCC to be, in default under the Contract, the Surety shall
   (a) if the work is not taken out of the Principal's hands, remedy the default of the Principal,
   (b) if the work is taken out of the Principal's hands and the NCC directs the Surety to undertake the completion of the work, complete the work in accordance with the Contract provided that if a contract is entered into for the completion of the work,
      (i) it shall be between the Surety and the completing contractor, and
      (ii) the selection of such completing contractor shall be subject to the approval of the NCC,
   (c) if the work is taken out of the Principal's hands and the NCC, after reasonable notice to the Surety, does not direct the Surety to undertake the completion of the work, assume the financial responsibility for the cost of completion in excess of the moneys available to the NCC under the Contract,
   (d) be liable for and pay all the excess costs of completion of the Contract, and
   (e) not be entitled to any Contract moneys earned by the Principal, up to the date of his default on the Contract and any holdbacks relating to such earned Contract moneys held by the NCC, and the liability of the Surety under this Bond shall remain unchanged provided, however, and without restricting the generality of the foregoing, upon the completion of the Contract to the satisfaction of the NCC, any Contract moneys earned by the Principal or holdbacks related thereto held by the NCC may be paid to the Surety by the NCC.

2. The Surety shall not be liable for a greater sum than the amount specified in this Bond.

3. No suit or action shall be instituted by the NCC herein against the Surety pursuant to these presents after the expiration of two (2) years from the date on which final payment under the Contract is payable.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and year first above written.

SIGNED, SEALED AND DELIVERED in the presence of:

Principal _____

Witness _____

Surety _____

Note: Affix Corporate seal if applicable.

LABOUR AND MATERIAL PAYMENT BOND

Bond Number _____

Amount $ _____

KNOW ALL MEN BY THESE PRESENTS, that _____ as Principal,

hereinafter called the Principal, and _____ as Surety, hereinafter

called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto the National Capital Commission as Obligee,

hereinafter called the NCC, In the amount of _____ dollars

($ _____), lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety

bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED AND SEALED this _____ day of _____ , _____ . WHEREAS, the Principal has entered into a Contract

with the NCC, dated the _____ day of _____ , _____ , for: _____

_____ which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that, if payment is promptly made to all Claimants who have performed labour or services or supplied material in connection with the Contract and any and all duly authorized modifications and extensions of the Contract that may hereafter be made, notice of which modifications and extensions to the Surety being hereby waived, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. For the purpose of this bond, a Claimant is defined as one having a direct contract with the Principal or any Sub-Contractor of the Principal for labour, material or both, used or reasonably required for use in the performance of the Contract, labour and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone services or rental of equipment (but excluding rental of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract.

2. For the purpose of this Bond, no payment is required to be made in respect of a claim for payment for labour or services performed or material supplied in connection with the Contract that represents a capital expenditure, overhead or general administration costs incurred by the Principal during the currency or in respect of the Contract.

3. The Principal and the Surety hereby jointly and severally agree with the NCC that if any Claimant has not been paid as provided for under the terms of his contract with the Principal or a Sub-Contractor of the Principal before the expiration of a period of ninety (90) days after the date on which the last of such Claimant's labour or service was done or performed or materials were supplied by such Claimant, the NCC may sue on this bond, have the right to prosecute the suit to final judgment for such sum or sums as may be due and have execution thereon; and such right of the NCC is assigned by virtue of Part VIII of the Financial Administration Act to such Claimant.

4. For the purpose of this bond the liability of the Surety and the Principal to make payment to any claimant not having a contract directly with the Principal shall be limited to that amount which the Principal would have been obliged to pay to such claimant had the provisions of the applicable provincial or territorial legislation on lien or privileges been applicable to the work. A claimant need not comply with provisions of such legislation setting out steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which the claimant might have had. Any such claimant shall be entitled to pursue a claim and to recover judgment hereunder subject to the terms and notification provisions of the Bond.

5. Any material change in the Contract between the Principal and the NCC shall not prejudice the rights or interest of any Claimant under this Bond who is not instrumental in bringing about or has not caused such change.

6. No suit or action shall be commenced hereunder by any Claimant:

   (a) Unless such Claimant shall have given written notice within the time limits hereinafter set forth to the Principal and the Surety above named, stating with substantial accuracy the amount claimed. Such notice shall be served by mailing the same by registered mail to the Principal and the Surety at any place where an office is regularly maintained for the transaction of business by such persons or served in any manner in which legal process may be served in the Province or other part of Canada in which the subject matter of the Contract is located. Such notice shall be given

      (i) in respect of any claim for the amount or any portion thereof required to be held back from the Claimant by the Principal or by the Sub-Contractor of the Principal under either the terms of the Claimant's Contract with the Principal or the Claimant's Contract with the Sub-Contractor of the Principal within one hundred and twenty (120) days after such Claimant should have been paid in full under this Contract;

…/2

(ii) in respect of any claim other than for the holdback or portion thereof referred to above within one hundred and twenty (120) days after the date upon which such Claimant did or performed the last of the service, work or labour or furnished the last of the materials for which such claim is made under the Claimant's Contract with the Principal or a Sub-Contractor of the Principal

(b) After the expiration of one (1) year following the date on which the Principal ceased work on the said Contract, including work performed under the guarantees provided in the Contract;

(c) Other than in a court of competent jurisdiction in the province or district of Canada in which the subject matter of the Contract or any part thereof is situated and not elsewhere, and the parties hereto hereby agree to submit to the jurisdiction of such court.

7. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder.

8. The Surety shall not be entitled to claim any moneys relating to the Contract and the liability of the Surety under this Bond shall remain unchanged and, without restricting the generality of the foregoing, the Surety shall pay all valid claims of Claimants under this Bond before any moneys relating to the Contract held by the NCC are paid to the Surety by the NCC.

9. The Surety shall not be liable for a greater sum that the amount specified in this bond.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and year first above written.

SIGNED, SEALED AND DELIVERED in the presence of:

Principal _____

Witness _____

Surety _____

Note: Affix Corporate seal if applicable.

GC10.1 INSURANCE CONTRACTS

1) The Contractor shall, at the Contractor's expense, obtain and maintain insurance contracts in respect of the work and shall provide evidence thereof to the NCC in accordance with the requirements of GC10.

2) The insurance contracts referred to in paragraph 1) of GC10.1 shall:

   (a) be in a form, of the nature, in the amounts, for the periods and containing the terms and conditions specified in GC10; and

   (b) provide for the payment of claims under such insurance contracts in accordance with GC10.2 INSURANCE PROCEEDS.

GC10.2 INSURANCE PROCEEDS

1) In the case of a claim payable under a Builders Risk/Installation (All Risks) insurance contract maintained by the Contractor pursuant to GC10.1 INSURANCE CONTRACTS, the proceeds of the claim shall be paid directly to the NCC, and:

   (a) the monies so paid shall be held by the NCC for the purposes of the contract; or

   (b) if the NCC elects, shall be retained by the NCC, in which event they vest in the NCC absolutely.

2) In the case of a claim payable under a General Liability insurance contract maintained by the Contractor pursuant to GC10.1 INSURANCE CONTRACTS, the proceeds of the claim shall be paid by the insurer directly to the claimant.

3) If an election is made pursuant to paragraph 1) of GC10.2, the NCC may cause an audit to be made of the accounts of the Contractor and of the NCC in respect of the part of the work that was lost, damaged or destroyed for the purpose of establishing the difference, if any, between:

   (a) the aggregate of the amount of the loss or damage suffered or sustained by the NCC, including any costs incurred in respect of the clearing of the work and its site and any other amount that is payable by the Contractor to the NCC under the contract, minus any monies retained pursuant to subparagraph 1)(b) of GC10.2; and

   (b) the aggregate of the amounts payable by the NCC to the Contractor pursuant to the contract up to the date of the loss or damage.

4) A difference that is established pursuant to paragraph 3) of GC10.2 shall be paid forthwith by the party who is determined by the audit to be the debtor to the party who is determined by the audit to be the creditor.

5) When payment of a deficiency has been made pursuant to paragraph 4) of GC10.2, all rights and obligations of the NCC and the Contractor under the contract shall, with respect only to the part of the work that was the subject of the audit referred to in paragraph 3) of GC10.2, be deemed to have been expended and discharged.

6) If an election is not made pursuant to subparagraph 1)(b) of GC10.2, the Contractor shall, subject to paragraph 7) of GC10.2, clear and clean the work and its site and restore and replace the part of the work that was lost, damaged or destroyed at the Contractor's expense as if that part of the work had not yet been performed.

7) When the Contractor clears and cleans the work and its site and restores and replaces the work referred to in paragraph 6) of GC10.2, the NCC shall pay the Contractor out of the monies referred to in paragraph 1) of GC10.2 so far as they will thereunto extend.

8) Subject to paragraph 7) of GC10.2, payment by the NCC pursuant to paragraph 7) of GC10.2 shall be made in accordance with the contract but the amount of each payment shall be 100% of the amount claimed notwithstanding subparagraphs 3)(a) and 3)(b) of GC5.4 PROGRESS PAYMENT.

GC10.3 INSURANCE TERMS

GC10.3.1 General

GC10.3.1.1 Proof of Insurance

1) Before commencement of the Work, and prior to contract award, the Contractor shall deposit with the NCC a Certificate of Insurance (approved Insurance form is enclosed at the end of this section).

2) Upon request by the NCC, the Contractor shall provide originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the provisions contained herein.

3) The insurance policies shall be endorsed to provide the NCC with no less than 30 days notice in writing in advance of a cancellation of insurance or any reduction in coverage.

GC10.3.1.2 Payment of Deductible

1) Any moneys paid or payable in respect of a deductible amount shall be borne exclusively by the Contractor.

GC10.3.2 Commercial General Liability

GC10.3.2.1 Scope of Policy

1) The insurance coverage provided shall not be less than that provided by IBC Form 2100, as amended from time to time, and shall have:

(a) an Each Occurrence Limit of not less than $5,000,000;

(b) a Products/Completed Operations Aggregate Limit of not less than $5,000,000; and

(c) a General Aggregate Limit of not be less than $10,000,000 per policy year, if the policy is subject to such a limit.

2) The policy shall either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto:
   (a) Blasting;

   (b) Pile driving and caisson work;

   (c) Underpinning;

   (d) Removal or weakening of support of any building or land whether such support be natural or otherwise if the work is performed by the insured Contractor.

GC10.3.2.2 Insured

1) The policy shall insure the Contractor and shall include the NCC as an additional Insured, with respect to liability arising out of the operations of the Contractor with regard to the work.

GC10.3.2.3 Period of Insurance

1) Unless otherwise directed in writing by the NCC, or, otherwise stipulated elsewhere herein, the policy required herein shall be in force and be maintained from the date of contract award until the day of issue of the Certificate of Completion except that the coverage for Completed Operations Liability shall, in any event, be maintained for a period of at least six (6) years beyond the date of the Certificate of Substantial Performance.

GC10.3.3 Builder's Risk / Installation Floater

GC10.3.3.1 Scope of Policy

1) The insurance coverage provided by a Builder's Risk policy or an Installation Floater policy shall not be less than that provided by IBC Forms 4042 and 4047, as amended from time to time.

2) The policy shall permit use and occupancy of the project, or any part thereof, where such use and occupancy is for the purposes for which the project is intended upon completion.

3) The policy may exclude or be endorsed to exclude coverage for loss or damage caused by any of the following:

   (a) Asbestos;

   (b) Fungi or spores;

   (c) Cyber;

   (d) Terrorism.

GC10.3.3.2 Amount of Insurance

1) The amount of insurance shall not be 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 the NCC 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 shall be changed to reflect the revised contract value.

GC10.3.3.3 Insurance Proceeds

1) The policy shall provide that the proceeds thereof are payable to the NCC may direct in accordance with GC10.2, "Insurance Proceeds".

2) The Contractor shall, without delay, do such things and execute such documents as are necessary to effect payment of the proceeds.

CERTIFICAT OF INSURANCE
ATTESTATION D'ASSURANCE

- **To be completed by the insurer / À être rempli par l'assureur**

CONTRACT / MARCHÉ	
Description and location of work / Description et endroit des travaux	Contract no. / N° de contrat

INSURER / ASSUREUR			
Name / Nom			
Address / Adresse	No., Street / N°, rue		
	City / Ville	Province	Postal code / Code postal

BROKER / COURTIER			
Name / Nom			
Address / Adresse	No., Street / N°, rue		
	City / Ville	Province	Postal code / Code postal

INSURED / ASSURÉ			
Name of contractor / Nom de l'entrepreneur			
Address / Adresse	No., Street / N°, rue		
	City / Ville	Province	Postal code / Code postal

ADDITIONAL INSURED / ASSURÉ ADDITIIONNEL

The National Capital Commission / La Commission de la capitale nationale

This insurer certifies that the following policies of insurance are at present in force covering all operations of the Insured, in connection with the contract made between the named insured and the National Capital Commission.

L'assureur atteste que les polices d'assurances suivantes sont présentement en vigueur et couvrent toutes les activités de l'assuré en fonction du marché conclu entre l'Assuré dénommé la Commission de la capitale nationale

POLICY / POLICE

Type Genre	Number Numéro	Inception Date Date d'effet	Expiry Date Date d'expiration	Limit of Liability Limites de garantie
Commercial General Liability Responsabilité civile des entreprises				
Builder's Risk "All Risks" Assurance des chantiers « tous risques »				
Installation Floater "All Risks" Risques d'installation « tous risques »				
Other (list) / Autre (énumérer)				

Each of these policies includes the coverages and provisions as specified in Insurance Terms and each policy has been endorsed to cover the National Capital Commission as an Additional Insured. The Insurer agrees to notify the National Capital Commission in writing thirty (30) days prior to any material change in, or cancellation of any policy or coverage.	Chacune des présentes polices renferment des garanties et dispositions spécifiées aux Conditions d'assurance, et chaque police a été amendée pour couvrir la Commission de la capitale nationale en tant qu'assuré additionnel. L'assureur convient de donner un préavis de trente (30) jours à la Commission de la capitale nationale en cas de changement visant la garantie d'assurance ou les conditions ou de l'annulation de n'importe quelle police ou garantie.

Name of Insurer's Office or Authorized Employee / Nom du cadre ou de la personne autorisée

Telephone number / Numéro de téléphone

Signature

Date

OCCUPATIONAL HEALTH AND SAFETY REQUIREMENTS

1. General

1.1 In this Contract "OHS" means "occupational health and safety".

1.2 With respect to the work to be performed under the Contract, the Contractor covenants and agrees to perform at, and to enforce conformity with, a standard equivalent to or greater than the best practices prevailing in the construction industry at that time.

1.3 The Contractor acknowledges that, to the extent that the following matters may be affected by conduct of the work, it is responsible for the:

1.3.1 health and safety of persons on site;

1.3.2 safety of property on site;

1.3.3 protection of persons adjacent to the site; and,

1.3.4 protection of the environment.

1.4 Without limiting the generality of section 1.3, the Contractor acknowledges that it is required to, and covenants and agrees to, comply and to enforce compliance with all laws or regulations that may be applicable to the conduct of the work including, without limitation:

(a) the provisions of the *Occupational Health and Safety Act* of Ontario and all regulations, policies or directives issued thereunder for work performed in Ontario;

(b) La *Loi sur la santé et la sécurité du travail* of Québec and all regulations, policies or directives issued thereunder for work performed in Québec;

(c) Applicable provisions of the *Canada Labour Code, Part II;*

(d) Employment standards legislation in the province(s) in which any part of the work is performed; and

(e) Any policies or directives issued by the NCC in respect of the subject matter of the contract.

The NCC will present any such policies or directives referred to in paragraph (e) to the Contractor in written form by not later than the pre-construction meeting. The Contractor is obliged to ensure that the relevant policies and directives have been communicated to and acknowledged by all its employees and that they will be complied with. The NCC reserves the right to require the Contractor to produce evidence satisfactory to the NCC acting reasonably that the Contractor has discharged the foregoing obligations.

1.5 By entering into the Contract with the NCC, the Contractor represents and warrants to the NCC that it has informed itself of and is knowledgeable about the obligations imposed by the legislation referred to in 1.4. above.

1.6 For purposes of the relevant provincial OHS legislative regime the Contractor acknowledges and agrees that it is the "Constructor" and covenants to discharge and accept all liability for the performance of the obligations of the "Constructor" in respect of the work provided for in the Contract. Notwithstanding a determination by the relevant authority having jurisdiction that the NCC is the "Constructor" in the event of a dispute between the Contractor and the NCC, the Contractor acknowledges and agrees that the Contractor shall be financially responsible for the implementation of protective measures necessary to fulfill the obligations of the "Constructor".

1.7 As between the NCC and the Contractor, the NCC's decision as to whether the Contractor is discharging its obligations in respect of OHS issues shall be definitive. Without limiting the generality of the foregoing, in the event of any dispute with respect to instructions given by the NCC's designated representative, the Contractor may note such dispute, but must nevertheless forthwith comply with any such instructions.

1.8 The Contractor hereby indemnifies and agrees to hold harmless the NCC, its agents and employees, from and against any and all claims, demands, losses, costs (including legal fees on a full indemnity basis), damages, actions, suits or proceedings (hereinafter collectively referred to as "claims") by third parties that arise out of or are attributable to the Contractor's errors or omissions in the performance of the Contract. Without limiting the generality of the foregoing, this indemnification extends to any claims related to any violation of any statute or regulation relating to OHS matters.

1.9 The NCC shall provide the contractor:

1.9.1 a written description of every known and foreseeable health and safety hazard to which persons employed in the performance of the work may be exposed because of the nature of the site;

1.9.2 a list of any prescribed materials, equipment, devices and clothing necessary because of the nature of the site;

1.9.3 with written information indicating the prescribed circumstances and manner to use all prescribed materials, equipment, devices and clothing listed pursuant to 1.9.2; and,

1.9.4 with a copy of any NCC policies and procedures that may be applicable in relation to the work site.

1.10 Without limiting the generality of 1.9, prior to the commencement of the work by the contractor, the contractor shall, at the contractor's expense:

1.10.1 take all reasonable care to ensure that all persons employed in the performance of the work or granted access to the work or its site are informed of any health and safety hazard described pursuant to 1.9.1;

1.10.2 provide all persons employed in the performance of the work or granted access to the work or its site with prescribed materials, equipment, devices and clothing listed pursuant to 1.9.2;

1.10.3 take all reasonable care to ensure that all persons employed in the performance of the work or granted access to the work or its site are familiar with the prescribed circumstances and manner all prescribed materials, equipment, devices and clothing listed pursuant to 1.9.2; and

1.10.4 take all reasonable care to ensure that all persons employed in the performance of the work or granted access to the work or its site are familiar with policies and procedures referred to in 1.9.4.

2. Qualifications of Personnel

2.1 By entering into this agreement the contractor represents and warrants the it has the requisite experience, training, formal certification and equipment to enable it to discharge the obligations enumerated in sections 1.3. 1.4, 1.5 and 1.6 above.

2.2 The Contractor represents and warrants that supervisory personnel employed by the Contractor in respect of performance of any part of the work have the requisite experience, authority, training, formal certification and equipment to ensure that the obligations enumerated in sections 1.3 1.4, 1.5

and 1.6 above are discharged and agrees to deliver such evidence as may be required by the NCC from time to time to verify same.

3. Certification

3.1 After receiving notification that its bid has been retained and prior to and as a condition of contract award, the Contractor covenants and agrees to deliver a Worker's Compensation Clearance Certificate. Where the duration of the project is greater than sixty days, the Contractor covenants and agrees to deliver up-dated certificates at least every 60 days. In the event of a failure by the Contractor to deliver up-dated certificates, the NCC shall be entitled to immediately terminate the contract without notice and without incurring any liability to the Contractor.

3.2 After receiving notification that its bid has been retained and prior to and as a condition of contract award, the Contractor covenants and agrees to deliver historical information on its injury experience including any pertinent Worker's Compensation Experience Reports. Such historical information shall report data for the previous three years.

4. Plans Policies and Procedures

4.1 After receiving notification that its bid has been retained and prior to and as a condition of contract award, the Contractor covenants and agrees to deliver for the review and approval of the NCC:

(a) A copy of the contractor's OHS policy;

(b) A safety program and plan specific to the work to be performed pursuant to the Contract which plan shall include a risk assessment and analysis, a description of safe working methods, injury and incident reporting protocols, regular periodic reporting on compliance with OHS obligations including any policies, practices and procedures otherwise provided for herein, and a site-specific contingency and emergency response plan; and

(c) Health and safety training records of personnel and alternates responsible for OHS issues on site.

The Contractor covenants and agrees to deliver the necessary material safety data sheets for the review and approval of the NCC prior to entering the site to perform work related to the relevant material.

Approval by the NCC does not amend the provisions of the Contract with respect to the allocation of liability for discharging or failing to discharge OHS obligations. Such liability remains with the Contractor notwithstanding the granting of such approval.

4.2 The Contractor acknowledges and agrees that prior to commencement of work it must attend a pre-construction briefing at which any special or additional practices and procedures to be followed in completing the work are to be established. Without limiting the provisions of section 1.4(e) above, the representatives of the Contractor attending the briefing will be required to deliver a signed acknowledgement that the practices and procedures set out in the pre-construction briefing have been understood and will be complied with.

4.3 At any time and from time to time during the performance of the work, the NCC shall have the right to audit the manner in which the Contractor is discharging its OHS obligations and to determine whether the project specification and/or OHS policies, practices and procedures are being complied with. In the event that the audit discloses any failure by the Contractor to discharge such OHS obligations , the NCC shall be entitled to forthwith rectify at the Contractor's expense any such deficiency and the NCC shall have the further right to immediately terminate the contract without notice and without incurring any liability to the Contractor.

4.4 The Contractor covenants and agrees to conform with all requirements of the Workplace Hazardous Materials Information System.

4.5 The Contractor acknowledges and agrees that where required by any law or regulation applicable to the performance of the work it must establish and maintain a project health and safety committee. The contractor further acknowledges and agrees that it must enable staff to attend all relevant safety meetings, and that the cost of same, including costs attributable to standing down equipment is included in its bid price and is not independently recoverable.

4.6 Where required by the relevant provincial regulatory regime, the Contractor acknowledges and agrees that it is responsible for delivery of notice of the project to the relevant regulatory authority, and for the performance of any other administrative activity required to meet the obligations imposed in the pertinent provincial regulatory regime.

4.7 **(Optional depending on hazard or scope of project)**. The contractor covenants and agrees that it shall employ and assign to the work, a competent OHS professional as Health and Safety Coordinator that must:

(a) have a minimum two (2) years' site-related working experience specific to activities associated with.(identify specific subject matter)

(b) have basic working knowledge of specified occupational safety and health regulations,

(c) be responsible for completing health and safety training session and ensuring that personnel not successfully completing the required training are not permitted to enter the site to perform the Work,

(d) be responsible for implementing, enforcing daily and monitoring the site-specific Health and Safety Plan, and

(e) be on site during execution of the Work.

The parties acknowledge that in lieu of employing an OHS professional, the Contractor may provide same by sub-contracting for such services.

4.8 Upon completion of the work the Contractor covenants and agrees to participate with the NCC in a post performance interview to evaluate the performance of the Contractor in respect of the OHS obligations under the contract. Without limiting the generality of the foregoing, the interview will identify areas of compliance and non-compliance in terms of:

(a) actual performance of the work;

(b) reporting or procedural requirements;

(c) resolution of deficiencies.

The contractor acknowledges and agrees that the results of the post-completion interview may be relied upon by the NCC in evaluating bids subsequently submitted by the Contractor on other NCC projects.

Security Requirements

The NCC complies with Treasury Board's *Policy on Government Security* and consequently, it will require that the Contractor's employees submit to a personal security screening process (Security Clearance Form TBS/SCT 330-60E). The NCC may also perform a credit check when the duties or tasks to be performed require it or in the event of a criminal record containing a charge/offence of a financial nature.

The NCC reserves the right to not award the Contract until such time as the Contractor's core employees have obtained the required level of security screening as identified by the NCC's Corporate Security. In this case the level of security required will be **Reliability/Site Access/Secret**.

The NCC also reserves the right to request that the Contractor submit to a *Designated Organisation Screening* and/or *Facility Security Clearance*– depending on the nature of the information it will be entrusted with. In the event that the Contractor does not meet the requirements to obtain the requested clearance, the Contractor shall take the corrective measures recommended by the Canadian Industrial Security Directorate (of PWGSC) or by the NCC's Corporate Security in order to meet these requirements. If no corrective measures are possible or if the Contractor fails to take the recommended measures, then the Contractor shall be in default of its obligations under this Contract and the NCC shall have the rights and remedies listed in section 2.14, including the right to terminate the Contract without further notice to the Contractor.

Additional information

As part of their personal screening, individuals may be required to provide evidence of their status as a Canadian citizen or permanent resident as well as any other information/documentation requested by the NCC's Corporate Security in order to complete the screening.

The NCC reserves the right to refuse access to personnel who fail to obtain the required level of security screening.

The NCC reserves the right to impose additional security measures with respect to this Contract as the need arises.

Company Security Representative

The Contractor shall appoint one Company Security Representative (CSR) as well as one alternate (for companies who have more than five employees).

Selection criteria for the CSR and the alternate are the following:

- They must be employees of the Contractor;
- They must have a security clearance (the NCC will process the clearances once the individuals have been identified).

Responsibilities of the Company Security Representative

The CSR's responsibilities are the following:

- Act as liaison between the NCC's Corporate Security and the Contractor to ensure coordination;
- In collaboration with the NCC's Corporate Security, identify the Contractor's employees who will require access to NCC information/assets/sites **as well as any recurring subcontractors** (and their employees) who will require similar access and may not be supervised by the Contractor at all times during such access. Ensure that accurate and complete Personnel Security Screening documentation is

submitted to the NCC's Corporate Security for the employees/subcontractors who have been identified;

- Ensure that employees/subcontractors, upon notification of having been granted a reliability status, sign the *Security Screening Certificate and Briefing Form* and return to the NCC's Corporate Security;
- Ensure that only persons who have been security screened to the appropriate level and who are on a "need-to-know basis" will have access to information and assets;
- Maintain a current list of security screened employees/subcontractors;
- Ensure proper safeguard of all information and assets, including any information/assets entrusted to subcontractors;
- If a Security incident or suspected breach of security occurs, prepare and submit to the NCC an occurrence report as soon as possible.

RICHMOND LANDING SHORELINE ACCESS
OTTAWA

LAND ENTRY

CONTRACT SPECIFICATIONS

APRIL 2018

For Tender

PART 1 - GENERAL

1.1 Minimum Standards

1. Execute work to meet or exceed:

    1. National Building Code of Canada 2015, National Fire Code of Canada 2015, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
    2. Rules and regulations of authorities having jurisdiction.
    3. Fire Commissioner of Canada, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.
    4. Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended, R.R.O. 1990, Reg. 834. O. Reg. 629/94 as amended, Diving Operations.
    5. Environmental Protection Act, O. Reg. 102/94, O. Reg. 103/94, and Regulation 347.
    6. Canadian Labour Code Part 2.

1.2 Taxes

1. Pay applicable Federal, Provincial and Municipal taxes.

1.3 Fees, Permits and Certificates

1. Provide authorities having jurisdiction with information requested.

2. Pay fees and obtain certificates and permits required.

3. Furnish certificates and permits when requested.

1.4 Examination

1. Before submitting tender, examine existing conditions and determine conditions affecting work.

2. Obtain all information which may be necessary for proper execution of Contract.

1.5 Site

1. Confine work, including temporary structures, plant, equipment and materials to the minimum required to complete construction. The drawings indicate permitted

access routes to the site and, permissible work and storage areas. Confine all operations to these locations. Movement of equipment, tools, machinery, etc. in areas that are within the two year high water mark is to be minimized.

2. Contractor Parking is to be confined to the site, as indicated on the drawings, and not to interfere with the adjacent properties, driveways etc.

3. Make adjustments, as directed by the NCC Representative, to correct any issues which may affect neighboring properties.

4. Locate temporary buildings, access roads, walks, drainage facilities, services as directed and, maintain in a clean and orderly manner.

1.6 Construction Limits and Storage Areas

1. The limits of the Construction and Storage Area are shown on the drawings. Should the Contractor require additional area(s) for work and storage, the Contractor will be responsible for arranging for permission to use these areas and for obtaining releases from the affected Owners at the end of the project indemnifying the Contract and the Owner from any claim from the Owner of the land used in the form acceptable to the NCC Representative.

2. The staging area at the parking lot on Victoria Island is limited to a two week period. The two week period dates shall be suggested by the contractor for approval by the NCC Representative. During this period of staging, the contractor shall maintain public vehicular access (including tour buses) to the remainder of the parking stalls.

1.7 Documents

1. Keep on site one copy of Contract Documents and reviewed and approved Shop Drawings.

1.8 NCC Representative

1. The National Capital Commission will appoint or designate a representative for this contract who will be referred to as the NCC Representative. The Contractor will be informed of the designated individual or individuals. Should it be required to change the Representative, the Contractor will be informed.

1.9 Additional Drawings

1. The NCC Representative may furnish additional drawings to clarify work.

2. Such drawings shall become part of the Contract Documents.

1.10 Reproduction of Contract Document

1. Reproduce and distribute Contract Documents and all drawings to all Sub-Contractor and Contractor employees required to adequately control the work and provide information to all trades.

1.11 Layout of Work

1. Immediately upon entering the site for purpose of beginning work on this project, locate all general reference points and take proper action necessary to prevent their disturbance.

2. Supply stakes and other survey markers required for this work. Employ competent personnel to lay out work in accordance with lines and grades provided.

3. Maintain all reference points and markers for duration of Contract.

1.12 Co-operation and Protection

1. Execute work with minimum disturbance to occupants, public and normal use of site (outside of delineated work and storage areas). Make arrangements with NCC Representative to facilitate execution of work.

2. Maintain access and exits.

3. Provide necessary barriers, warning lights and signs. Replace damaged existing and new signs and work with material and finish to match work of similar nature specified elsewhere in the Contract or to match the original in good condition if no similar work is specified.

1.13 Existing Utilities

1. Establish location, protect and maintain existing utilities.

2. Connect to existing utilities with minimum disturbance to pedestrian and vehicular traffic and only with the approval of the utility owner.

3. Power for construction is not available at the site. The Contractor shall arrange for and provide all power requirements necessary to complete the work.

1.14 Material and Equipment

1. Use new products unless otherwise specified.

2. Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

3. When material or equipment is specified by standard or performance specifications, upon request of the NCC Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.15 Inspection and Testing

1. The NCC Representative may employ an Inspection and Testing company to ensure work conforms with Contract Documents.

2. When initial tests and inspections reveal work not to Contract requirements, pay for additional tests and inspections required by NCC Representative on corrected work.

1.16 Fires

1. Burning any material or rubbish on site is not permitted.

1.17 Progress Photographs

1. As soon as work commences, take periodic progress electronic/digital photographs from four locations.

2. View points, which will best illustrate progress of work, will be selected by the NCC Representative.

3. Forward electronic photos to NCC Representative.

1.18 Datum

1. Elevations and soundings shown on Drawings are expressed in metres relative to the established bench mark.

1.19 Site Meetings

1. Site meetings will be held at a maximum interval of every two weeks, at a designated site (by the NCC Representative) unless otherwise directed by the NCC Representative.

2. Ensure that all key site personnel and a representative from the Contractor, who is designated to speak on behalf of the Contractor and can commit the Contractor to action and price, is present at the meetings.

1.20 Washroom Facilities

1. The Contractor shall supply an acceptable chemical toilet and locate as directed by the NCC Representative. The toilet shall be thoroughly cleaned at least once a week and shall be a minimum of 10 meters from the water.

2. No waste or chemicals will be allowed to stain or wet the ground or be washed by rain into the waterway. The Contractor will have a spill kit on site capable of preventing such an occurrence.

1.21 OPSS and OPSD

1. OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings are quoted in these specifications. Copies of these standards are not included in these documents but the latest editions will be considered to be an integral part of these specifications. Generally they are available online at http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage .

1.22 Protection of the Site

1. Prevent damage to any features of the site to remain (trees, structures, etc.). Modify operations, as directed by the NCC Representative, if the methods being used are considered to be detrimental to any site features to remain in place.

2. No works shall be undertaken in the water between the following dates: March 15 to July 15 in any year.

1.23 Measurement and Payment

1. No measurement for payment will be made for the work of this section. Payment shall be by lump sum under the item, “Mobilization and Construction Site Installation”.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Not Used

********** END OF SECTION **********

PART 1 - GENERAL

1.1 Work Covered by Contract Documents

.1 Work of this Contract comprises general landscape construction, electrical and lighting for the Land Entry, located at Richmond Landing in Ottawa.

1.2 Information to Bidders

.1 This section describes the general scope of work. The scope of work is general in nature, and is not to be considered exhaustive.

.2 The Contractor is responsible for supplying labour, equipment and services, and the supply, delivery and installation of materials required for the proper execution of the Contract.

.3 Contractual price payments are based on a lump sum and unit prices and will be compensated for all labour, services, equipment and materials necessary to fully complete, following pay items specified in tender forms of the Contract Documents.

.4 All unit prices must include labour, equipment and materials necessary to fully complete according to work items for each category listed. The unit price for each item listed included the payment of any related work that is not identified elsewhere in the tender document.

.5 Without limitation, each activity to contain all additional work as follows:

.1 Control of dust and smoke.
.2 Protection of facilities that remain.
.3 Protection of utilities and equipment.
.4 Reinstallation of disturbed structural elements or equipment affected by Contractor’s operations.
.5 Access to work areas.
.6 All costs associated with compliance to noise and vibration restrictions.
.7 Costs related to bids and permits.
.8 All costs associated with required steps.
.9 All costs associated with required traffic diversions.
.10 All costs for tests beyond those stipulated for in the Contract to be executed by the Owner.
.11 All costs associated with the disposal of materials removed from site and recycling in an environmentally sound manner, in full compliance with municipal, provincial and federal regulations and statutes.
.12 All costs associated with certified labourers, as required in the Contract.

.6 Indexes and References Numbers

.1 All index and reference numbers of tender form, plans, specifications etc., are shown only for the convenience of the Contractor and are to be

interpreted only as a general guide to sections of work. It is not to be assumed that index and reference numbers are the only means to refer to an item. Plans and specifications are to be read in detail as a whole.

.7 Description of Individual Tasks

.1 The scope of work is provided as general information only, for the convenience of the Contractor, and should therefore not be considered exhaustive. Any description of a specific task should be read in conjunction with the Contract Drawings. In the case of discrepancies between specifications and drawings, the bidder must assume the most costly option. Any work indicated on the Contract Drawings that is not listed, mentioned or described in the written provisions of the Contract or vice versa, will be considered included in both.

.8 Unit Price Table

.1 Quantities, as indicated in the unit price table, are intended to indicate to bidder the general importance of Work. For all work done in unit price, the Contractor will be paid for actual quantities measured at the unit price submitted in the Unit Price Table, subject to provisions of General Instructions.

.9 Measurement Procedures for Payment

.1 Measurement for payment for each item measured and identified in the Unit Price Table will be as shown in the Price Table.

.10 The contract price shall include sufficient allowance for expenses related to all probable and unforeseen site conditions at the time work to be executed. No payment will be made for claims based on site conditions varying from those assumed by the Contractor during the bidding period. For the purpose of this Contract, there are no hidden conditions because all components are accessible.

1.3 Landscape Architecture

.1 Related Sections

01 01 00	General Requirements
01 33 00	Submittal Procedures
01 35 13.43	Special Procedures for Contaminated Sites
01 35 30	Health and Safety
01 35 43	Environmental Procedures
01 45 00	Quality Control
01 52 00	Construction Facilities
01 74 11	Cleaning
02 41 13	Selective Site Demolition
03 10 00	Concrete Forming and Accessories
03 20 00	Concrete Reinforcing
03 30 00	Cast-In-Place Concrete
31 05 16	Aggregate Materials
31 11 00	Clearing and Grubbing
31 22 13	Rough Grading
31 23 33.01	Excavating, Trenching and Backfilling
31 32 19.01	Geotextiles

31 37 00 Rip-Rap and Stone work
32 11 16.01 Granular Sub-base
32 12 16.01 Asphalt Paving
32 37 00 Exterior Site Furnishings
32 91 19.13 Topsoil Placement and Grading
32 92 23 Sodding
32 03 10 Trees, Shrubs and Ground Cover Planting

.2 Summary of Paid Items as Listed in Price Table

.1 Landscape architecture work of this Contract consists of the construction of the land entry.

Basis of Payments

Payment at the price per item listed in the Unit Price Table shall be full compensation for all labour, services and equipment as well as the supply, delivery and installation of all materials required for the proper execution of this contract, as well as the maintenance, watering, and replacement of plant materials during the guaranty period.

.3 Pay Item Description

.1 Landscape and earthwork

.1 Mobilization and Construction Site Installations

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings and in the following sections 01 01 00 General Requirements, 01 35 30 Health and safety, 01 52 00 Construction Facilities, amongst others, including:

- Mobilisation/demobilisation of equipment, labour and materials.
- The installations of construction facilities, including field office, sanitary facilities,
- General instructions, schedules, shop drawings, temporary facilities, protection of public utilities, safety measures, coordination of subcontractor work and management of vehicle and pedestrian circulation.
- All work associated with the removal and relocation of signage.
- Installation of temporary barriers, fencing and all other protection measures and signage necessary to prevent users from accessing the work area and temporary storage.
- A plan for the bike path detour from Portage Bridge to the Ottawa River pathway, sealed and signed by a traffic engineer, following the preliminary sketch

illustrated on the plans and according to the NCC's Representative specifications.

- The construction of a temporary asphalt bicycle pathway, including temporary bollards, ramps, signage and lighting, as well as all other necessary works to maintain safe bicycle circulation for the duration of the site's construction work.
- Provide and install temporary access, platform access and all other accessories needed to complete work.
- Site rehabilitation after the work, including site leveling and sodding of all damaged area, especially in the storage areas.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item also covers all general requirements identified in the specifications, but is not necessarily subject to clarifications contained within specific items.

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table. This will be paid in an amount of equal value distributed over the entire length of the project.

.2 Erosion and Sediment Control and Environmental Procedures

.1 This item covers all general requirements relative to erosion and sediment control and all environmental protection measures, as indicated in the Contract Drawings, including:

- The Environmental Protection Plan as specified in section 01 35 43 Environmental Procedures, including the Erosion and sediment control plan.
- Supply and installation of sediment barriers (geotextile membranes and wooden stakes), where indicated on plans for control of sediments on land.
- Supply and installation of floating confinement barriers, where indicated on plans for control of sediments in the water.
- The barriers and protections must be securely installed and maintained throughout the work duration.
- All barriers and protections must be removed at the end of the project.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item also covers all requirements identified in the specifications and in section 01 35 43 Environmental

Procedures, even if not necessarily identified on the plans, and as required by the NCC representative.

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table. This will be paid at the end of the project, after the barriers have been removed.

.3 Tree and Vegetation Protection

.1 This item covers all general requirements relative to the protective fence, as indicated in the Contract Drawings, and specified in section 01 35 43 Environmental Procedures, including:

- Supply and installation of a 4 metres minimum diameter perimeter fence around drip line of exiting trees and vegetation areas. The 1.8 m high fence must be securely installed and maintained throughout the work duration.
- Individual protection of trees with wood planks (2.4 m height).
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table. This will be paid at the end of the project, after the fence has been removed.

.4 Clearing and Grubbing

.1 This item covers all requirements for clearing and grubbing, as indicated in the Contract Drawings, including:

- All work associated with the clearing and grubbing. The removal of trees and shrubs, bushes and existing vegetation, as indicated in the Contract Documents.
- All work associated with transportation off-site of waste material.
- All measures necessary to protect existing vegetation to be conserved.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table. This amount will be paid when the work has been completed.

.5 Demolition of Surfaces

.1 This item covers all requirements for removal and salvage of the items indicated in the demolition plan, including all work associated with:

- The removal of concrete surfaces and structures.
- The removal of asphalt surfaces.
- The removal of subgrade of demolished surfaces.
- The removal of granite curbs and rear border for reuse and disposal of the excess at NCC' Depot, at 1740 Woodroffe Avenue, Ottawa, Ontario K2G 3R8. Dates and hours: Monday to Friday between 7:00 a.m. and 11:00 a.m. Contact: Mr. Steven Clermont at 613 946-8713 (Woodroffe), or 239-5678 ext. 5065 (office) or 613 795-3301 (cellular) at least twenty-four hours prior to pick-up.
- The removal of granite cobblestones for reuse and disposal of the excess at NCC' Depot. Including shipping and handeling from site to the NCC' Depot.
- All work associated with transportation off-site of waste material, if not reusable.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table. This amount will be paid when the work has been completed.

.6 Excavation and Disposal of Contaminated Soils

.1 This item covers all the requirements for the excavation and disposal of contaminated soils as indicated in the Contract Drawings, including:

- Labour, supply of materials and transport off-site of excess materials.
- All work associated with the removal, transport and placement of dry materials as well as Class I blocks.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid per metric ton, according to the price listed in the Unit Price Table. This item will be paid upon receipt of bills of lading, dated and identified with the proper project name and number. The bills of lading must be compiled every day and given to the NCC Representative. Only bills of lading that are dated and identified with the proper project name and number will be paid.

.7 Fill and rough grading

.1 This item covers all the requirements for the installation and compaction of fill material as indicated in the Contract Documents, including:

- The supply of class B fill material, including transport to specific site locations as required.
- Labour and equipment for installation and compaction of fill material for the site's rough grading.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid per metric ton, according to the price listed in the Unit Price Table. This item will be paid upon receipt of bills of lading, dated and identified with the proper project name and number. The bills of lading must be compiled every day and given to the NCC Representative. Only bills of lading that are dated and identified with the proper project name and number will be paid.

.8 Asphalt Pathway

.3 This item includes the supply, installation, and all other related works required to complete the asphalt pathway as indicated in the Contract Drawings, including:

- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile fabric on the compacted sub-grade.
- Supply and installation of a 400 mm, Granular 'A' base material (0-19 mm crushed stone) in accordance with OPSS 1010, compacted in 150 mm layers to 95% maximum dry density as determined by Standard Proctor Density.
- Approval of base course by NCC representative prior to laying of asphalt layer.
- Supply and installation of a 50 mm asphalt surface course.
- Supply and installation of traffic paint for center line markings in 'Traffic Yellow' (for the Capital pathway only).
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.4 This item will be paid per square metre, according to the price listed in the Unit Price Table.

.9 Bench – Precast Concrete

.1 This item covers the supply and installation of precast concrete benches, as indicated in the Contract Drawings, including:

- Production of shop drawings, including placing, dimension and type of reinforcement, including finishes of exposed concrete surfaces.
- Fabrication of one (1) 300x 300 mm sample of concrete color and finish with antigraffiti coating for approval. Approved sample, color and finish will be used as reference.
- Shop fabrication of bench modules according to the dimensions specified in the Contract Drawing, using standard gray, 35 MPa at 28 days cast-in-place concrete, with a medium abrasive blasting finish for all exposed surfaces.
- Supply and installation in shop of a antigraffiti guard on all apparent concrete surfaces.
- Embedded conduits and junction boxes as per lighting / electrical plan.
- Transport of modules to the site.
- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile membrane.
- Supply and installation of Granular ‘A’ base material (0-19 mm crushed stone) in accordance with OPSS 1010, to depth indicated in the Contract Drawings, and compacted to 95% P.M..
- Formwork, reinforcing, and 30 MPa at 28 days cast-in-place concrete footing to dimensions indicated in the Contract Drawings.
- Assembly and anchoring on site, using galvanized steel anchor rods with epoxy resin.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid by metre according to the price included in the Unit Price Table.

.10 Bench – Corner Module

.1 This item covers the supply and installation of precast concrete corner bench modules, as indicated in the Contract Drawings, including:

- Production of shop drawings, including placing, dimension and type of reinforcement, including finishes of exposed concrete surfaces.

- Shop fabrication of bench modules according to the dimensions specified in the Contract Drawing, using standard gray, 35 MPa at 28 days cast-in-place concrete, with a medium abrasive blasting finish for all exposed surfaces.
- Supply and installation in shop of a antigraffiti guard on all apparent concrete surfaces.
- Embedded conduits and junction boxes as per lighting / electrical plan.
- Transport of modules to the site.
- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile membrane.
- Supply and installation of Granular ‘A’ base material (0-19 mm crushed stone) in accordance with OPSS 1010, to depth indicated in the Contract Drawings, and compacted to 95% P.M..
- Formwork, reinforcing, and 30 MPa at 28 days cast-in-place concrete footing to dimensions indicated in the Contract Drawings.
- Assembly and anchoring on site, using galvanized steel anchor rods with epoxy resin.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid in accordance with the unit rate listed in the Unit Price Table

.11 Wall – Cast-in-place Concrete

.1 This item covers the supply and installation of cast-in-place concrete walls, as indicated in the Contract Drawings, including:

- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile membrane.
- Supply and installation of drain and drainage material.
- Supply and installation of Granular ‘A’ base material (0-19 mm crushed stone) in accordance with OPSS 1010, to depth indicated in the Contract Drawings, and compacted to 95% P.M..
- Formwork, reinforcing, and 30 MPa at 28 days cast-in-place concrete footing to dimensions indicated in the Contract Drawings.

- Formwork, reinforcing, and 32 MPa at 28 days cast-in-place concrete wall to dimensions indicated in the Contract Drawings.
- Inner board pattern in formwork according to design and dimensions indicated in the Contract Drawings, Approval of formwork by NCC representative prior to pouring concrete.
- Supply and installation of a antigraffiti guard on all apparent concrete surfaces.
- Embedded conduits and junction boxes as per lighting / electrical plan.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid by metre according to the price included in the Unit Price Table.

.12 Staircase – Cast-in-place Concrete

.1 This item covers the supply and installation of cast-in-place concrete staircase, including steps and landings, as indicated in the Contract Drawings, including:

- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile membrane.
- Supply and installation of Granular ‘A’ base material (0-19 mm crushed stone) in accordance with OPSS 1010, to depth indicated in the Contract Drawings, and compacted to 95% P.M..
- Formwork, reinforcing, and 32 MPa at 28 days cast-in-place concrete staircase and landings to dimensions indicated in the Contract Drawings.
- Supply and installation of expansion joints at beginning and end of each landing (including 12 mm bituminous fiber board, rods, sleeves, sealant…) and control joints.
- Ridge finish at top of stairs, as indicated in the construction details and plans.
- Medium abrasive blasting finish for all apparent surfaces.
- Supply and installation of a antigraffiti guard on all apparent concrete surfaces.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.3 The lump sum listed in the Unit Price Table will be paid according the percentage of work advancement for this work.

.13 Concrete Ramp – Cast-in-place

.1 This item covers the supply and installation of a cast-in-place concrete ramp, as indicated in the Contract Drawings, including:

- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile membrane.
- Supply and installation of Granular 'A' base material (0-19 mm crushed stone) in accordance with OPSS 1010, to depth indicated in the Contract Drawings, and compacted to 95% P.M..
- Formwork, reinforcing, and 32 MPa at 28 days cast-in-place concrete to dimensions indicated in the Contract Drawings.
- Supply and installation of construction joints (including 13mm bituminous impregnated fiberboard, sealant, rods…) and control joints.
- Medium abrasive blasting finish for all apparent surfaces.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item is paid per square metre, according to the price listed in the Unit Price Table.

.14 Concrete Slab – Cast-in-place

.1 This item covers the supply and installation of a cast-in-place concrete slab, as indicated in the Contract Drawings, including:

- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile membrane.
- Supply and installation of Granular 'A' base material (0-19 mm crushed stone) in accordance with OPSS 1010, to depth indicated in the Contract Drawings, and compacted to 95% P.M..
- Formwork, reinforcing, and 32 MPa at 28 days cast-in-place concrete to dimensions indicated in the Contract Drawings.
- Supply and installation of construction joints (including 13mm bituminous impregnated fiberboard, sealant, rods…) and control joints.

- Medium abrasive blasting finish for all apparent surfaces.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.3 This item is paid per square metre, according to the price listed in the Unit Price Table.

.15 Salvaged Granite Curb

.1 This item covers the installation of granite curbs and granite rear borders salvaged from site, as indicated the Contract Drawings, including:

- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of a 150 mm, Granular ‘A’ base material (0-19 mm crushed stone) in accordance with OPSS 1010, compacted to 95% maximum dry density as determined by Standard Proctor Density.
- Formwork, reinforcing, and 30 MPa at 28 days cast-in-place concrete footing to dimensions indicated in the Contract Drawings.
- Installation of salvaged curbs and rear border, including cutting, drilling, and joints filling.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid by metre according to the price included in the Unit Price Table.

.16 Granite Cobblestone Pavers

.1 This item covers the installation of granite cobblestone pavers salvaged from site, as indicated in the Contract Drawings, including:

- Verification and adjustments of the sub-grade widths and grade levels as necessary.
- Supply and installation of non-woven geotextile fabric on the compacted sub-grade.
- Supply and installation of a 300 mm, Granular ‘A’ base material (0-19 mm crushed stone) in accordance with OPSS 1010, compacted in 150 mm layers to 95% maximum dry density as determined by Standard Proctor Density.
- Approval of base course by NCC representative prior to laying of pavers.
- Supply and installation of a 30 mm setting bedding of concrete sand.

- Installation of salvaged pavers, including cutting pavers, filling the joints with crushed granite, and cleaning the finished surface.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid by square metre according to the price included in the Unit Price Table.

.17 Individual Stone and stone alignment

.1 This item covers the supply and installation of rounded stones (approx. 1 m^3 in size), as indicated in the Contract Drawings.

.2 Supply a photograph of stones for approval by the NCC before transporting on site.

.3 This item includes installation and compaction for the base and final grading. And all other necessary work to complete the item, as specified to plans and technical specifications.

.4 This item will be paid in accordance with the unit rate listed in the Unit Price Table.

.2 Equipment and Furniture

.1 Waste Receptacle

.1 This item covers the supply and installation of the waste receptacle (model to be determined by NCC), including stainless steel anchor screws, and all other necessary work to complete the item, as indicated in the Contract Drawings.

.2 This item will be paid in accordance with the unit rate listed in the Unit Price Table.

.2 Handrail – for stairs

.1 This item covers the supply and installation of handrails, as indicated in the Contract Drawings, including:.

- Production of shop drawings, including dimensions according to finished elevations measured on site after staircase has been built, as well as stainless steel anchoring and hardware, and finishes, for approval.
- Shop fabrication of galvanized steel handrails(no paint finish).
- Connection with conduits and junction boxes as per lighting / electrical plan.
- Transport of handrails to the site.

- Installation and adjustments on site. No welding on site is permitted. All welding must be done in the shop and all welded parts must be galvanized.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid by metre according to the price included in the Unit Price Table.

.3 Handrail – for ramp

.1 This item covers the supply and installation of handrails, as indicated in the Contract Drawings, including:.

- Production of shop drawings, including dimensions according to finished elevations measured on site after staircase has been built, as well as stainless steel anchoring and hardware, and finishes, for approval.
- Shop fabrication of galvanized steel handrails(no paint finish).
- Connection with conduits and junction boxes as per lighting / electrical plan.
- Transport of handrails to the site.
- Installation and adjustments on site. No welding on site is permitted. All welding must be done in the shop and all welded parts must be galvanized.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid by metre according to the price included in the Unit Price Table.

.4 Armrest – for concrete bench

.1 This item covers the supply and installation of armrests on the concrete benches, as indicated in the Contract Drawings, including:.

- Production of shop drawings, including dimensions according to construction details, as well as stainless steel anchoring and hardware, and finishes, for approval.
- Shop fabrication of galvanized steel armrest (no paint finish).
- Transport of armrest to the site.
- Installation and adjustments on site. No welding on site is permitted. All welding must be done in the shop and all welded parts must be galvanized.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid in accordance with the unit rate listed in the Unit Price Table.

.3 Planting

.1 Shrub Planting

.1 This item covers the supply, installation, and all other related works required for shrub planting as indicated the Contract Documents, including:

- Supply and planting of shrubs, including plant placement approval by NCC representative.
- Supply and installation of a 500 mm layer of type A3 soil and mycorrhiza.
- Supply and installation of a 50 mm layer of Nimcompoop mulch composed of a mixture of compost, manure and straw, no wood, (or approved equivalent).
- Maintenance and warranty for all plants over a period of two years, including watering, removal and replacement of dead plants, pruning, as well as all related operations necessary for the growth and health of plants.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid in accordance with the unit rate listed in the Unit Price Table. Progress payments of the unit price specified in tender form will be made according to the following breakdown:

- 80% for supply and installation.
- 10% at the end of the first year.
- 10% at the end of second year – final approval.

.2 Perennial Planting

.1 This item covers the supply, installation, and all other related works required for perennial planting as indicated the Contract Documents, including:

- Supply and planting of perennials, including plant placement approval by NCC representative.
- Supply and installation of a 500 mm layer of type A3 soil and mycorrhiza.
- Supply and installation of a 50 mm layer of Nimcompoop mulch composed of a mixture of compost, manure and straw, no wood, (or approved equivalent).
- Maintenance and warranty for all plants over a period of two years, including watering, removal and replacement of dead plants, pruning, as well as

all related operations necessary for the growth and health of plants.

- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid in accordance with the unit rate listed in the Unit Price Table. Progress payments of the unit price specified in tender form will be made according to the following breakdown:

- 80% for supply and installation.
- 10% at the end of the first year.
- 10% at the end of second year – final approval.

.3 Tree Planting

.1 This item covers the supply, installation, and all other related works required for tree planting as indicated the Contract Documents, including:

- Supply and planting of trees, including tree placement approval by NCC representative.
- Supply and installation of type A2 soil (2000 x 2000 x height of tree ball) and mycorrhiza.
- Supply and installation of and a 80 mm layer of Nimcompoop mulch composed of a mixture of compost, manure and straw, no wood, (or approved equivalent).
- Maintenance and warranty for all plants over a period of two years, including watering, removal and replacement of dead plants, pruning, as well as all related operations necessary for the growth and health of plants.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid in accordance with the unit rate listed in the Unit Price Table. Progress payments of the unit price specified in tender form will be made according to the following breakdown:

- 80% for supply and installation.
- 10% at the end of the first year.
- 10% at the end of second year – final approval.

.4 Bulb Planting

.1 This item covers the supply, installation, and all other related works required for bulb planting as indicated the Contract Documents, including:

- Supply and planting of bulbs placed randomly in the indicated area. Approval of NCC Representative before planting.
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item will be paid in accordance with the unit rate listed in the Unit Price Table. Progress payments of the unit price specified in Unit Price Table will be made according to the following breakdown:

- 80% for supply and installation
- 10% at the end of the first year
- 10% at the end of second year – final approval

.5 Sodding

.1 This item covers the supply, installation, and all other related works required for sodding as indicated the Contract Documents, including:

- Supply and installation of 150 mm of type A1 soil and final grading to indicated elevations.
- Supply and installation of sod. TWCA grade (drought resistant).
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 Submitted price will also include watering and maintenance until satisfactory establishment of grassed areas, and after the new lawn area has been mowed twice, as described in the Contract documents.

.3 This item will be paid by square metre according to the price included in the Unit Price Table. Progress payments of the price specified in the Unit Price Table will be made according to the following breakdown:

- 60% for supply and installation.
- 40% for satisfactory watering and maintenance, until the grassed area are deemed fully established.

1.4 Lighting

.1 Related Sections

26 50 00 Lighting Equipment

.2 Summary of Paid Items as Listed in Price Table

1. Work of this Contract comprises lighting and controls equipment installation at the Land Entry located at Richmond Landing in Ottawa
2. The scope of the lighting work includes the supply and installation of the specified lighting equipment, including all related electrical work. See section 26 50 00 LIGHTING EQUIPMENT for the lighting equipment specification.

   This work is to include:
3. concrete footing/base work for installation of types L1, L2a,L2b, L2c, L2d bollards, L4a, and relocated L6 Core park light pole fixtures per electrical and lighting drawings
4. supply of all electrical and lighting equipment required for installation according to design and specification documents, and current electrical codes and compliant best practices
5. installation of all fixture types specified in quantities and locations identified on I series Lighting drawings
6. commissioning support with manufacturer/manufacturer's sales rep, and lighting designer, to establish final settings for any lighting control devices, including photocells, timers, and dimming devices

Basis of Payments

Payment at the price per item listed in the Unit Price Table shall be full compensation for all labour, services and equipment as well as the supply, delivery and installation of all materials required for the proper execution of this contract, as well as replacement of materials during the guaranty period.

.3 Pay Item Description

.1 L1 Fixture

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Provision of any hardware or accessories, specified or necessary, for the proper durable and compliant installation of the electrical infrastructure and lighting equipment, mechanically and electrically
- All site work associated with the necessary electrical infrastructure for the equipment
- Site rehabilitation, re-instated to same or per landscape design and specifications, post installation of the electrical infrastructure and lighting equipment
- Any required materials to ensure water-tightness and durability of installation, to benefit long-term integrity and maintenance of installed infrastructure and equipment
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item consists of the supply and installation of all materials, labour and equipment required to install and commission and dim to desired lighting intensity

.3 This item will be paid by linear metre according to the price included in the Unit Price Table.

.2 L2a (IP66) Fixture

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- All site work associated with bringing the necessary electrical infrastructure to the lighting fixture location
- Excavation, fill, compaction, and pouring of base onto which the lighting fixture will attach, mechanically and electrically
- Site rehabilitation after the trenching and excavation work, to re-instate to same before condition, or new condition per landscaping design and specifications
- Provision of any hardware or accessories, specified or necessary, for the proper durable and compliant installation of the electrical infrastructure and lighting equipment, mechanically and electrically
- Any required materials to ensure water-tightness and durability of installation, to benefit long-term integrity and maintenance of installed infrastructure and equipment

- And all other necessary work to complete the item, as specified to plans and technical specifications

.2 This item consists of the supply of all materials, labour and equipment required to prepare the site, dig for and pour the footings, and install all necessary electrical infrastructure and mechanical attachments for installation of the lighting fixture

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.3 L2b (IP66) Fixture

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- All site work associated with bringing the necessary electrical infrastructure to the lighting fixture location
- Excavation, fill, compaction, and pouring of base onto which the lighting fixture will attach, mechanically and electrically
- Site rehabilitation after the trenching and excavation work, to re-instate to same before condition, or new condition per landscaping design and specifications
- Provision of any hardware or accessories, specified or necessary, for the proper durable and compliant installation of the electrical infrastructure and lighting equipment, mechanically and electrically
- Any required materials to ensure water-tightness and durability of installation, to benefit long-term integrity and maintenance of installed infrastructure and equipment
- And all other necessary work to complete the item, as specified to plans and technical specifications

.2 This item consists of the supply of all materials, labour and equipment required to prepare the site, dig for and pour the footings, and install all necessary electrical infrastructure and mechanical attachments for installation of the lighting fixture

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.4 L2c (IP66) Fixture

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- All site work associated with bringing the necessary electrical infrastructure to the lighting fixture location
- Coordinated site work with all contractors for the proper durable, and compliant electrical infrastructure and mechanical attachment of light fixture atop the wall, per

fixture location and design drawings and specifications
- Site rehabilitation in coordination with contracting team, to re-instate to same before condition, or new condition per landscaping design and specifications
- Any required materials to ensure water-tightness and durability of installation, to benefit long-term integrity and maintenance of installed infrastructure and equipment
- And all other necessary work to complete the item, as specified to plans and technical specifications

.2 This item consists of the supply of all materials, labour and equipment required to prepare the site, dig for and pour the footings, and install all necessary electrical infrastructure and mechanical attachments for installation of the lighting fixture

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.5 L2d (IP66) Fixture

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- All site work associated with bringing the necessary electrical infrastructure to the lighting fixture location
- Coordinated site work with all contractors for the proper durable, and compliant electrical infrastructure and mechanical attachment of light fixture atop the wall, per fixture location and design drawings and specifications
- Site rehabilitation in coordination with contracting team, to re-instate to same before condition, or new condition per landscaping design and specifications
- Any required materials to ensure water-tightness and durability of installation, to benefit long-term integrity and maintenance of installed infrastructure and equipment
- And all other necessary work to complete the item, as specified to plans and technical specifications

.2 This item consists of the supply of all materials, labour and equipment required to prepare the site, dig for and pour the footings, and install all necessary electrical infrastructure and mechanical attachments for installation of the lighting fixture

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.6 L4a Fixture

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Provision of any hardware or accessories, specified or

necessary, for the proper durable and compliant installation of the electrical infrastructure and lighting equipment, mechanically and electrically
- Integration of necessary electrical infrastructure and lighting equipment into their mounting locations
- Site rehabilitation, re-instated to same or per landscape design and specifications, post installation of the electrical infrastructure
- Any required materials to ensure water-tightness and durability of installation, to benefit long-term integrity and maintenance of installed infrastructure, equipment, and attachment locations
- And all other necessary work to complete the item, as specified to plans and technical specifications.

.2 This item consists of the supply and installation of all materials, labour and equipment required to install and commission and dim to desired lighting intensity

.3 This item will be paid by linear metre according to the price included in the Unit Price Table.

.7 L6 Fixture

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Removal and electrical disconnection of ‘Core park lights’ from their existing locations
- Transportation of surplus park lights, not required for site relocation as Type L6, to NCC storage facility, per project manager direction at time of removal
- Decommission existing fixture type LS locations and investigate electrical integrity for potential upgrade and extension to new fixture locations
- All site work required to decommission existing pole bases and cover or integrate effectively into new landscaping design and specifications
- All site work associated with bringing/extending the necessary electrical infrastructure to the new lighting fixture location
- Excavation, fill, compaction, and pouring of new base onto which the lighting fixture will attach, mechanically and electrically
- Site rehabilitation after the trenching and excavation work, to re-instate to same before condition, or new condition per landscaping design and specifications
- Provision of any hardware or accessories, specified or necessary, for the proper durable and compliant installation of the electrical infrastructure and lighting equipment, mechanically and electrically

- Any required materials to ensure water-tightness and durability of installation, to benefit long-term integrity and maintenance of installed infrastructure and equipment
- And all other necessary work to complete the item, as specified to plans and technical specifications

.2 This item consists of the supply of all materials, labour and equipment required to decommission existing fixture locations, prepare the site, dig for and pour footings at new locations, and install all necessary electrical infrastructure and mechanical attachments for installation of the allocated existing lighting fixtures at these new locations

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.8 NEMA 3R Electrical Cabinet

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Supply and Installation
- Integration with any other lighting control devices for the site, as required, including dimmers, photocells, and timers for on/off control and schedules

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.9 250W Strip heater (for NEMA 3R electrical cabinet)

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Supply and Installation within electrical cabinet, at required distances from other equipment

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.10 Room Controller (within NEMA 3R electrical cabinet)

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Supply and Installation within electrical cabinet, at required distances from other equipment
- Integration with any other lighting control devices for the site, as required, including dimmers, photocells, and timers for on/off control and schedules

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.11 Astronomical Timeclock (within NEMA 3R electrical cabinet)

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Installation within electrical cabinet and commissioning settings of dimmer, with support from manufacturer/manufacturer's agent, per desired light fixture intensity and any other on/off/dim schedules as required by designer or client
- Integration with any other lighting control devices for the site, as required, including dimmers for on/off control and schedules

.2 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

.12 Phase adaptive Dimmer (ELV)

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, including:

- Installation and commissioning settings of dimmer, with support from manufacturer/manufacturer's agent, per desired light fixture intensity and any other on/off/dim schedules as required by designer or client
- Integration with any other lighting control devices for the site, as required, including room controller, and astronomical timers for on/off control and schedules

.2 This item consists of the supply of all materials, labour and equipment required to fully commission the dimmers per final on site preferred intensity and schedule control of the corresponding light fixtures

.3 This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table.

1.5 Electrical

.1 Related Sections

26 05 00	Common Work Results for Electrical
26 05 02	Electrical Basic Materials and Method
26 05 34	Conduits Conduit Fastening and Fittings

.2 Summary of Paid Items as Listed in Price Table

.1 Work of this Contract comprises electrical construction at the Land Entry.

Basis of Payments

Payment at the price per item listed in the Unit Price Table shall be full compensation for all labour, services and equipment as well as the supply, delivery and installation of all materials required for the proper execution of this contract, as well as replacement of materials during the guaranty period.

.3 Pay Item Description

.1 Hand hole (E27 – NCC)

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106 and 602.

.2 Payment at the Contract price for this item corresponding to a per unit sum listed in the Unit Price Table shall be full compensation for all labour, Equipment, and Material to do the work.

.2 Rigid Duct, Direct Buried

.2 This item covers all general requirements relative to the project including

- two different sizes of duct (25mm and 50mm), as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106 and 603.

.2 Payment at the Contract price for this item corresponding to a per metre sum listed in the Unit Price Table shall be full compensation for all labour, equipment and material to do the work.

.3 Low Voltage Cable, in Duct

.1 This item covers all general requirements relative to the project including:

- two different gauges of low voltage wiring (1/C #6 LV AWG and 1/C #10 LV AWG), as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106 and 604.

.2 Payment at the Contract price for this item corresponding to a per metre sum listed in the Unit Price Table shall be full compensation for all labour, Equipment, and Material to do the work.

.4 Ground Wires

.1 This item covers all general requirements relative to the project including:

- two type of ground wire (1/C #6 AWG insulated and 1/C #6 AWG bare), as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106 and 609.

.2 Payment at the Contract price for this item corresponding to a per metre sum listed in the Unit Price Table (per metre) shall be full compensation for all labour, Equipment, and Material to do the work.

.5 Ground Electrodes

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106 and 609.

.2 Payment at the Contract price for this item corresponding to a per unit sum listed in the Unit Price Table shall be full compensation for all labour, Equipment, and Material to do the work.

.6 Embedded Electrical Work

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106, 602, 603, 604.

.2 Payment at the Contract price for this item corresponding to a lump sum listed in the Unit Price Table shall be full compensation for all labour, Equipment, and Material to do the work. This will be paid in an amount of equal value distributed over the entire length of the project.

.7 Power Supply Modification

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106 and 614.

.2 Payment at the Contract price for this item corresponding to lump unit sum listed in the Unit Price Table shall be full compensation for all labour, Equipment, and Material to do the work. This item is subject to payment based on a price corresponding to a lump sum listed in the Unit Price Table. This will be paid in an amount of equal value distributed over the entire length of the project.

.8 Wood Post Mounted PVC Box

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106, 602, 603 and 604.

.2 Payment at the Contract price for this item corresponding to a lump sum listed in the Unit Price Table shall be full compensation

for all labour, Equipment, and Material to do the work. This will be paid in an amount of equal value distributed over the entire length of the project.

.9 GFCI Duplex Receptacle in Enclosure

.1 This item covers all general requirements relative to the project, as indicated in the Contract Drawings, specifications, and as per Ontario Provincial Standard specification 106, 602, 603, 604 and 614.

.2 Payment at the Contract price for this item corresponding to a lump sum listed in the Unit Price Table shall be full compensation for all labour, Equipment, and Material to do the work. This will be paid in an amount of equal value distributed over the entire length of the project.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 – EXECUTION

3.1 Not Used

END OF SECTION

PART 1 - GENERAL

1.1 Administrative

.1 Submit to NCC 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 Do not proceed with Work affected by submittal until review and approval is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission. 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.

.6 Notify NCC Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by NCC Representative's review and approval of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by NCC Representative’s review and approval.

.10 Keep one reviewed and approved copy of each submission on site.

1.2 Shop drawing 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 Shop drawings for concrete structures must be stamped and signed by a registered professional engineer.

.3 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.

.4 Allow 10 days for NCC Representative's review of each submission.

.5 Adjustments made on shop drawings by NCC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to NCC Representative prior to proceeding with Work.

.6 Make changes in shop drawings as NCC Representative may require, consistent with Contract Documents. When resubmitting, notify NCC Representative in writing of revisions other than those requested.

.7 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.

.8 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.
  - .11 Soumettre les dessins et fiches sur support électronique de type PDF.

.9 Supplement standard information to provide details applicable to project.

.10 If upon review by NCC Representative, no errors or omissions are discovered or if only minor corrections are made, drawings will be returned and fabrication and installation of Work may proceed as noted on the reviewed shop drawings. 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.

1.3 Samples

.1 Submit for review and approval samples as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to NCC Representative's business address.

.3 Notify NCC Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture are specified, submit full range of samples.

.5 Adjustments made on samples by NCC Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to NCC Representative prior to proceeding with Work.

.6 Make changes in samples which NCC Representative may require, consistent with Contract Documents.

.7 Reviewed and approved samples will become standard of workmanship and material.

1.4 Photographic Documentation

.1 The Contractor is responsible for taking pictures of existing site conditions before starting work on site. Submit photos to NCC Representative in JPEF format.

1.5 Mock-ups

.1 Erect mock-ups in accordance with Section 01 45 00 – Quality Control

.2 Mock-ups: field-erected example of work complete with specified materials and workmanship.

.3 Erect mock-ups at locations acceptable to NCC Representative.

.4 Reviewed and approved mock-ups will become standards of workmanship and material against which installed work will be verified.

1.6 Certificate of Conformance

.1 Submit Certificates of Conformance to the NCC Representative, stating that the component(s) has been installed in conformance with the approved shop drawings. The Certificate of Conformance must bear the seal and signature of a Professional Engineer licensed in the province of Ontario.

.2 Certificates of Conformance required as specified elsewhere in the Contract Documents.

1.7 Procedures

.1 Provide procedures required as specified in the Contract documents or as directed by the NCC Representative.

1.8 Other Submissions

.1 Provide a construction schedule and cash flow forecasts updated every month.

.2 Provide all other submissions as required by law and the Contract documents.

PART 2 - PRODUCTS

1.9 Materials

.1 Meet or exceed specified provincial standards using only materials that are approved for use in Ministry of Transportation Ontario (MTO) construction projects. Demonstrate in writing that each product meets or exceeds provincial requirements.

PART 3 - EXECUTION

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

1. Section 31 23 33.01 Excavating, Trenching and Backfilling.

1.2 References

.1 Transportation and Dangerous Goods Act (1999).

.2 Ontario Environmental Protection Act and related Regulations, including O. Reg. 387/04 for Water Taking; O.Reg. 347 – General Waste; O.Reg 153 – Record of Site Condition, or other as may be applicable.

.3 Canadian Environmental Protection Act.

.4 Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects, Ministry of Transportation Ontario.

.5 Ontario Provincial Standard Specification for Temporary Erosion and Sediment Control; the Management of Excess Material or other as may be applicable.

.6 Canadian Council of Ministers of the Environment guidelines and procedures.

.7 City of Ottawa Sewer Use By-law (No. 2003-514).

.8 United States Environmental Protection Agency, Environmental Protection Technology Series. Guidelines for Erosion and Sediment Control Planning and Implementation.

1.3 Action and Information Submittals

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit, prior to start of work, with sufficient time (a minimum of two weeks) to allow review and approval before site work is initiated, the Environmental Protection Plan as specified in section 01 35 43 Environmental Procedures.

.3 Submit, prior to start of work, with sufficient time (a minimum of two weeks) to allow review before site work is initiated, the Soil Removal and Management Plan, including equipment decontamination and soil tracking plan (note that control of equipment access to contaminated excavation area is acceptable as part of the decontamination plan).

.4 As work progresses, submit the following documentation of site activities:

.1 Copies of transport manifests, trip tickets, and disposal receipts for waste materials removed from work area.
.2 Weekly copies of site entry and work area logbooks with information on worker and visitor access.
.3 Traffic management measures with control of ingress and egress from work area at contaminated soil excavation.
.4 Documentation of regular inspection of equipment and materials storage and staging and environmental protection measures.

1.4 Regulatory Requirements

.1 Provide erosion and sediment control in accordance with federal and provincial regulations to ensure that no solids are transmitted to waterways or to a clean area of the site.

.2 Comply with federal, provincial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish. In particular, the Contractor shall ensure that no contamination, waste or other substances which may be detrimental to aquatic life or quality of water shall enter the watercourse as either direct or indirect result of construction.

1.5 Sequencing and Scheduling

.1 Do not commence Work involving contact with potentially contaminated materials until site layout and all protection plans are approved by NCC Representative.

1.6 Regulatory Review

.1 Various regulatory agencies having jurisdiction over the project and area may request access to the site during construction and the Contractor shall provide easy access and meet the requirements of those agencies without delay.

1.7 Soil Stockpiling Facilities

.1 Where possible, avoid requirement for soil stockpiling and manage excavation to ensure stockpiles are not required for long duration. Provide, maintain, and operate storage/stockpiling areas as required, in manner consistent with Environmental Protection Plan.

.2 Incorporate liners into proposed stockpile locations to prevent contact between stockpile material and ground. Equip facility with tarps capable of covering stockpiled material until material can be removed off site.

1.8 Vehicular Access and Parking

.1 Maintenance and Use:

.1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by NCC Representative; transport and dispose of at appropriate off-site disposal facility. Clean access roads as required.

.2 NCC Representative may collect soil samples for chemical analyses from traveling surfaces of constructed and existing access routes prior to, during, and upon completion of Work. Excavate and dispose of clean soil contaminated by Contractor's activities at no additional cost to NCC.

1.9 Pollution Control

.1 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations, as specified in Section 01 35 43 Environmental Procedures.

1.10 Equipment Decontamination

.1 Prior to commencing work involving equipment contact with potentially contaminated materials, include decontamination procedures in Soil Removal and Management Plan to ensure that contaminants are not tracked beyond the excavation area. This may include, control of equipment that enters the excavation area, equipment washing areas, truck tire washing and dust control on local access routes.

.2 Provide, operate, and maintain suitable equipment and labour to ensure plan is effectively implemented.

.3 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.

.4 During equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated water generated. Use water or steam for decontamination as appropriate and as approved by NCC Representative. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent. Air dry equipment away from contaminant excavation, in designated area before removing from site or travelling on clean areas.

.5 Take appropriate measures necessary to minimize drift of mist and spray during decontamination including provision of wind screens.

.6 Collect decontamination wastewaters and sediments which accumulate from equipment decontamination and dispose of in accordance with municipal regulations and permits, as applicable.

.7 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields, in accordance with the Contractors Site-specific Health and Safety Plan.

1.11 Water Control

.1 Prepare and submit a Surface Water and Groundwater Management Plan for review and approval by NCC. Do not proceed with Work affected by submittal until review and approval is complete. Plan must consider contaminants identified in soil and groundwater as documented in Environmental Reports provided by NCC.

.2 Do not proceed with Work affected by submittal until review and approval is complete.

.3 Prevent surface water runoff from puddling in the work are and from leaving work areas. Grade site to drain in manner described in Erosion and Sediment Control Plan.

.4 Do not discharge decontamination water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off site or to municipal sewers except in accordance with permits.

.5 Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable liner during periods of work stoppage including at end of each working day and when inclement weather is forecast.

.6 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.

.7 Control surface drainage including ensuring that gutters are kept open, water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.

.8 Dispose of water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.

.9 Provide, operate, and maintain necessary equipment appropriately sized to control water in work areas.

1.12 Dewatering

1. If dewatering is required based on construction methods, apply for, obtain and follow a Permit to Take Water issued by the Ministry of the Environment and Climate Change and any other acts and regulations.

1.13 Erosion and Sediment Control

.1 Plan and execute construction by methods to control surface drainage from cuts and fills, from stockpiles, staging areas, and other work areas to be implemented and maintained at all times. Prevent erosion and sedimentation in accordance with approved Sediment and Erosion Control Plan as specified in Section 01 35 43 Environmental Procedures.

.2 Progress Cleaning

.3 Maintain cleanliness of Work and surrounding site to comply with federal, provincial, and local fire and safety laws, ordinances, codes, and regulations.

.4 Co-ordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.14 Final Decontamination

.1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.

.2 Remove surplus materials, non-contaminated waste, litter, debris and temporary facilities from site.

.3 Do not burn or bury rubbish and waste materials on site.

.4 Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

.5 Minimize generation of waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Not Used

********** END OF SECTION **********

PART 1 - GENERAL

1.1 References

1. Canadian Standards Association (CSA):
    1. CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures.

2. National Building Code 2015 (NBC):
    1. Division B, Part 8 Safety Measures at Construction and Demolition Sites

3. National Fire Code 2015 (NFC):
    1. NFC 2015, division B, Part 2 Emergency Planning, subsection 2.8.2 Fire Safety Plan.

4. Province of Ontario:
    1. Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended, Reg. 834, 0. Reg. 278/05 (Asbestos - Construction).
    2. Workplace Safety and Insurance Act, 1997
    3. Municipal statutes and authorities.

5. Fire Commissioner of Canada (FCC):
    1. FC-301 Standard for Construction Operations, June 1982.

    2. FC-302 Standard for Welding and Cutting, June 1982.

6. Canadian Labour Code Part 2.

1.2 Submittals

1. Make submittals in accordance with Sections 01 01 00 and 01 33 00.

2. Submit site-specific Health and Safety Plan: Within 5 days after date of Award of Contract and prior to commencement of Work. Health and Safety Plan must include:
    1. Results of site specific safety hazard assessment.
    2. Results of safety and health risk or hazard analysis for site tasks and operations.
    3. Measures and controls to be implemented to address identified safety hazards and risks.
    4. Contractor's and Sub-contractors' Safety Communication Plan.
    5. Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during

emergency situations, including evacuating injured personnel from the site and areas of limited or special access such as height.

3. NCC Representative will review Contractor's site-specific Health and Safety Plan and may provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to NCC Representative within 5 days after receipt of comments from NCC Representative.

4. NCC Representative's review of Contractor's final Site Specific Health and Safety Plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction site health and safety.

5. Submit records of Contractor's Safety Meetings at site meetings.

6. Submit 1 copy of the Contractor's authorized representative's work site health and safety inspection reports to NCC Representative when requested.

7. Submit copies of reports or directions issued by safety inspectors of authority having jurisdiction.

8. Submit copies of near-miss, incident, and accident reports, and/or confirmation monthly that no incidents have occurred.

9. Submit Material Safety Data Sheets (MSDS) for all products and items used on site to Departmental Representative.

10. Submit names of personnel and alternates responsible for site safety and health.

11. Submit Workplace Safety and Insurance Board (WSIB), Experience Rating Report for Province of Ontario.

1.3 Filing of Notice

1. File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 Safety Assessment

1. Perform site specific safety hazard assessment, related to project, identifying all potential hazards that may affect workers or the public, particularly related to but not limited to contaminants present in soil and groundwater as identified in Environmental Reports as provided by NCC.

1.5 Meetings

1. Pre-construction meeting: schedule and administer Health and Safety meeting with NCC Representative prior to commencement of work.

1.6 Regulatory Requirements

1. Comply with Acts and regulations of Canada and the Province of Ontario.

2. Comply with specified standards and regulations to ensure safe operations at site.

3. In event of conflict between any provisions of specified standards and regulations, the most stringent provision governs.

1.7 Project Site Conditions

1. Work at the site will also involve:
    1. A Hazard Assessment and listing of designated substances on site such as contaminated soils.
    2. Contact with silica/dust in Concrete.
    3. Work near water.
    4. Ice (depending on timing of construction activities).
    5. Work near utilities including overhead utilities.

1.8 General Requirements

1. Develop an independent written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until after final demobilization from site. Health and Safety Plan must address project specifications.

2. Relief from or substitution for any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan shall be submitted to NCC Representative in writing. NCC Representative will respond in writing, where deficiencies are noted and request resubmission with correction of deficiencies either accepting or requesting improvements.

1.9 Responsibility

1. Be responsible for safety of persons and property on site and for protection of environment to extent that they may be affected by conduct of Work.

2. Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

3. The Contractor shall be designated "Constructor", as defined by Ontario Act.

1.10 Compliance Requirements

1. Comply with Ontario Occupational Health and Safety Act, R.S.O., 1990 Chapter 0.1, as amended.

1.11 Unforeseen Hazards

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

2. Follow procedures in place for Employees Right to Refuse Work as specified in the Act for the Province of Ontario and Canada Labour Code Part 2.

1.12 Health and Safety Coordinator

1. Employ and assign to Work, competent and authorized representative as Health and Safety Coordinator. Health and Safety Coordinator must:
    1. Have site-related working experience specific to activities associated with remediation of contaminated soil.
    2. Have working knowledge of occupational safety and health regulations.
    3. Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
    4. Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
    5. Be on site during execution of Work and report directly to site supervisor.

1.13 Posting of Documents

1. Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with NCC Representative.
    1. Contractor's Safety Policy.
    2. Constructor's Name.
    3. Notice of Project.
    4. Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members.
    5. Ministry of Labour Orders and reports.
    6. Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
    7. Address and phone number of nearest Ministry of Labour office.
    8. Material Safety Data Sheets.
    9. Written emergency Response Plan.
    10. Site Specific Safety Plan.
    11. Copy of Valid certificate of first aid personnel on duty.
    12. WSIB "In Case of Injury At Work" poster.
    13. Location of toilet and cleanup facilities.
    14. Any special handling or procedures specific to the site.

2. Comply with Provincial general posting requirements.

1.14 Correction of Non-Compliance

1. Immediately address health and safety non-compliance issues identified by NCC Representative and regulatory agency having jurisdiction in the Province or any individual who notes a safety related issue.

2. Provide NCC Representative with written report of action taken to correct non-compliance of health and safety issues identified.

3. NCC Representative may stop Work if a perceived non-compliance of health and safety regulations is perceived to not be immediately corrected.

1.15 Work Stoppage

1. Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

2. Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. NCC Representative or, their designates, may also stop Work for health and safety considerations.

PART 2 - PRODUCTS

2.1 Not Used

PART 3 - EXECUTION

3.1 Not Used

********** END OF SECTION **********

PART 1 - GENERAL

1.1 References

.1 Definitions:

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

.2 Jurisdiction, enforcement, notification and incident reporting:

.1 Comply with conditions of any permits issued by the Ministry of Natural Resources, Ministry of Environment and Climate Change or the applicable Conservation Authority in Ontario.

.2 Comply with conditions of permit obtained by the NCC from the Municipality having jurisdiction as well to law, rules, and dispositions related to environmental permitting.

.3 A copy of all obtained permits as well as all documents required to execute the work (i.e. drawing and specification) shall be available on site at all times during construction so that anyone (foreman, inspector, etc.) can consult them.

.4 Comply with mitigation measures stipulated by the Department of Fisheries and Oceans (DFO) see following sections for the protection of fish and fish habitat.

.5 Contractor shall be liable for penalties imposed by local, provincial and/or federal authorities if Contractor does not enforce all required environmental mitigation clauses and measures required by law or the regulations of these authorities.

.6 In the event that archeological resources or human remains are discovered during the project, all works at this location must be suspended and the Project Manager and Ian Badgley, NCC Heritage Program archeologist (613-239-5678 ext. 5751 or ian.badgley@ncc-ccn.ca) must be contacted immediately. Works cannot be resumed until the appropriate measures for the protection of these resources or remains have been put in place.

.7 In the event of a spill or other environmental emergency Contractor will immediately report the incident to the 24H NCC emergency number (613-239-5353) and to the NCC Project Manager.

1.2 Action and Information Submittals

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

.2 Prior to commencing construction activities or delivery of materials to site, provide Environmental Protection Plan for review and approval by NCC Representative.

.3 Ensure Environmental Protection Plan includes comprehensive overview of known or potential environmental issues to be addressed during construction.

.4 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.5 Include in Environmental Protection Plan:

.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.

.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.

.3 Names and qualifications of persons responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations. The contractor must avoid the spilling of suspended materials into water bodies. Berms, anti-erosion fences and other management tools conforming to the contractor's work methods, must be installed in the appropriate locations in order to maintain turbidity at the minimum required by regulating authorities and governmental organizations. At a minimum the following Erosion and Sediment Control measures must be implemented:

a. Limit the surface area of exposed soil
b. Revegetate exposed areas as soon as possible
c. Ensure the temporary protection of any exposed slopes of 3H: 1V or steeper, or of three meters and higher, with plastic materials or mulches approved by the Project Manager.
d. Install a filtrating material in between the cover and frame of all collector basins and manholes that could be impacted by sediment from the work site.
e. Install barriers and fencing along shorelines, ditches and wetlands, in accordance with the Erosion and Sediment Control Plan.
f. Install a sediment barrier which delineates the culvert installation area in order to preserve water quality in wetlands.
g. Install support mechanisms in order to ensure soil stability and to avoid any risk of landslides.
h. Interventions on fragile surfaces, slopes or areas susceptible to erosion should be limited.
i. An anti-erosion fence should be installed around the perimeter of all excavated soil. All excavated soil should be stored outside of floodplains in areas approved by the NCC Project Manager.

j. Erosion and Sediment Control measures must be inspected, maintained and repaired on a weekly basis and after any rainfall event.

.6 Drawings showing locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Ensure plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Ensure plan includes measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance. In the event of a spill, the contractor shall immediately clean up any spills of contamination, water or other substances which may be either detrimental to marine or terrestrial life or quality of surface water, groundwater or soil in accordance with the appropriate federal and provincial guidelines/regulations.

.10 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.11 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials

.13 Waste and Groundwater Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.

a. All groundwater encountered during excavations is to be considered as contaminated and non-hazardous and shall be disposed of at an approved facility.

b. Surface water that has come into contact with contaminated soil must be managed the same way as contaminated groundwater.

c. Any washwater generated as part of equipment decontamination must be collected and treated as contaminated waste.

d. All groundwater and waste water must be captured and tested prior to discharge to determine management and disposal options.

e. If one of the management options (after testing) is determined to be discharge to the river, the contractor MUST CONFIRM that the water also meets Federal and Provincial Guidelines and Standards for the protection of surface water and/or freshwater aquatic life.

f. f one of the management options (after testing) is determined to be discharge into the municipal system, t it must be done so in compliance with provincial and/or municipal approvals / permits (e.g., Environmental Compliance Approval and/or Permit to Take Water from the Ontario Ministry of the Environment and Climate Change (MOECC); Sanitary Sewer Agreement from the City of Ottawa)

g. Any sediment filtered out of the water must be disposed of as contaminated waste at an approved facility.

.14 A copy of the Environmental Protection Plan must be available on the work site at all times. The Contractor must ensure that all workers understand the importance of the Environmental Protection Plan as well as the consequences of refraining to respect the requirements of all regulating organizations.

.15 Following project works, it is the contractor's responsibility to restore the site to its original conditions.

1.3 Fires

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

1.4 Drainage

.1 Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes monitoring and reporting requirements to verify that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Provide temporary drainage and pumping required to keep excavations and site free from water.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

.4 Maintain and ensure proper functioning of protection measures for the project's duration. The Contractor is responsible for the proper functioning and necessary repairs.

.5 Regular inspections of the protection measures will be made by the NCC Representative. The Contractor is responsible for correcting any situation deemed unacceptable by the NCC Representative within 48hrs following written notice.

1.5 Site Clearing and Plant Protection

.1 Protect trees and plants on site and adjacent properties as indicated.

.2 Any tree larger than 10 cm of DBH which could be damaged by the equipment during construction shall by encasing trees with protective wood framework from grade level to height of 2 m minimum.

.3 Install protection fences on ground around trees located nearby the construction site to prevent damage to their root systems. These fences shall be installed at the vertical limit of tree crown to be protected

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by NCC Representative. If other trees with outside diameter larger than 10cm need to be cut, an authorization from the NCC Representative shall be obtained by Contractor before proceeding.

.6 If trees are accidentally damaged or removed as a result of the works, the contractor will plant two trees for each tree damaged or removed (a 2:1 ratio). Contractor shall get a planting plan approved by NCC before the planting of trees. Contractor will monitor the success of all plantings and re-vegetation for two years and will undertake any remedial actions that may be required.

.7 Pruning of vegetation, if necessary, should take place following the indications of the NCC Representative.

.8 If cutting works in vegetation are to be done during nesting period of migratory birds, a NCC appointed biologist shall do a reconnaissance of work areas to locate active nests so as to avoid disturbing migratory birds during the nesting period (April 15 to August 15).

.9 Fauna on site shall not be hunted, harassed or tracked down. All motorized vehicles and machinery shall stay in the designated road or pathways to avoid perturbing the fauna habitat.

.10 A northern map turtle, which is listed as Species at Risk (SAR) was observed in the vicinity of the work. The contractor shall execute daily visual inspections through the construction site to prevent potential harm to the turtles, which are active approximately from April to October. During the active turtle nesting season, approximately from May 1 to July 31, excavated soils should not be left exposed overnight to prevent turtles from nesting on potentially contaminated stockpiled soil. If excavated soil needs to be stockpiled overnight, it shall be fully covered by a tarp or geotextile.

1.6 Work Adjacent to Waterways

.1 Construction equipment to be operated on land only. It is forbidden to circulate with machinery in the waterway.

.2 Do not use waterway beds for borrow material. No debris shall be accumulated at less than 30m from the waterway.

.3 Waterways to be free of excavated fill, waste material and debris. All debris introduced accidentally in waterway shall be removed immediately.

.4 Design and construct temporary crossings to minimize erosion to waterways.

.5 Develop and implement an Erosion and Sediment Control Plan for the site that minimizes risk of sedimentation of the waterbody during all phases of the project. This plan must follow the requirements outlined in the Environmental Protection Plan (1.2.5.5).

.6 Do not skid logs or construction materials across waterways.

.7 Avoid indicated spawning beds when constructing temporary crossings of waterways.

.8 Blasting to be above water and 100 m minimum from indicated spawning beds.

.9 Ensure at all times the free water flow and a sufficient quantity of water to maintain the functionality of fish habitat upstream and downstream of the construction area.

.10 Time work in or around water to respect the timing windows identified below to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed. See timing windows by province and species available at: http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html.

1.7 Pollution Control

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant to local authorities' emission requirements.

.3 Invasive buckthorns and honeysuckles are present in the work area. The Contractor shall avoid further dispersion of these species by abiding by best management practices identified by the Ontario Invasive Plant Council (http://www.ontarioinvasiveplants.ca/resources/best-management-practices) including inspecting, cleaning and removing mud, seeds and plant parts from clothing, vehicles, and equipment such as mowers and tools. Vehicles and equipment are to be cleaned in an area where plant seeds or parts are not likely to spread (hardstand, carwash facilities). Fruit shall be removed from species such as invasive honeysuckle and buckthorn prior to chipping.

.4 Prevent abrasive blasting and other extraneous materials from contaminating air and waterways beyond application area.

.1 Provide temporary enclosures to the satisfaction of the NCC Representative.

.5 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.6 Do not store any machinery, equipment or materials within 15m of natural high water mark of the watercourse.

.7 Do not store, handle, or transfer petroleum or lubricating products within 60m of the natural high water mark of the watercourse. All tools and equipment shall be refueled at a distance of at least 60m from the natural high water mark of watercourse.

.8 No concrete shall be fabricated in bulk within 30 meters of the high water mark. All concrete necessary for the execution of construction shall be delivered by concrete trucks or other transport means (including pumping. Small batch mixing is permitted in areas approved by the NCC Representative.

.9 Washing of concrete material from trucks and other equipment used to mix concrete shall be done at least 30 m from waterways and outside of the immediate construction site. All concrete trucks shall recuperate their washing water and it shall be disposed of at an authorized dump site.

.10 Avoid the use of potentially harmful materials such as treated wood and acidic rocks (notably rocks producing sulfur, or easily dissolvable limestone).

1.8 Historical/Archaeological Control

.1 In the event that archeological resources or human remains are discovered during the project, all works at this location must be suspended and the NCC Representative must be contacted immediately. Works cannot be resumed until the following measures for the protection of these resources or remains have been put in place.

.2 In the event that archeological resources or human remains are discovered, the Contractor must provide a historical, archaeological and cultural resources, biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological and cultural resources, biological resources and wetlands known to be on the project site: and/or identifies procedures to be followed if historical, archaeological and cultural resources, biological resources and wetlands not previously known to be onsite or in the area are discovered during construction.

.3 The plan must include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and NCC Representative. The Contractor will be paid separately for producing the plan and putting in place the necessary protection measures.

1.9 Notification

.1 The NCC Representative will notify the Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform NCC Representative of proposed corrective action and take such action for approval by NCC Representative.

.1 Do not take action until after receipt of written approval.

.3 NCC Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

.1 Not Used.

PART 3 - EXECUTION

.1 Cleaning

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse/recycling when possible.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

END OF SECTION

PART 1 - GENERAL

1.1 Definitions

.1 Certificate of Conformance: document issued by the Quality Verification Engineer (QVE) confirming that specified components of Work are in General Conformance with requirements of Contract Documents.

.2 General Conformance: means that, in the opinion of a Professional Engineer, the standard of construction work fulfills essential requirements of Contract Documents, and has been done in accordance with normally accepted industry standards, and will perform its intended function.

.3 Interim Inspection: an inspection confirming that specified components of Work are in General Conformance with Contract Documents. Written confirmation must be submitted to Department Representative before the Contractor can proceed to next stage of work.

.4 Quality Control: a system or series of activities carried out by Contractor to ensure that the final product and materials supplied to Canada meets the specified requirements.

.5 Quality Control Administrator (QCA): Contractor's representative responsible for monitoring and ensuring Quality Control compliance.

.6 Quality Verification Engineer (QVE): one or more Professional Engineer(s) licensed in both the Province of Ontario designated by the Contractor to provide the QVE services specified in the Contract Documents. The QVE will be responsible for certifying that the work is in General Conformance with Contract documents and for issuing Certificate(s) of Conformance as required. QVE to have experience directly related to Work for which Certificate of Conformance will be issued.

1.2 Action and Informational Submittals

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

.2 Develop and submit a Quality Control program for quality control activities in Contract, and provide the necessary staff and resources. Program to include:

.1 Retain the services of a QVE and QVE delegates as required.

.2 Assign a Quality Control Administrator (QCA).

.3 Make available and submit all QC documentation upon

request by NCC Representative.

.4 Ensure Interim Inspections are completed and Certificates of Conformance are submitted, where specified, prior to proceeding to the next stage of Work.

.5 Use the same QVE for Interim Inspections as for Certificate of Conformance.

.3 During the course of Work, submit all QC inspection activities and associated records in accordance with the quality control requirements of the Contract Documents. In particular, the Contractor should ensure that the following items are in accordance with the Contract Documents:

.1 Submission of materials-related documentation, mix designs, mock-ups, etc prior to proceeding with fabrication and construction of particular elements of work.

.2 Environmental conditions for material placement, including but not limited to, temperature and weather constraints and placement restrictions.

.3 Construction methods for material placement and/or removal.

.4 Provision of environmental protection of materials and elements of work and/or maintenance of environmental conditions after material placement including but not limited to: curing of concrete, cold weather protection, etc.).

.5 Any other relevant information and records requested by NCC Representative.

Please note that the above, is not an exhaustive list and that it is the Contractor's responsibility to ensure that all quality control requirements are in accordance with the Contract Documents.

.4 Use only personnel/firms identified in the submissions, or in other forms of communication when permitted by Contract Documents, for the indicated Certificates of Conformance, Interim Inspections, and other quality control activities.

.1 Submit in writing to NCC Representative revisions to the designated QVE at least two weeks prior to the activity for which the substituted personnel will be required.

1.3 Inspection

.1 Allow NCC 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 NCC Representative instructions, or law of Place of Work.

.3 If Work designated for special tests has been covered prior to inspection or approval, uncover such Work, have inspections or tests satisfactorily completed and make good such Work. Pay costs for uncovering and making good Work that is covered prior to inspection.

.4 Employ accredited inspection and testing agencies as required and as specified elsewhere in the Contract documents.

.5 NCC 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.

1.4 Independent Inspection Agencies

.1 Independent Inspection/Testing Agencies will be engaged by the NCC for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the NCC.

.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 at no cost to the NCC. Pay costs for retesting and re-inspection.

1.5 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.

1.6 Procedures

.1 Notify appropriate agency 24 hours 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.

1.7 Rejected Work

.1 Remove defective or non-conformance work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by NCC Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

1.8 Reports

.1 Submit the original inspection and test reports to NCC Representative in electronic PDF format.

.2 Provide copies to subcontractor of work being inspected or tested manufacturer or fabricator of material being inspected or tested.

1.9 Tests and Mix Designs

.1 Furnish test results and mix designs as requested.

1.10 Mock-ups

.1 Prepare mock-ups for Works specifically requested in specifications. Specifications included in the present section are valid for all sections in which mock-ups are required.

PART 2 - PRODUCTS

2.1 Not used.

Part 3 – EXECUTION

3.1 Quality Verification Service (QVE)

.1 The QVE shall:

.1 Issue Certificates of Conformance as indicated.

.2 Conduct Interim Inspections where required pursuant to the Contract Documents and issue written confirmation of conformance to the NCC Representative following an interim inspection.

.3 Include time, date and components inspected for Interim Inspections.

.4 Application of the waterproofing material is to be carried out only by a firm certified to apply the waterproofing material by the manufacturer of the product.

.2 Do not delegate any activity that Contract Documents require QVE to "witness". For all other activities, QVE may delegate the function to another person where it is consistent with prudent engineering practice to do so, and function is performed under supervision of QVE.

.3 Submit Certificates of Conformance, with reference to the applicable Working Drawings and other Contract Documents, to NCC Representative at the milestones indicated. Submit Certificate(s) of Conformance within 24 hours of completing the Work described in the Certificate of Conformance and prior to commencing subsequent stages of Work. Where Interim Inspections are specified, do not proceed to the next stage of work until a written confirmation has been issued to the NCC Representative by the QVE. Make available copies of the written confirmation to NCC Representative upon request.

.4 QVE to seal, sign and date Certificates of Conformance indicating that construction of Work is in General Conformance with the stamped Working Drawings and requirements indicated. Do not include conditions or limitations as part of Certificate of Conformance or written confirmation to proceed following an Interim Inspection. Append any amendments to Contract Documents accepted by NCC Representative, and related to Certificate of Conformance.

.5 Seek clarification of requirements from NCC Representative if QVE is prevented from issuing written confirmation following an Interim Inspection, or a Certificate of Conformance, because of lack of clarity of Contract Documents.

END OF SECTION

PART 1 - GENERAL

1.1 References

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.

.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.

1.2 Submittals

.1 Provide submittals in accordance with Section 01 33 00 - Shop Drawings, Samples and Product Data.

.2 Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.3 Installation and Removal

.1 Prepare Site plan indicating existing location and dimensions of area fenced and used by Contractor, number of trailers to be used, and avenues of ingress/egress.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from Site all such work after use.

1.4 Site Storage / Loading

.1 Confine work and operations of employees to area defined by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.5 Construction Parking

.1 Parking will be permitted on Site

.2 Provide and maintain adequate access to Project Site.

.3 Provide two parking spots on-site for NCC Representative

1.6 Security

.1 Contractor to ensure at his own expense that Site and materials are secured at all times including after working hours and during holidays.

1.7 Materials Storage

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of materials, where needed.

.2 Store only materials identified to be reused or new materials to be used. Do not stockpile material to be disposed off-site.

1.8 Sanitary Facility

.1 Provide sanitary facility for work force in accordance with governing regulations and ordinances.

.2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.9 Construction Signage

.1 The NCC will install two signs at the Site, and will remove them upon completion of construction work. No additional signs or advertisements, other than warning signs, are permitted on Site.

.2 Direct requests for approval to erect Consultant/Contractor signboard to the NCC Representative.

.3 Provide signs and notices for safety and instruction in both official languages; Graphic symbols shall be in accordance with CAN/CSA-Z321.

.4 Maintain approved signs and notices in good condition for duration of Project, and dispose of off-site on completion of Project or earlier if directed by NCC Representative.

1.10 Protection and Maintenance of Traffic

.1 Provide temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by the NCC Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.

.4 Protect travelling public from damage to person and property.

.5 Contractor's traffic on roads selected for hauling material to and from Site to interfere as little as possible with public traffic, An existing temporary traffic signal has been provided at Wellington and Lett Street intersection.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor is responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary.

.8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.1 Operate and maintain existing temporary traffic signal located at the intersection of Wellington and Lett Streets; signal will be removed by the City of Ottawa upon completion of construction.

.10 Dust control: adequate to ensure safe operation at all times. Refer to “Dust Control” Article in Division 01 Section 011000 – General Instructions for additional requirements.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by the NCC Representative.

.12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads.

.15 Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

.16 Common-Use Field Office: Of sufficient size (20-34m2 floor area) to accommodate needs of NCC Representative and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

.1 Furniture required for Project-Site documents including file cabinets, plan tables, plan racks, and bookcases.
.2 Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no less than one receptacle on each wall. Furnish room with conference table, chairs, and 1.2-m-square tack and marker boards.
.3 Drinking water and private toilet.
.4 Coffee machine and supplies.
.5 Heating and cooling equipment necessary to maintain a uniform indoor temperature of 20 to 22 deg C.
.6 Lighting fixtures capable of maintaining average illumination of 215 lx at desk height.

.17 Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1.11 Clean-up

.1 Remove construction debris, waste materials, packaging material from Work Site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

PART 2 - PRODUCT - NOT USED

PART 3 - EXECUTION

3.1 Water Service

.1 Water Service: Install water service and distribution piping in sizes and pressures adequate for construction and in accordance with governing regulations and ordinances. The NCC has already obtained a Permit to Take Water (PTTW) for the duration of construction.

3.2 Electric Service

.1 Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations in accordance with governing regulations and ordinances. A 600V / 200A service connection is provided at the hand hole on the western property line by Booth St.

3.3 Operation, Termination and Removal

.1 Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

.2 Maintenance: Maintain facilities in good operating condition until removal.

.3 Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

.4 Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion, unless otherwise directed by NCC Representative. Complete or, if necessary, restore permanent construction that may have been delayed because of

interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

.5 Materials and facilities that constitute temporary facilities are property of Contractor, except those previously installed by NCC, e.g. perimeter fence and Project identification signs. Owner reserves right to take possession of Project identification signs erected by the Contractor.

.6 At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section 017700 - Closeout Procedures.

3.4 Temporary Erosion and Sedimentation Control

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways. These measures must be specific to Site, in compliance with EPA 832/R-92-005 or requirements of authorities having jurisdiction, whichever are more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.4 Reinstate areas disturbed by construction to their original condition to the satisfaction of the NCC Representative, at the Contractor’s expense.

.5 All areas disturbed shall be reinstated by the Contractor to its original condition at the Contractor's expense and to the NCC Representative's satisfaction.

END OF SECTION

PART 1 - GENERAL

1.1 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.

1.2 Project Cleanliness

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by NCC Representative. Do not burn waste materials on site, unless approved by NCC Representative.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only or remove from site.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling.

.7 Dispose of waste materials and debris at designated dumping areas off site.

.8 Clean interior areas prior to start of finishing work, and maintain areas free of dust and other contaminants during finishing operations.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

.11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 Final Cleaning

.1 When Work is Substantially Completed remove surplus products, tools, construction machinery and equipment not required for completion of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris including that caused by NCC or other Contractors.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by NCC Representative. Do not burn waste materials on site, unless approved by NCC Representative.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.

.8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and ground surfaces.

.9 Clean lighting reflectors, lenses, and other lighting surfaces.

.10 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.11 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.12 Remove dirt and other disfiguration from exterior surfaces.

.13 Clean and sweep roofs, gutters, areaways, and sunken wells.

.14 Sweep and wash clean paved areas.

.15 Clean equipment and fixtures to sanitary condition; clean or replace filters of mechanical equipment.

.16 Clean roofs, downspouts, and drainage systems.

.17 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.18 Remove snow and ice from access to building.

1.4 Waste Management and Disposal

.1 Separate waste materials for recycling when possible.

PART 2 -PRODUCTS

.1 Not Used

PART 3 - EXECUTION

.1 Not Used

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

.1 Section 01 35 43 - Environmental Procedures.

1.2 Measurement Procedures

.1 Measure site demolition in the unit specified in the Price Table for such work.

1.3 Site Conditions

.1 Site Environmental Requirements.

.1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Protect existing items designated to remain and materials designated for salvage and relocation. In event of damage, immediately replace such items or make repairs to approval of NCC Representative at no additional cost to the NCC.

PART 2 - PRODUCTS

.1 Not Used

PART 3 - EXECUTION

3.1 Preparation

.1 Inspect site with NCC Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Notify and obtain approval of utility companies before starting demolition.

3.2 Removal Operations

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by NCC Representative.

.2 Protect adjacent joints and underlying and adjacent granular materials designated to remain in place.

.4 Remove the designated trees during demolition.

.1 Obtain written approval of NCC Representative prior to removal of trees not designated on plans.

.5 Stockpile topsoil for final grading and landscaping.

.1 Provide erosion control and hydroseeding if not immediately used.

.6 Salvage.

.1 Dismantle items containing materials for salvage and stockpile salvaged materials at indicated locations.

.2 Removal and salvage of pavers:

.1 Lift and stack pavers on wood pallets. Discard broken pavers. Do not stack higher than 900 mm. Wrap palletized pavers with plastic wrap sufficient to prevent damage or movement during transport or storage. Safely store and stack cut pavers to prevent damage.

.3 Removal and salvage of granite curbs:

.1 Safely store and stack curbs to prevent damage.

.2 Saw out ends of curbs when they are substantially chipped or broken as indicated by the NCC Representative.

.7 Disposal of Material.

.1 Dispose of materials not designated for salvage or reuse on site.

.2 Restore storage and disposal areas to the satisfaction of the NCC Representative.

.8 Backfill.

.1 Backfill in areas as indicated and in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.3 Stockpiling

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site, and which does not impede disassembly, processing, or hauling procedures.

3.4 Removal From Site

.1 Remove stockpiled material as directed by NCC Representative when it interferes with operations of project.

.2 Dispose of materials not designated for alternate disposal off site in accordance with applicable regulations.

3.5 Restoration

.1 Restore areas and existing works outside areas of demolition to match condition of adjacent, undisturbed areas.

3.6 Cleaning

.1 Remove debris, clean surfaces and leave work site clean, upon completion of Work.

.2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirments

.1 Section 03-20-00 – Concrete Reinforcing

.2 Section 03-30-00 – Cast-in-Place Concrete

1.2 Reference Standards

.1 Canadian Standards Association (CSA International)

.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.

.3 CSA O121-M1978(R2003), Douglas Fir Plywood.

.4 CSA O151-04, Canadian Softwood Plywood.

.5 CSA O153-M1980(R2003), Poplar Plywood.

.6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.

.7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.

.8 CSA S269.1-1975(R2003), Falsework for Construction Purposes.

.9 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada.

.2 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 Submittals

.1 Submittals in accordance with Section 01 33 00 – Submittal Procedures

1.4 Delivery, Storage and Handling

.1 Waste Management and Disposal:

.1 Separate waste materials for recycling

1.5 Action and Informational Submittals

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

.2 Submit shop drawings for formwork and falsework.

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario.

.3 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01- Hazardous Materials.

.4 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3 for formwork drawings.

.5 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

.6 Indicate sequence of erection and removal of formwork/falsework.

PART 2 -PRODUCTS

2.1 Materials

.1 Formwork Materials:

.1 To CSA-A23.1/A23.2.

.2 For concrete without special architectural features, use wood and wood product formwork materials to CSA-O121, CAN/CSA-O86, CSA-O437 Series, CSD-O153.

.3 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.

.4 For concrete curbs, use metal formwork on straight sections

.2 Form Ties:

.1 For concrete not designated 'Architectural', use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.

.2 For Architectural concrete, use snap ties complete with plastic cones and light grey concrete plugs.

.3 Form Liner: Plywood: high density overlay to medium density overlay Douglas Fir to CSA O121 grade, 13 mm thick

.4 Form Stripping Agent: colourless mineral oil, non-toxic, free of kerosene, with viscosity between 15 to 24 mm^2/s at 40 degrees C, flashpoint minimum 150 degrees C, open cup.

.5 Falsework Materials: to CSA-S269.1.

PART 3 - EXECUTION

3.1 Fabrication and Erection

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Obtain NCC Representative's approval for use of earth forms framing openings not indicated on drawings.

.3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.4 Fabricate and erect falsework in accordance with CSA S269.1.

.5 Do not place shores and mud sills on frozen ground.

.6 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.7 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

.8 Refer to drawings for concrete elements requiring architectural exposed finishes and formwork patterns.

.9 Align form joints and make watertight.

.1 Keep form joints to minimum.

.10 Use 20mm chamfer strips on external corners, unless specified otherwise.

.11 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.12 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.13 Use new forms or steel forms only. Textile form liners are not to be used.

.14 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete

3.2 Removal and Reshoring

.1 Remove formwork when concrete has reached 75% of its design strength.

.2 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.3 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

PART 1 - GENERAL

1.1 DESCRIPTION OF THE WORK

.1 The work of this section includes the supply and installation of black reinforcing steel.

1.2 RELATED REQUIREMENTS

.1 Section 03-10-00 – Concrete Forming and Accessories

.2 Section 03-30-00 – Cast-in-Place Concrete

1.3 MEASUREMENT AND PAYMENT

.1 No measurement will be made for the item “Concrete Reinforcing”. Payment shall be included in items of concrete work in Section 03 30 00 - Cast-In-Place Concrete and as indicated in the Summary of paid items as listed in the price table. Payment shall include all costs for labour, materials, and equipment necessary to complete the work of this item in accordance with the drawings and specifications.

1.4 REFERENCE STANDARDS

.1 American Concrete Institute (ACI)

.1 SP-66-04, ACI Detailing Manual 2004.

.1 ACI 315-99, Details and Detailing of Concrete Reinforcement.

.2 ACI 315-04, Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.ASTM International

.2 CSA International

.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-04(R2010), Design of Concrete Structures.

.3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.4 CSA-G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.5 CAN/CSA-G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.6 CSA W186-M1990(R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.7 CAN/CSA S6-14, Canadian Highway Bridge Design Code

.3 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

.4 ASTM International

.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

.2 ASTM A143/A143M-07, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

.3 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.4 ASTM A775/A775M-07b, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice and ACI 315.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer licensed in Ontario.

.1 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by NCC Representative, with identifying code marks to permit correct placement without reference to structural drawings.

.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

.2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

.1 Provide type B tension lap splices unless otherwise indicated.

1.6 QUALITY ASSURANCE

.1 Quality Control:

.1 Upon request submit in writing to NCC Representative proposed source of reinforcement material to be supplied.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Ensure reinforcing steel and accessories are kept clean of mud, oil, and other deleterious materials, and store clear of contact with the ground.

.2 Delivery and Acceptance Requirements: deliver materials to site labelled with manufacturer's name and address and the lot number corresponding to the submitted mill certificate.

.3 Storage and Handling Requirements:

.1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations.

.2 Keep reinforcing steel covered at all times with opaque polyethylene sheeting of minimum thickness of 150 µm.

.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by the NCC Representative.

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.

.3 Reinforcing steel: weldable low alloy steel deformed bars to CSA-G30.18.

.4 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.5 Deformed steel wire for concrete reinforcement: to ASTM A82/A82M.

.6 Welded steel wire fabric: to ASTM A185/A185M. Provide in flat sheets only. Unless otherwise indicated, use 152 mm X 152 mm X 5.22 kg/m^2 mesh.

.7 Welded deformed steel wire fabric: to [ASTM A82/A82M]. Provide in flat sheets only. Unless otherwise indicated, use 152 mm X 152 mm X 5.22 kg/m^2 mesh.

.8 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2, non-metallic.

.9 Mechanical splices: subject to approval of NCC Representative.

.10 In the event of a discrepancy on the drawings where the same bar is called out as two different sizes, the larger size shall govern.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2, ACI 315, and the Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Obtain NCC Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of NCC Representative, weld reinforcement in accordance with CSA W186.

.4 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

.5 NCC Representative may reject any material with defects not meeting ASTM standards. Material to be replaced at no additional cost.

2.3 SOURCE QUALITY CONTROL

.1 Provide NCC Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, for each lot prior to shipment of the reinforcing bars and a minimum of 4 weeks prior to beginning reinforcing work. The certificates to show that the material is as specified in the Contract Documents.

.2 Inform NCC Representative of proposed source of material to be supplied.

PART 3 - EXECUTION

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated on the Contract Drawings or authorized by NCC Representative.

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

3.2 FIELD CUTTING

.1 Field cut reinforcing bars and splice bars using mechanical saws and as approved in writing by NCC Representative.

.2 Do not torch cut.

3.3 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on placing drawings and in accordance with CSA-A23.1/A23.2.

.2 Prior to placing concrete, provide Certificate of Conformance for reinforcing steel material and placement.

.3 Use plain round bars as slip dowels in concrete.

.1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.

.2 When paint is dry, apply thick even film of mineral lubricating grease.

.4 Ensure cover to reinforcement is maintained during concrete placement.

END OF SECTION

Part 1 GENERAL

1.1 Related Requirements

.1 Section 03-10-00 – Concrete Forming and Accessories

.2 Section 03-20-00 – Concrete Reinforcing

1.2 Measurement and Payment

.1 Payment shall be in accordance with Summary of paid items as listed in the unit price table and shall include all costs for labour, materials, and equipment necessary to complete the work of this item in accordance with the drawings and specifications.

.2 No deductions will be made for volume of concrete displaced by reinforcing steel, structural steel, or piles.

.3 Supply and installation of anchor bolts, nuts and washers and bolt grouting will not be measured but considered incidental to work.

1.3 Reference Standards

.1 ASTM International

.1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C309-07, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C494/C494M-15, Standard Specification for Chemical Admixtures for Concrete.

.4 ASTM C518-10, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

.5 ASTM C1017/C1017M-13e1, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.6 ASTM D412-06ae1, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

.7 ASTM D624-00(2007), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

.8 ASTM D1056-14, Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.

.9 ASTM D1751-2013e1, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

.10 ASTM D1752-04a, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

.2 CAN/CGSB-51.34-M86(R1988) , Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

.3 Canada Green Building Council

.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum [2007]).

.2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide for Commercial Interiors.

.4 CSA International

.1 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A283-06-R2016, Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.4 CSA A179-04, Mortar and Grout for Unit Masonry

.5 Abreviations and Acronymns

.1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).

.1 Type GU or GUb - General use cement.

.2 Type MS or MSb - Moderate sulphate-resistant cement.

.3 Type MH or MHb - Moderate heat of hydration cement.

.4 Type HE or Heb - High early-strength cement.

.5 Type LH or LHb - Low heat of hydration cement.

.6 Type HS or HSb - High sulphate-resistant cement.

.2 Fly ash:

.1 Type F - with CaO content less than 8%.

.2 Type CI - with CaO content ranging from 8 to 20%.

.3 Type CH - with CaO greater than 20%.

.3 GGBFS - Ground, granulated blast-furnace slag.

1.4 Abbreviations and Acronyms

.1 Limestone Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement.

.1 Type GU, GUb and GUL - General use cement.

.2 Type MS and MSb - Moderate sulphate-resistant cement.

.3 Type MH, MHb and MHL - Moderate heat of hydration cement.

.4 Type HE, HEb and HEL - High early-strength cement.

.5 Type LH, LHb and LHL - Low heat of hydration cement.

.6 Type HS and HSb - High sulphate-resistant cement.

.2 Fly ash:

.1 Type F - with CaO content less than 8%.

.2 Type CI - with CaO content ranging from 8 to 20%.

.3 Type CH - with CaO greater than 20%.

.3 GGBFS - Ground, granulated blast-furnace slag.

.4 SF - Silica fume with high silicon dioxide (SiO_2) content

.5 N - Natural pozzolans

1.5 Action and Informational Submittals

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

.2 Provide NCC Representative, a minimum of 4 weeks prior to starting concrete work, with:

.1 Certification of concrete plant.

.2 Mix design(s) for concrete, including technical data on mix proportions, admixtures, and aggregate sources.

.1 28 day compressive strength.

.2 Air void parameters of the hardened concrete.

.3 Aggregate test results.

.4 Admixture test results.

.5 All supporting documentation to be less than 12 months old at the time of submission of mix design.

.6 When superplasticizer is used, supporting documentation to be based on mix design with superplasticizer.

.3 Provide NCC Representative, minimum 4 weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.

.1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

.4 Minimum 4 weeks prior to starting concrete work, provide proposed quality control procedures for review and approval by NCC Representative on following items:

.1 Falsework erection.

.2 Hot weather concrete.

.3 Cold weather concrete.

.4 Curing.

.5 Finishes.

.6 Location of construction joints.

.5 Certify that mix proportions and materials are adjusted to meet alkali-aggregate reactivity requirements of CSA A23.1/A23.2.

1.6 Quality Control

.1 Provide quality control in accordance with Section 01 45 00- Quality Control.

.2 Provide testing results for review and approval by NCC Representative.

.1 Provide accurate records of placed concrete indicating date and location of concrete placement, quality, air and concrete temperature, slump, and entrained air.

.3 Milestone inspections:

.1 Permissions: submit a written request to proceed to the NCC Representative prior to commencement of the successive operation following each interim inspection of the work, each to be witnessed by the Quality Verification Engineer. Interim inspections, to include:

.1 Prior to placement of any mass concrete.

1.7 Delivery, Storage and Handling

.1 Delivery and Acceptance Requirements:

.1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

.1 Do not modify maximum time limit without receipt of prior written agreement from NCC Representative and concrete producer as described in CSA A23.1/A23.2.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

.2 Packaging Waste Management: in accordance with Section 01 74 19- Construction/Demolition Waste Management and Disposal.

Part 2 PRODUCTS

2.1 Design Criteria

.1 Performance: to CSA A23.1/A23.2, and as described in this specification

2.2 Materials

.1 Portland Cement: to CSA A3001, Type GU.

.2 Blended hydraulic cement: Type GUb to CSA A3001.

.3 Portland-limestone cement: CSA A3001.

.4 Water: to CSA A23.1.

.5 Aggregates: to CSA A23.1/A23.2.

.6 Admixtures:

.1 Air entraining admixture: to ASTM C260.

.2 Chemical admixture: to CSA A23.1/A23.2. NCC Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.7 Non-metallic shrinkage compensating grout: to material requirements of Section 01 61 00 – Common Product Requirements.

.1 Use applicable Ontario provincial standards for material, surface preparation, placement, and acceptance, modified as indicated.

.8 Cast-in-place concrete compressive strength: 35 MPa at 28 days unless noted otherwise.

.9 Grout compressive strength: 35 MPa at 28 days unless noted otherwise.

.10 Mass concrete compressive strength: 35 MPa unless specified otherwise.

.11 Polyethylene film: 0.15 mm thickness to CAN/CGSB-51.34.

.12 Ethyl vinyl acetate (EVA) foam seals: to ASTM D-1056.

.1 Colour to match concrete.

.13 Insulation for frost protection:

.1 Insulation to be high density extruded polystyrene foam insulation with the following properties:

.1 Nominal board thickness: 50 mm

.2 Thermal Resistance per inch (25 mm), R-Value (1) min: 5.0

.3 Board size: 610 x 2440 mm (2 x 8 ft)

.4 Edge Treatment: square edge

.5 Minimum Compressive Strength (2): 415 kPa (60 psi)

(1) R means resistance to heat flow. The higher the R-value, the greater the insulating power. R-values are expressed in ft2·h·ºF/Btu. R-value deterimed by ASTM C518.

(2) Vertical compressive strength is measured at 5% deformation or at yield, whichever occurs first.

.2 Adhesives shall be in accordance with the recommendations of the insulation manufacturer.

.3 Mortar sand for frost protection bedding shall meet the gradation limits in Table 1 in the Canadian Standards Association (CSA) Standard A179-04 clause 5.3.2.2.

.14 Geotextile fibre to be composed of at least 95% polypropylene, polyethylene, polyester, or other synthetic polymers, excluding polyamides.

.15 Crushed stone to be clean of fines with a minimum particle size of 20mm.

.16 Curing compound: to CSA A23.1/A23.2 white and ASTM C309.

.17 Premoulded joint fillers:

.1 Bituminous impregnated fiber board: to ASTM D1751. The board thickness shall comply with the indications specified in the plans and details, unless corrected to the contrary, i.e. 12 mm thick.

.18 The discharge nozzles shall be galvanized steel.

.19 The caulking shall be a polyurethane-based one-component product, grey colour (Sika-Flex 1a or approved equivalent).

.20 The bearing pads shall be made of a resistant and elastic material, weatherproof, moisture-proof and oil-proof, not subject to corrosion or causing corrosion, consisting of approved coutil layers deeply saturated and bound together with rubber or approved synthetic products designed expressly for this purpose.

.21 Anti-graffitis Guard : Apply a graffiti protection such as Faceal Oleo HD or approved equivalent on all apparent concrete surfaces of walls and benches. Apply in shop whenever possible, following the manufacturers recommendations.

2.3 Mixes

.1 Performance Method for specifying concrete: to meet performance criteria to CSA A23.1/A23.2.

.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.

.2 Provide concrete mix to meet following requirements:

.1 Durability and class of exposure:

.1 Footings and caissons: F-1.

.2 Remainder: C-1

.2 Compressive strength at 28 days: 35MPa

.3 Water/cement ratio: 0.40

.4 Chloride ion permeablility: < 1500 coulombs within 91 days

.5 Air content category: 1.

.6 Aggregate size: 19 mm.

.7 Slump at time and point of discharge: 70 ± 20 mm.

.3 Mix concrete at batching plant. Do not use mobile mixers.

.4 Provide quality management plan to ensure verification of concrete quality to specified performance.

.5 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

2.4 Equipment

.1 Consolidating equipment: CSA A23.1.

.1 Internal vibrators to have resilient coverings to prevent damage to reinforcement.

.2 Do not use external vibrators.

.2 Finishing equipment

.1 Finish deck in accordance with Section 03 30 51 – Concrete for Bridge Decks.

.2 Use magnesium or wood floats for hand finishing.

.3 Use commercially manufactured magnesium bull floats.

Part 3 EXECUTION

3.1 Preparation

.1 Obtain NCC Representative's written approval before placing concrete.

.1 Provide 24 hours minimum notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 During concreting operations:

.1 Development of cold joints not allowed.

.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

.4 Pumping of concrete is permitted only after approval of equipment and mix.

.5 Ensure reinforcement and inserts are not disturbed during concrete placement.

.6 Protect previous Work from staining.

.7 Clean and remove stains prior to application for concrete finishes.

.8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, workability, air content, temperature and test samples taken.

.9 Do not place load upon new concrete until authorized by NCC Representative.

.10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.

.1 Place steel dowels of deformed steel reinforcing bars to anchor and hold dowels in positions as indicated.

3.2 Installation/Application

.1 Do cast-in-place concrete work to CSA A23.1/A23.2.

.2 Sleeves and inserts:

.1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through structural components (steel or concrete), except where indicated or approved by NCC Representative.

.2 Where approved by NCC Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.

.3 Sleeves and openings greater than 100 x 100 mm not indicated, must be reviewed and approved by NCC Representative.

.4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from NCC Representative before placing of concrete.

.5 Confirm locations and sizes of sleeves and openings shown on drawings.

.6 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.

.3 Anchor bolts:

.1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.

.2 Preset anchor bolts for bearings. Installation to be based on template from bearing supplier.

.3 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.

.4 Grout under base plates using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.5 Drainage holes and weep holes:

.1 Form weep holes and drainage holes in accordance with Section 03 10 00 - Concrete Forming and Accessories. If wood forms are used, remove them after concrete has set.

.2 Install weep hole tubes and drains as indicated.

.6 Finishing and curing:

.1 Finish concrete to CSA A23.1/A23.2.

.2 Apply the graffiti protection on all finished apparent surfaces of concrete structures, according to the manufacturer’s recommendations.

.3 Use procedures as noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.

.4 Formed surfaces to be smooth-form finish.

.5 Cure concrete to CSA A23.1/A23.2.

.1 Curing regimen: 2 (additional).

.2 Do not use curing compound on any part of the concrete work.

.3 Burlap shall be presoaked by immersing it in water for a period of 24 hours prior to placing.

.4 Continuously wet burlap for seven (7) days.

Provide for hot-weather and cold-weather protection as required in OPSS 904 and CAN/CSA-A23.1-04.

.7 Construction and expansion joints - Joint fillers:

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by the NCC Representative.

.2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form construction and expansion joints as indicated.

.4 Install joint filler.

.5 For the slabs, sidewalks and curbs, the expansion joints shall be constructed at the following locations:

.1 at the intersections of sidewalks, curbs, walls, etc.;

.2 at each change of direction;

.3 at the beginning and end of each curve;

.4 at casting stops of more than one (1) hour (this stop shall coincide with the location of a joint prescribed in the drawings);

.5 at intervals not exceeding six (6) metres in both (2) directions.

.6 Before pouring concrete, carefully poke holes in the asphalt floor at the prescribed locations to insert the metal rods. The metal rods shall rest solidly on reinforcement supports at the required level. Temporarily fasten a 12 x 12 mm filet to the top of the plank. After the concrete sets, remove the fillet, clean the crevice and apply the caulking product according to the manufacturer's recommendations.

.7 When expressly specified by the NCC Representative, the concrete slabs and sidewalks are poured in two (2) distinct operations, according to the alternating pouring principle, to ensure that perfectly straight expansion joints are obtained. The time between the two pourings shall be long enough to allow form release of the concrete poured first. The contractor shall obtain the NCC Representative's authorization before executing the second concrete pouring required.

.8 EVA foam seals at the abutments to be positively attached to at least one surface using an approved epoxy adhesive.

.1 Recess seals 10mm from concrete edge and shall be installed straight.

.2 Adjust thickness of seals to account for concrete placement tolerances.

.9 EVA foam for the semi-integral deck overhang to be installed as shown in the Contract Drawings following installation of the sub drains and compaction of the subgrade material prior to placing the semi-integral overhang.

.10 Construction and expansion joints - Joint fillers:

.1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by the NCC Representative.

.2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.

.3 Locate and form construction and expansion joints as indicated.

.4 Install joint filler.

.5 For the slabs, sidewalks and curbs, the expansion joints shall be constructed at the following locations:

.1 at the intersections of sidewalks, curbs, walls, etc.;

.2 at each change of direction;

.3 at the beginning and end of each curve;

.4 at casting stops of more than one (1) hour (this stop shall coincide with the location of a joint prescribed in the drawings);

.5 at intervals not exceeding six (6) metres in both (2) directions.

.6 Before pouring concrete, carefully poke holes in the asphalt floor at the prescribed locations to insert the metal rods. The metal rods shall rest solidly on reinforcement supports at the required level. Temporarily fasten a 12 x 12 mm filet to the top of the plank. After the concrete sets, remove the fillet, clean the crevice and apply the caulking product according to the manufacturer's recommendations.

.7 When expressly specified by the NCC Representative, the concrete slabs and sidewalks are poured in two (2) distinct operations, according to the alternating pouring principle, to ensure that perfectly straight expansion joints are obtained. The time between the two pourings shall be long enough to allow form release of the concrete poured first. The contractor shall obtain the NCC Representative's authorization before executing the second concrete pouring required.

.11 Mass Concrete:

.1 Following inspection and approval by the Quality Verification Engineer, place mass concrete on the foundation subgrade as specified in the Contract Drawings.

.2 Place mass concrete as soon as practical after completion of the excavation and in no case later than 4 hours after excavation.

.12 Insulation for frost protection:

.1 Protect insulation from physical damage during storage, handling or installation.

.2 Store insulation away from direct sunlight and cover with a light-coloured opaque tarp for protection from solar radiation.

.3 Frost protection bedding shall be 50 mm thick (minimum) Mortar sand installed on undisturbed native soil.

.4 Rough concrete surfaces (i.e. existing walls, pile caps, etc) to receive frost protection treatment shall be smoothened to permit installation of frost protection insulation.

.5 Install insulation panels in accordance with the recommended procedures of the manufacturer. All joints shall be glued and/or lapped. All joints shall be staggered a minimum of 200 mm.

.6 Protect insulation from damage during backfilling and compaction in accordance with the manufacturer's recommendation.

.7 Limits of installation shall be as detailed on the Contract Drawings.

3.4 Concrete Placement

.1 Execute the cast-in-place structures and perform the tests in accordance with the latest version of CSA A23.1- (Concrete Materials and Methods of Concrete Construction) and A23.2- (Methods of Test and Standard Practices for Concrete) – except where otherwise indicated.

.2 Construction of curbs and other concrete structures corresponding to exposure class C-2 of Table 11 of CSA A23.1- shall be performed in accordance with the latest version of said standard and those cited in reference. The following requirements shall be respected:

.1 The contractor shall prepare the surface of the bed according to the plans and profiles and shall compact the infrastructure mechanically to the equivalent of 90% of the Modified Proctor. The contractor shall pass the vibrating plate over the clean stone.

.2 The formwork shall be oiled and the stone watered before pouring the concrete.

.3 The watercourses are 150 mm high, measured between the final paving level and the top of the edge of the sidewalk or the curb, unless otherwise indicated in the drawings.

.4 The driveways are 40 mm high, measured between the final paving level and the top of the edge of the sidewalk or the curb, unless otherwise indicated in the drawings.

.5 The tolerance for the height of the watercourse and the driveways is ± 7 mm. The tolerance for longitudinal alignments is ± 10 mm.

.6 The concrete shall be transported from the mixer to its final position as quickly as possible by means designed to avoid segregation of aggregates.

.7 It is forbidden to place concrete by letting it fall freely from a height greater than 1,500 mm.

.8 Pouring shall be continuous to ensure a good bond between each concrete layer.

.9 Tamp the concrete with mechanical vibrators of the type and dimensions approved by the NCC Representative. Avoid excessive vibration. Formwork vibrators are prohibited.

.10 Ensure reinforcement and inserts are not disturbed during concrete placement.

.11 Pumping of the concrete is authorized.

.12 The temperature limits of the concrete during placement shall be as indicated in the following table (according to CAN/CSA-A23).

Smallest dimension of the element	Temperature, in degrees Celsius	
	Minimum	Maximum
Less than 0.3 m	10°	35°
From 0.3 m to 1 m	10°	30°
From 1 m to 2 m	5°	25°
More than 2 m	5°	20°

.13 No concrete shall be placed against a surface with a temperature of less than 5°C.

.14 During hot weather, water the formwork and the reinforcing steel with cold water before placement. During very hot weather, concreting is permitted only during the night.

3.5 Concrete Finishing

.1 Non-slip finish (if no other finish is prescribed use this type of finish for the slabs):

1. The surface of the concrete shall be flattened by means of an adjusting slat resting on the formwork.
2. The surface of the concrete shall be finished with a wooden trowel, taking care not to attract "laitance" to the surface.
3. When the concrete has reached a certain consistency, the edges of the curb and the joints shall be rounded with the appropriate tools.
4. Any addition of water on the surface to facilitate concrete finishing is prohibited. Finish the concrete only with a wooden trowel.

.2 Exposed aggregate finish (aggregates no larger than 10 mm):

1. When required, the contractor shall build a concrete pavement with exposed aggregate with an aggregate coverage density ranging between 70% and 80% of the area to be covered. The structure shall comply with the existing standards and the requirements of these specifications.
2. The concrete formula shall be submitted to the NCC Representative for approval. The concrete including the chosen aggregate shall be mixed at the plant and the mix shall be placed in a single layer to obtain a homogeneous concrete over the entire thickness of the required slab.
3. Comply with the placement requirements stated above.
4. Moreover, setting of the concrete must be retarded on the surface by a chemical product submitted by the contractor with the application method and the dosage required by the manufacturer.
5. When the concrete has reached a sufficient strength, strip the surface by water blasting to expose the largest aggregates to a depth of approximately 2 mm, without exceeding 3 mm. Stripping shall be done to obtain a uniform and constant degree of aggregate exposure. Any cavity, cracking or unevenness and any stain on this surface shall be corrected to the NCC Representative’s satisfaction. For this purpose, the structure may be demolished and rebuilt by the contractor at its expense if the NCC Representative so requires.
6. During concrete curing, no water-based curing compound shall be used.
7. The stripped concrete residues shall be recovered and shall not be released into the sewer. The contractor shall take all precautions to avoid soiling and

damaging the facilities near the structure. The contractor is liable for any damaged caused by the work.

.3 Abrasive finish :

1. Where specified, and after minimum 7 days water cure, apply an abrasive blast over the entire exposed surface of the identified concrete works. The abrasive blast must remove any stain, oil, cement laitance, trowel mark and all other surface contaminants. The abrasive blast must be uniform and the depth of the concrete stripping must be constant for the entire work. Any cavity, crack or unevenness, as well as any surface stain must be corrected to the NCC's Representative satisfaction. Accordingly, any concrete work that does not meet the NCC's Representative requirements must be demolished and rebuilt by the Contractor at no additional costs.
2. All concrete residues must be gathered and disposed of off-site. None must be washed off in the sewers or the river. The Contractor must take all the necessary precautions to avoid damaging or dirtying adjacent works and surfaces. The Contractor is responsible for all damages ensuing from the abrasive work.
3. Apply abrasive finish to pre-cast elements while still in the workshop, a sample must be delivered prior to production.
4. The contractor will coordinate the appropriate level of abrasive finish for all the concrete elements according to the specification of the Contract documents.
5. The use of abrasives other than sand is privileged.

3.6 Concrete Curing

.1 The concrete that has just been placed shall be protected against frost, high temperatures, excessively rapid drying and loss of moisture for a sufficient period of time for the concrete to attain the prescribed characteristics (article 21.1.2). A minimum period of 30 days after concreting is required before application of de-icing salts.

.2 Curing during the initial period, or obtaining a strength equivalent to 40% of the strength specified at 28 days, shall be done by spraying water and by application of a curing membrane. Fabric soaked in water may also be used to ensure cooling by evaporation.

.3 The white pigmentation curing products must comply with the standards of the Ministère des Transports du Québec and ASTM-C309.

.4 The curing product is applied mechanically with a vaporizer mixer to obtain a homogeneous mixture and ensure uniform application over the entire surface. In cold weather, 5^0C and under, the concrete must be protected against frost for a period of at least 7 days, by means if insulating covers or straw covered with a plastic film. Never use curing product on concrete that will be exposed to frost less than one month after its placement.

.5 In all cases, the concrete mixing formulas and the technical data sheets of the curing products are supplied to the laboratories for approval.

.6 Water is added on the site in accordance with the latest version of CSA A23.1

3.7 Temperature Protection

Indicative table of interventions:

Requirements	**Daily mean outdoor temperature during the protection period (° Celsius)**	
	Smallest dimension of the element, less than 1 m	**Smallest dimension of the element, greater than 1 m**
Suitable shelter and appropriate heating or insulation	Below 0°C	Below -5°C
Appropriate cover and sufficient insulation	From 0 to 5°C	From -5 to 5°C
Normal curing	From 5 to 25°C	From 5 to 20°C
Continuous water curing to minimize the concrete's rise in temperature	Over 25°C	Over 20°C

.1 Ensure protection of the structures, either by building an enclosure or a shelter, or by covering the concrete surfaces with raised tarps or using thick enough insulation. The methods used shall be submitted for approval to the NCC Representative and comply with the latest version of CAN/CSA-A23.1.

.2 In a frost period, make the necessary arrangements to allow introduction of heat into the enclosure or the shelter, as needed.

.3 During placement and curing, the concrete surfaces shall be protected against direct contact with combustion gases, either by formwork or with a protective membrane.

.4 In no case shall the concrete be allowed to freeze before it reaches 7 MPa of strength.

.5 Cooling of the concrete to the ambient temperature shall not exceed the rate of 1°C per hour.

3.8 Anti-Graffitis Guard

.1 Apply a graffiti protection on all apparent concrete surfaces of walls and benches. Apply in shop whenever possible, following the manufacturers recommendations.

3.9 Repair Of Cracks In Curbs And Sidewalks

.1 The cracks or other deficiencies that could appear in curbs or sidewalks during the warranty period will be repaired at the contractor's expense as follows:

.1 **Sidewalks**: saw in the expansion and movement joints on each side of the sections containing one or more cracks and/or deficiencies, remove and dispose of the damaged sections. Drill holes and place the new metal rods. Place new joint filler and proceed with concreting according to the indications of this section of the specifications and according to the construction details. Repair the adjacent surfaces (asphalt concrete, cement concrete, paving stones, grass, etc.).

.2 **Curbs**: Saw the damaged section on both sides of the crack and/or the deficiency over a minimum length of 1.5 m (if the deficiency is located within 1.5 m of a movement joint, the contractor shall go to this point), remove and dispose of the materials, drills holes and install the new metal roads (minimum of 2 rods). Place new joint filler and proceed with concreting according to the indications of this section of the specifications and according to the construction details. Repair the adjacent surfaces (asphalt concrete, cement concrete, paving stones, grass, etc.).

.2 No vertical movement of the sidewalk or curb section will be tolerated.

3.10 Surface Tolerance

.1 Concrete tolerance to CSA A23.1, straight edge method

3.11 Field Quality Control

.1 Implement and follow a Quality Control Plan for quality control testing of concrete.

.2 Methods of testing plastic and hardened concrete: to CSA A23.1/A23.2. Testing to include:

.1 Slump.

.2 Air content.

.3 Compressive strength at 7 and 28 days.

.4 Ambient air, formwork, and concrete temperature.

.5 Air voids in hardened concrete.

.6 Compressive strength for early concrete breaks.

.3 Inspect and test concrete and concrete materials to CAN/CSA A23.1/A23.2 using an independent testing laboratory.

.1 Ensure testing laboratory is certified to CSA A283.

.4 Sampling: to CSA A23.2.

.1 Discharge approximately 10% of the load prior to sampling.

.2 Do not place any further concrete until testing of plastic concrete has been completed.

.3 Reject remainder of the load if the results of testing do not meet specifications, and if on-site adjustments permitted in CSA A23.1/A23.2 cannot produce acceptable results.

.5 Acceptance: to CSA A23.1/A23.2.

.1 For a compressive strength less than specified, concrete will be removed and replaced at no additional cost to NCC Representative.

3.12 Cleaning

.1 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19- Construction/Demolition Waste Management and Disposal.

.1 Divert unused concrete materials from landfill.

.2 Provide appropriate area on job site where concrete trucks and be safely washed.

.3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by NCC Representative.

.4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.

.5 Prevent admixtures and additive materials from entering drinking water supplies or streams.

.6 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal.

.7 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

1. Section 26 05 00 Common Work Result – for Electrical

1.2 References

1. Canadian Standards Association (CSA International):

    1. CAN/CSA C22.2 No.18 - Conduit Boxes, and Fittings
    2. CSAC22.2 No.38-M - Thermoset Insulated Wires and Cables
    3. CSAC22.2 No.40-M - Junction and Pull Boxes
    4. CSAC22.2 No.65 - Wire Connectors
    5. CSAC222 No.75-M - Thermoplastic Insulated Wires and Cables
    6. CAN/CSA-C22.2 No. 85-M89 - Rigid PVC Boxes and Fittings
    7. CSAC222No.211.2-M - Rigid PVC (Unplasticized) Conduit

2. Ontario provincial Standard Specifications:

    1. OPSS 602 – Construction Specification for Installation of Electrical Chambers
    2. OPSS 603 - Construction Specification for Installation of Duct
    3. OPSS 604 - Construction Specification for Installation of Cable
    4. OPSS 609 – Construction Specification for Grounding

    5. OPSS 614 – Construction Specification for Installation of Power Supply Equipment

1.3 Submittals

1. NCC Representative reserves the right to require Contractor to submit samples of any materials to be used in this project.

1.4 Measurement and Basis of Payment

2. Electrical work on Structures

    1. All work to be a lump sum item and to include all labour, materials and equipment to complete the work.

3. Embedded Work in benches

    1. All work to be a lump sum item and to include all labour, materials and equipment to complete the work.

4. Power Supply Modifications

    1. All work to be a lump sum item and to include all labour, materials and equipment to complete the work.

5. Wood Post Mounted PVC Box

    1. All work to be a lump sum item and to include all labour, materials and equipment to complete the work.

6. GFCI Duplex Receptacle in Enclosure

    1. All work to be a lump sum item and to include all labour, materials and equipment to complete the work.

PART 2 - PRODUCTS

2.1 Wire Low Voltage Up To 1000v Service

1. Conductors as per OPSS 604 and contract drawings.

2.2 Wire and Cable Connectors

1. Conductors as per OPSS 604 and contract drawings.

2.3 Conduit and Fittings

1. Rigid PVC Conduit
    1. As per OPSS 603 and contract drawings

2. ENT Conduit
    1. As per OPSS 603 and contract drawings

3. Liquid Tight flexible Conduit
    1. As per OPSS 603 and contract drawings

4. Rigid PVC Conduit Fittings
    1. As per OPSS 603 and contract drawings

2.4 Embedded work in Benches

1. Junction Boxes (embedded in benches)

    a. Approved manufacturer: IPEX or approved alternative.

        i. 219mm x 219mm x 184mm (Standard Size)

ii. 500mm x 200mm x 200mm (special size made to order)

b. Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit and junction boxes specified.

2.5 Power Supply Modifications

All equipment located inside Portable Bridge Electrical Room.

1. NQ Load Centre – Panel F1

    a. Approved manufacturer: Square D or approved alternative.

        i. Three Phase, 120 / 208V, 24 cct with 100 Amp main with enclosure and all associated connections and fittings.

2. Contactor

    a. Approved manufacturer: Square D or approved alternative.

        i. Three phase, 60 amp Contactor with all wiring including a manual override switch with indicator on outside of contactor box (see existing contactor for example of switch).. When manual override switch is engaged, lighting is on. When in the off position, contactor controls the panel through with the timer or photocell.

3. Breakers

    a. Approved manufacturer: Square D or approved alternative.

        i. 20 single pole 15 amp breakers installed in Panel F1

        ii. 2 single pole 20 amp breakers installed for existing circuits in panel F1

        iii. One three pole 60 amp breaker installed in existing panel F for main feed to new panel F1.

2.6 Wood post mounted PVC Box

1. Six 4 x 4 wood posts

2. Six Nema 6x rated PVC box to house LED drivers

        i. Approved Manufacturer: IPEX or approved alternative

            1. 500mm x 200mm x 200mm (special size made to order)

3. PVC cladding around the wood post. Coordinate final product with Departmental Representative.

2.7 GFCI Duplex Receptacle in Enclosure

1. Two GFCI Duplex receptacles (5-20R T Slot) as shown in the contract package. Installed on the backside of the associated bench, final location to be determined in the field.

2. Two Nema 4x Stainless Steel enclosure with lockable and hinged in use cover.

    i. Approved Manufacturer: Eaton (model WIUMV-1) or approved alternative.

    ii. All associated wing and accessories.

PART 3 - EXECUTION

3.1 Wire Low Voltage Up To 1000v Service

1. Install as per OPSS 603 and contract drawings

3.2 Wire and Cable Connectors

1. Make splices in junction boxes and pole handholes. Underground splices shall be permitted only with water proof splice kit.

2. Make connections in lighting circuits with compression connectors protected with insulating covers.

3. Seal terminations and splices exposed to moisture, corrosive conditions or mechanical abrasions with heavy wall heat shrinkable insulation.

4. Install as per OPSS 603 and contract drawings.

3.3 Conduit and Fittings

1. Group conduits wherever possible.

2. Do not drill structural members to pass through.

3. PVC conduits to contain insulated green ground wire.

4. Install 6 mm diameter nylon pull cord in empty conduits.

5. Install as per OPSS 603 and contract drawings.

3.4 Embedded Work in Benches

1. Coordinate all embedded work with Landscape drawings and Bench manufacturers to ensure correct cavity sizing for cast in place benched.

3.5 Power Supply Modifications

1. Install breakers as per OPSS 614 and contract drawings. Coordinate installation and all final connections with NCC operations and Maintenance.

3.6 Wood Post mounted PVC Box

2. Install wood post mounted nema 6x rated PVC junction box a minimum 1500mm above final grade. Coordinate final locations in the field with coordination of landscape layout to avoid installing in bare open areas.

3.7 GFCI Duplex Receptacle in Enclosure

1. Install Receptacle as per OPSS 614 and contract drawings. Coordinate final locations in the field with coordination of NCC Electrical.

********** **END OF SECTION** **********

PART 1 - GENERAL

1.1 Related Sections

1. Section 01 11 01 Summary of Work - Electrical
2. Section 26 05 02 Electrical Basic Material and Methods
3. Section 26 05 34 Conduits, Conduits Fastenings and Fittings

1.2 References

1. Canadian Standards Association (CSA International)
    1. CSA C22.1-06, Canadian Electrical Code, Part 1 (20th Edition), Safety Standard for Electrical Installations.
    2. CAN/CSA-C22.3 NO 1-06, Overhead Systems.
    3. CAN3-C235, Preferred Voltage Levels for AC Systems, 0 to 50 000 V
    4. IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.
2. Ontario provincial Standard Specifications:
    1. OPSS 602 – Construction Specification for Installation of Electrical Chambers
    2. OPSS 603 - Construction Specification for Installation of Duct
    3. OPSS 604 - Construction Specification for Installation of Cable
    4. OPSS 609 – Construction Specification for Grounding
    5. OPSS 614 – Construction Specification for Installation of Power Supply Equipment

1.3 Definitions

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

1.4 Design Requirements

1. Operating voltages: to CAN3-C235.
2. Electrical 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 labels for control items in English and French.

1.5 Submittals

1. Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

2. 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 the Departmental Representative for 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 the Departmental Representative.

1.6 Quality Control

1. Quality Control as per 01 45 00

1.7 Delivery, Storage and Handling

1. Material Delivery Schedule: provide the 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.

1.8 System Start-up

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

1.9 Measurement and Basis of Payment

1. All tender items at the contract price to be measured and paid as per OPS standards unless otherwise noted.

PART 2 - PRODUCTS

2.1 Materials and Equipment

1. Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from the Departmental Representative before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

PART 3 - EXECUTION

3.1 Installation

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

3.2 Conduit Installation

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

3.3 Co-ordination of Protective Devices

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

3.4 Field Quality Control

1. Carry out any testing in presence of the Engineer.

2. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

END OF SECTION

PART 1 - GENERAL

1.1 Related Sections

1. Section 26 05 00 Common Work Result – for Electrical.

2. Section 26 05 02 Electrical Basic Material and Methods.

1.2 References

1. Canadian Standards Association (CSA International)
   1. CAN/CSA C22.2 No. 18-98 (R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
   2. CSA C22.2 No. 211.2-M1984 (R2003), Rigid PVC (Unplasticized) Conduit.
   3. CSA C22.2 No. 45.1-07 Electrical Rigid Metal Conduit – Steel
   4. CSA C22.2 No. 227.1 Electrical Non-Metallic Tubing
   5. CSA C22.2 No. 85-M89 (R2006)Rigid PVC Boxes and Fittings

2. Ontario Provincial Standard Specifications
   1. OPSS 106 - General Specification for Electrical Work.
   2. OPSS 603 - Construction Specification for Installation of Duct.

1.3 Submittals

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

2. Product data: submit manufacturer's printed product literature, specifications and datasheets.

3. Quality assurance submittals:
   .1 Test reports: submit certified test reports.
   .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

4. Instructions: submit manufacturer's installation instructions.

1.4 Waste Management And Disposal

1. Separate waste materials for reuse and recycling to the extent possible.

2. Place materials defined as hazardous or toxic waste in designated containers.

3. Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS

2.1 Conduits

1. Rigid pvc conduit: to CSA C22.2 No. 211.2.

2.2 Conduit Fittings

1. Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.

2. Ensure factory "ells" where 90 degrees bends for 25 mm and larger conduits.

2.3 Fish Cord

1. Polypropylene.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

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

3.2 Installation

1. Install PVC conduits underground, in accordance with OPSS 603 and as indicated.

2. Install electrical non-metallic tubing into sleeves in pole footings in accordance with OPSS 603 and as indicated.

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

4. Install fish cord in empty conduits.

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

6. Dry conduits out before installing wire.

3.3 Conduits Underground

1. Slope conduits to provide drainage.

3.4 Cleaning

1. On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1: General

1.1 REFERENCES

1. Illumination Engineering Society of North America (IESNA)
    1. LM-80-08 (or latest) – IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
    2. LM-79-08 (or latest) – IES Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
    3. TM-21-11 (or latest) – IES Technical Memorandum on Projecting Long Term Lumen Maintenance of LED Light Sources.
    4. TM-30-15 (or latest) - IES Method for Evaluating Light Source Color Rendition
2. National Electrical Manufacturers Association (NEMA)
    1. SSL 1-2010 (or latest) - Electronic Drivers for LED Devices, Arrays, or Systems.
3. 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.
4. Canadian Standards Association (CSA International)
    1. CSA 250.0-08, Luminaires
5. Underwriters' Laboratories of Canada (ULC)
    1. UL 2108, Low Voltage Lighting Systems
    2. UL 8750, Light Emitting Diode (LED) Equipment for use in lighting products

1.2 ACTION AND INFORMATION 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 any relevant installation information. Product literature to include product characteristics, performance criteria with: lumen output, candlepower distribution, beam angle, colour temperature, CRI and any TM30 data, L70 life, LM-79-08 and LM-80-15 compliance, dimming compatibilities as well as physical size, finish, limitations, and installation considerations for luminaire and wiring.
    2. Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for approval by NCC Representative.
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 procedures.

1.3 QUALITY ASSURANCE

1. To ensure the maintained quality of the installation, and guaranteeing 1-for-1 replacement of same product in case of failure or vandalism, order minimum 10% overage on each and all line item specified equipment per catalogue ordering information within 2.2 Drivers, 2.3 Dimmers, and 2.6 Luminaires.

2. Some notes below also appear in Part 3.1 Installation in this specification section, either with exact wording or as a cross-reference to the below points. Both specification sections must be read for quality assurance and installation purposes as they impact qualitative general installation procedures and considerations and end result quality of final installation, long-term project objectives and lifespan, lighting aesthetic, and effective control of lighting equipment.

3. Qualifications: Electrical contractor / Installer must have all certifications required for high voltage and low-voltage installations, including for networking and LED lighting equipment and control systems. Contractor's installer must be a certified electrical contractor with minimum 3 similar projects where LED lighting equipment, a phase control LED compatible dimming system, and controls and power wiring was successfully installed and commissioned. Work of this specification is to be executed by competent installers with minimum 5 years' experience in the installation and control of LED products and LED dimming control systems with power and data wiring and terminations.

4. Equipment manufacturer should have ISO 9001: 2008 certification and provide a copy of the certificate, if requested.

5. Review the lighting equipment shipment waybill and any other documents immediately upon arrival, to ensure consistency with fixture specifications and quantities. Make all necessary inquiries with appropriate contacts for resolve on any discrepancies between the shipment and the specifications, prior to signing approval of the shipment.

6. Document any visual damages on the packaging with accurate date-stamped photos and lead all follow-up communication with appropriate parties, stating any concerns on the integrity of the equipment inside.

7. Open the packaging of the equipment and provide a visual and touch inspection on the appearance of integrity for the equipment, as arrived on site. Provide notes and accurate date-stamped photos for any visual deficiencies or perceived issues based on the packaging.

8. Setup on-site testing procedures, making temporary power and data connections for EACH LED tapelight spool or continuous run, and a sampling of each other type of luminaire, to ensure that they are properly operating prior to final installation. If there are any deficiencies during the test, please document all details, including equipment serial numbers, and coordinate resolve with all appropriate parties.

9. At the time of the final test for power and controls/dimming integrity of the fixtures prior to final installation, coordinate the review with the lighting designer to go over specific installation instructions.

10. During installation of any controls/networking cable, note the wire insulation colour coding and use same wire pairs for linked connections to ensure integrity of data communication throughout installed lighting and control equipment.

11. Luminaire locations shall not deviate from designed locations shown on lighting location plans and details, unless directed and/or approved by lighting designer in consultation with project landscape architect and project manager. Contractor shall gain written direction from authority on this decision, prior to any installed location deviation. If a fixture or wiring has been mistakenly installed in an improper location, then installer shall relocate to proper locations without compromising integrity of fixture, wiring, or site condition and re-instate to proper required or previous condition, if different and whichever best serves project and landscaping considerations, for any changes as part of this installation error.

1.4 DELIVERY, STORAGE AND HANDLING

1. Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

2. Contractor to schedule purchase timeframe accordingly through coordination with manufacturer, sales rep., and distributor using ample lead times to ensure that all equipment arrives within project and installation schedules.

3. Review the lighting equipment shipment waybill and any other documents immediately upon arrival, to ensure consistency with fixture specifications and quantities.

4. After initial equipment inspection and testing upon shipment arrival, and confirmation of integrity of working equipment, return equipment to original packaging and best arrangement within packaging, to ensure integrity of equipment while stored prior to final installation.

5. Deliver materials to site in original factory packaging, labelled with manufacturer's name, address, and fixture types as identified in the design drawings and specifications.

6. Keep equipment in sealed box(es), unaffected by weather conditions, and within acceptable consistent ambient temperatures as required of the equipment, or ideally at room temperature, and away from dusty conditions.

7. Packaging Waste Management: remove for reuse and return by manufacturer in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

8. Divert unused metal materials from landfill to metal recycling facility.

9. Decommission and store/recycle/re-use any safe, code-compliant and functioning electrical and lighting equipment or dispose of any unusable or non-functioning electrical site lighting equipment, including any transformers or drivers located on the interior to drive the decommissioned lighting. Disposals of non-functioning equipment is to be in conformance with all applicable disposal guidelines or best practice, including for any applicable hazardous waste materials classifications.

Part 2 Products

2.1 LED LUMINAIRES

1. See the below product specifications for fixture type of luminaires, corresponding drivers and accessories for fixture types, fixture descriptions, and specification numbers. Catalog numbers are shown that meet quality and performance requirements, and represent fixtures that have been coordinated through design development, mockups, and construction documents as compliant with the lighting design intentions, as coordinated with integration into the site construction details and with wiring/control, and with any customizations necessary to permit installation and maintain integrity of both the built condition and designed lighting performance specific to this site and its details. Any alternative materials to those specified must only be proposed for consideration when fully coordinated and supported by a fully subsidized mockup that does not impact project schedule, and that meets or exceeds in all performance considerations of the indicated luminaires, and all design intents and practicalities of the design, installation, and wiring/control conditions. As an example of performance and installation conditions, the lighting output must meet or exceed the critical beam profile characteristics that optimize delivered lighting uniformity for lighting angles to the path and built site features. Installation considerations require

luminaire compliance with all dimensions and accessories required to fully fit within the architectural conditions using low impact installation techniques, allowing easy maintenance in case of replacement, and without compromising the performance which is the visual end result.

2. All Luminaires shall be certified by a Nationally Recognized Testing Laboratory (UL/ULC, ETL, or IEC). No equipment shall be installed unless it has been:
    1. Certified by a certification body in accordance with the certification body's terms of accreditation with Standards Council of Canada, or
    2. Inspected by an inspection body in accordance with the inspection body's terms of accreditation with Standards Council of Canada
    3. Approved of through formal shop drawing review and comments
3. LED Luminaires and Drivers shall meet all technical requirements below:
    1. Minimum Light Output and light output ranges as established by the acceptable material listed
    2. Identification of beam angles, or beam angles, or light distribution patterns
    3. Fixtures shall be dimmable to minimum 10% dimmed levels, and be able to turn off and maintain settings (address and last or preset intensities) using central control for dimming and on/off, during final commissioning as well as for permanent scene settings and any specialty functions that require on-the-fly standalone individual or grouped lighting changes over the entire site
    4. Maximum power allowance of 2.5w/ft average for all linear LED products
    5. Minimum CRI as indicated within the specification and lighting fixture schedule per fixture type
    6. Equipment to be min. IP66 or acceptable at lower IP ratings if they are fully contained within min. IP67 rated enclosures/housings for drivers, dimmers, and fixtures, or installed in locations suitable to the IP rating
    7. Minimum Lumen Maintenance of 50,000 hrs (L70 at 25-degree Celsius ambient for all LED fixtures
    8. Light output of the LED system shall be measured using the absolute photometry method following IES LM-79 and IES LM-80 requirements and guidelines.
    9. Fixed white 2700 Kelvin Colour Temperature is prescribed in the specification luminaires as listed in Part 2.5 Luminaires.
    10. Colour Consistency: LED manufacturer shall use a maximum 3-step MacAdam Ellipse binning process to achieve consistent luminaire-to-luminaire colour temperature for luminaires

2.2 DRIVERS

1. LED Drivers:
    1. Listed lifetimes of drivers shall have a rated average life of 50,000 hours, minimum, and be located in easily accessible NEMA watertight boxes, or other enclosure per manufacturer recommendations, for longevity of effective life and easy maintenance/replacement.
    2. Wiring connections to LED drivers shall be per installation instructions on corresponding equipment sheets, or per best practice for integrity and durability of electrical installation and for field maintenance considerations.
    3. Dimming:
        1. LED driver shall be compatible with dimming controls directly, or through an accessory that provides compatibility between the control system and the LED driver and its required dimming control operation of the LED fixture.

2. LED luminaires/drivers and their wiring configurations shall be able to dim to minimum (10%) without visible flicker for any static dimmed settings or continuously dimmed levels.

5. Driver and LEDs shall be compatible, either with driver identified through standard driver selection as part of the fixture catalogue information, alternative and acceptable driver from same manufacturer, or with LEDs/fixture specifically identified as approved for use with, or compatible with the prescribed driver type.
6. LED driver shall have a minimum power factor (pf) and maximum crest factor (cf) within tolerances of the proper operation of the LED, at full input power and across any specified voltage ranges.

2. **LED Driver for Luminaire type L1**

1. Fixtures are controlled via remote driver that is damp location rated only, to be installed into an appropriately sized wet location rated IP67 and watertight suitable NEMA enclosure for outdoor applications.
2. Remote driver provides up to 4 x 96w rated power with 120v input, and 24V DC output voltage to the linear LED tapelight.
3. Power supply/driver has an ambient temperature operating range of min. -20 Celsius to +50 Celsius, for effective operation in all seasons.
4. NEMA enclosure size according to driver recommendations in accommodating cooling requirements by free air convection. Consult manufacturer, rep, or product specifications for appropriate size NEMA enclosure to keep within driver temperature tolerances.
5. Driver is controlled by ELV dimming signal, from remotely located phase dimming control equipment that enables individual dimmed levels per same fixture type and area on the site. Driver/dimming control is to allow different dimmed levels if same fixtures are in different locations or mounting conditions on the site.
6. ***Acceptable materials:***
    1. Luminii ELV Power Supply #CVE-XXXX-24-(blank) XXXX = qty. required by electrical drawings/fixture wattage and run lengths

3. **LED Driver for Luminaire type L2a**

1. Driver is integral to the fixture with the standard fixture IP66 rating, as fixtures are above the established 10 year high water level elevation of 43.29
2. Integral LED driver accepts a universal 100-277v, 50/60Hz input
3. Driver is controlled by ELV dimming signal, from remotely located phase dimming control equipment that enables individual dimmed levels per same fixture type and area on the site. Driver/dimming control is to allow different dimmed levels if same fixtures are in different locations or mounting conditions on the site.
4. ***Acceptable materials:***
    1. Cooper Eaton Lumiere standard UNV “DIMELV” driver for Eon B1 LED bollard rated for IP66 conditions

4. **LED Driver for Luminaire type L2b**

1. Driver is integral to the fixture with the standard fixture IP66 rating, as fixtures are above the established 10 year high water level elevation of 43.29
2. Integral LED driver accepts a universal 100-277v, 50/60Hz input
3. Driver is controlled by ELV dimming signal, from remotely located phase dimming control equipment that enables individual dimmed levels per same fixture type and

area on the site. Driver/dimming control is to allow different dimmed levels if same fixtures are in different locations or mounting conditions on the site.

4. ***Acceptable materials:***
    1. Cooper Eaton Lumiere standard UNV “DIMELV” driver for Eon B1 LED bollard rated for IP66 conditions

5. **LED Driver for Luminaire type L2c**

    1. Driver is integral to the fixture with the standard fixture IP66 rating, as fixtures are above the established 10 year high water level elevation of 43.29
    2. Integral LED driver accepts a universal 100-277v, 50/60Hz input
    3. Driver is controlled by ELV dimming signal, from remotely located phase dimming control equipment that enables individual dimmed levels per same fixture type and area on the site. Driver/dimming control is to allow different dimmed levels if same fixtures are in different locations or mounting conditions on the site.
    4. ***Acceptable materials:***
        1. Cooper Eaton Lumiere standard UNV “DIMELV” driver for Eon B1 LED bollard rated for IP66 conditions

6. **LED Driver for Luminaire type L2d**

    1. Driver is integral to the fixture with the standard fixture IP66 rating, as fixtures are above the established 10 year high water level elevation of 43.29
    2. Integral LED driver accepts a universal 100-277v, 50/60Hz input
    3. Driver is controlled by ELV dimming signal, from remotely located phase dimming control equipment that enables individual dimmed levels per same fixture type and area on the site. Driver/dimming control is to allow different dimmed levels if same fixtures are in different locations or mounting conditions on the site.
    4. ***Acceptable materials:***
        1. Cooper Eaton Lumiere standard UNV “DIMELV” driver for Eon B1 LED bollard rated for IP66 conditions

7. **LED Driver for Luminaire type L3:**

    1. **NOT IN USE**

8. **LED Driver for Luminaire type L4a**

    1. Fixtures are controlled via remote driver that is damp location rated only, to be installed into an appropriately sized wet location rated IP67 and watertight suitable NEMA enclosure for outdoor applications.
    2. Remote driver provides up to 4 x 96w rated power with 120v input, and 24V DC output voltage to the linear LED tapelight.
    3. Power supply/driver has an ambient temperature operating range of min. -20 Celsius to +50 Celsius, for effective operation in all seasons.
    4. NEMA enclosure size according to driver recommendations in accommodating cooling requirements by free air convection. Consult manufacturer, rep, or product specifications for appropriate size NEMA enclosure to keep within driver temperature tolerances.
    5. Driver is controlled by ELV dimming signal, from remotely located phase dimming control equipment that enables individual dimmed levels per same fixture type and

area on the site. Driver/dimming control is to allow different dimmed levels if same fixtures are in different locations or mounting conditions on the site.

6. ***Acceptable materials:***
    1. Luminii ELV Power Supply #CVE-XXXX-24-(blank) XXXX = qty. required by electrical drawings/fixture wattage and run lengths

9. **LED Driver for Luminaire type L5**

    1. **NOT IN USE**

10. **Ballast/Driver for Luminaire type L6**

    1. **Maintain existing for any relocated type L6 fixtures, or upgrade or revise if the pedestrian lamp post is to undergo any upgrades to its technology, optics, or electrical systems.**

2.3 DIMMING and LIGHTING CONTROL (FOR ALL LIGHTING FIXTURE TYPES L1, L2a, L2b, L2c, L2d, L4a)

1. DIMMER

    1. a 120-volt reversed phase dimmer with rated power suitable for outdoor use at -10 to +45 degrees Celsius, installation to accommodate this functionality
    2. The dimmer must be placed inside the electrical cabinet, protected from the weather.
    3. The dimmer is compatible with the photocell and / or timer signal to switch on / off devices with the corresponding commissioning intensities.
    4. The dimmer is designed to operate in a power distribution configuration at the line power supply and to be connected to a separate power source that is networked to a control station.
    5. The dimmer operates at a voltage of 120 volts
    6. Dimmer with phase matching and phase inversion default with a load capacity of 600 watts. 600W resistive or electronic load capacity. 300W magnetic load capacity (120V only)
    7. The installation must include commissioning in the presence of the project design team and the project manager.
    8. The final intensity settings for each dimmer must be documented and retained from beginning to end, including after regular checks and maintenance of the facilities.
    9. Magnetic transformers must be properly loaded to their rated current
    10. Use care when retrofitting magnetic transformers with LED loads to ensure proper loading
    11. EchoConnect Class 2 control network
    12. Topology-free wiring using Belden 8471 or equivalent and one #18 ESD drain wire
    13. Wiring may be bus, loop, homerun or any combination of these
    14. Up to 500 meters (1640 feet) of control wiring per system
    15. Optional Cat5/5e wiring using Belden 1583A or equivalent
    16. Requires optional Cat5 termination accessories
    17. UL and cUL LISTED
    18. Conforms to UL 508 and UL 2043
    19. Ambient room temperature: -10 to 45°C / 14 to 113°F
    20. Ambient humidity: 5 to 95% non-condensing

21. ***Acceptable materials:***
    1. ETC Unison Echo Phase-Adaptive Dimmer #ELVD, mounted internally or externally to the lighting control system cabinet x 6 quantity (1 per circuit)

2. ROOM CONTROLLER

    1. 100-277V, 60Hz power input per circuit
    2. Supports 120V and 277V circuits within the same controller
    3. 20-amp, fully-rated bi-state latching relay per output
    4. 0-10VDC control rated for 100mA maximum sink per zone
    5. Optional 0-10V isolation kit available for use with non-isolated drivers and ballasts
    6. Supports rising clamp screw terminal wiring connections for:
    7. Line-voltage relay power input, output and pass-through with support for 14-8AWG wire
    8. Low-voltage 0-10V dimming output with support for 22-16AWG wire
    9. EchoConnect control connection for Belden 8471 wire (or approved equal)
    10. 24V auxiliary power output terminals with support for 22-16AWG wire
    11. A/V contact input terminals with support for 22-16AWG wire
    12. Demand Response contact input with support for 22-16AWG wire
    13. UL924 emergency lighting input with support for 22-16AWG wire
    14. Built-in EchoConnect station power supply with support for up to six stations/sensors and five external power controllers
    15. Up to 16 stations/sensors and 15 externals power controllers supported with optional 16U EchoConnect power supply
    16. A/V input supports normally open (NO) or normally closed (NC) operation
    17. Demand Response input supports Normally Open (NO) operation
    18. UL924 Contact input supports normally open (NO) or normally closed (NC) operation
    19. Onboard status indicators for station power , UL924 input, A/V input, demand response, and controller power
    20. Dip switch configuration for:
        Onboard EchoConnect Power Supply (on/off)
        A/V input type (NO/NC)
        UL924 input type (NO/NC)
        UL924 inclusion per circuit (on/off)
    21. UL and cUL LISTED
    22. Conforms to UL508, UL2043 and UL924
    23. Ambient room temperature: 0 to 45°C
    24. Ambient humidity: 5 to 95% non-condensing
    25. ***Acceptable materials:***
        1. ETC Unison Echo 8-zone Room Controller with TimeClock #ERMC8-TC x 1 quantity

3. ASTRONOMICAL TIMECLOCK

    1. Connects via the EchoConnect® control network via low voltage Class 2 wiring
    2. Two #16 AWG wires for 24VDC auxiliary power
    3. Topology-free wiring over Belden 8471 or equivalent and one #14 ESD drain wire

4. Supports optional use of Belden 1583A or equivalent Ethernet control-wire when used with Cat5 termination accessories
5. Wiring may be bus, loop, homerun or any combination of these
6. Supports up to 500 meters (1,640 feet) of control wiring
   Up to 1000ft using CAT5
7. All station terminations utilize pluggable connectors
8. Ambient temperature: 32° to 104°F/0 to 40°C
9. Ambient humidity: 30-90% non-condensing
10. ***Acceptable materials:***
    1. ETC Unison Echo TimeClock #E-ATC-4 (Black – RAL 9004) with #E-2B (two-gang locking cover – flush mount black) x 1 quantity

4. STRIP HEATER (for Electrical enclosure)

1. 250W 120v strip heater for maintaining temperature above low end limits for electrical and electronic lighting control equipment
2. Strip heater measures 10 ½" length and 1 ½" width
3. Heaters must be wired by qualified personnel to electrical code requirements
4. Check supply voltage for compliance with heater nameplate voltage.
5. Ensure that suitable wire and connectors are used. Good tight low resistance connections are essential for good heater life.
6. All heating systems should include suitable thermostatic control and safety limits. Check code requirements and the factory for available devices.
7. SA1054 terminal box is available to aid in protecting live electrical terminals.
   FIELD ELECTRICAL CONNECTIONS
8. The bottom nuts of the electrical connections are factory torqued to a maximum of 10 in.-lbs.
9. When making field electrical connections ensure that the terminal stud is not allowed to rotate.
10. Failure to restrain the bottom nut to prevent the terminal stud from rotating when tightening the top nut, may damage the mica washer, the terminal stud to resistance coil connection or the insulating material around the coil to stud connection.
11. Recommended torque for tigntening the top nut is 15 in.-lbs. minimum and 20 to 25 in.-lbs. maximum.
12. If it is necessary to tighten the top nut without restraining the bottom nut, it is suggested that a torque of 10 in.-lbs. not be exceeded
11. ***Acceptable materials:***
    1. CCI Thermal Technologies inc. Caloritech #SS1101 (120v) x 1 quantity

5. ELECTRICAL CABINET (FOR LIGHTING CONTROL EQUIPMENT)

1. NEMA Type 3R enclosure for inside electrical room
2. Double door style cabinet
3. Fits all lighting control equipment, with exception of possibly the Adaptive phase dimmers which can accommodate temperatures of -10 Celsius to 45 Celsius
4. Cabinet measures min. 30" width x 30" height x 10" depth, with a 27" x 27" removable mounting panel
5. 16 or 14 steel guage
6. Neoprene gasketed doors
7. Padlock hasp, if required

8. Three point lock with vault handle
9. Nylon rollers on latch rods
10. ANSI/ASA61 grey polyester – epoxy textured powder coating inside out
11. CSA Certified 150359
12. ***Acceptable materials:***
    1. BEL Products Inc. AMC Series EEMAC/NEMA 3R cabinet #AMC303010 x 1 quantity. Reference lighting design drawings for possible lighting control equipment arrangement

2.4 FINISHES

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

2. Fixture brackets, anchors, and any attachment hardware required to affix fixtures to locations should be considerate of material which it is attaching to, and provide for any intermediate materials necessary between to avoid galvanic reactions of dissimilar metals.

3. Final luminaire colour shall be determined at or before final shop drawing approvals, as a coordination item between possible fixture colours from manufacturer and preferred fixture colour by architect, lighting designer, and project design and stakeholder team. Final fixture colour shall be chosen against physical colour swatches, including the industry-wide acceptable RAL swatches, and be evaluated on-site under typical daytime lighting conditions based on preferred colour and any cost implications of non-standard colours. Any extended lead time information per colour choice is to be communicated by contractor, and not factor into the decision-making but be respected for scheduling, such that there is an appropriate timeframe for Final colour choice and that it can be decided without impacting the schedule, and required timeframe by contractor for fixture arrival and installation.

2.5 OPTICAL CONTROL DEVICES

1. Acceptable lenses and optical control accessories are specified below with the respective catalog information in the Luminaires section

2. Provide all specified lenses and optical control accessories identified with the luminaires. The specification includes lenses and optical accessories of which some or all of them may be required as part of the final commissioning and focus of the fixture to achieve optimal lighting results.

2.6 LUMINAIRES

1. **Luminaire type L1 (Extrusion with lens)**

    1. ***Description:*** Custom length linear aluminum extrusion complete with lens options. Extrusion is compatible with LED strips up to 14mm width. Extrusion ends are near end of slot, approx. 152.5mm from end of bench itself, and allow enough space at end of slot to accommodate end-feed wiring into LED tape.
    2. ***Fixture dimensions:*** Available in custom length sections between 50mm and 6,000mm, with lengths to be determined as best suits installation condition, and finalized during or before final shop drawing review.
    3. ***Voltage:*** n/a
    4. ***Wattage:*** n/a

5. ***Light characteristics:*** Extrusion available with identified lens types as well as other lens types, offering versatile and customizable optical control of the LED tapelight within the extrusion. Final lens decided at shop drawing review.
6. ***Mounting:*** Integrated onto kick plate curb for lighting at stairs. Fixture comes complete with bracket onto which the main extrusion can snap into place for secure retention of extrusion to bracket. LED extrusion or clip is attached to kickplate curb with nutted welded stud, or tapped machine bolt. Both installation possibilities require that no hardware penetrate through and be exposed at the top side of the metal curb. Optimal installation method to be coordinated and determined by contractor with project design and manager team.
7. ***Control:*** n/a
8. ***Special features:*** Versatile optics with 6 available lens types, customizable extrusion lengths with a kit of parts available to fully complete a single extrusion fixture length between 50mm and 6,000mm, or a continuous running extrusion length, and with brackets that accommodate adjustments in attachment location along extrusion length, with lenses that accommodate different desired beam distributions
9. ***Finish:*** ALCOA 6063 T-5 aluminum alloy finish, in natural unpainted finish or available in black painted finish. Use of natural finish for this project. Where dissimilar metals exist between extrusion and mounting location or hardware, appropriate gasketing is to be used to elimate possible galvanic reactions
10. ***Acceptable materials:***
    1. Luminergie LumenTruss 1000 series, 1400 Profile #1230 (1400 profile-LM22220) – 1263 (standard opal lens-LM22292) or 1261 (standard optiflex lens-LM22290) - 1476 (standard endcap-LM22304-45 without hole) – 1441 (standard endcap-LM22304-41 with hole) – 1280 (flat bracket-LM22306) – 1325 (straight joiner-LM22335-01) – lengths and quantities to be determined by contractor, confirmed at shop drawing phase, based on total continuous fixture length as shown on drawings, locations for mounting, and any limitations on tapelight continuous run length. Final lens selection will be decided at shop drawing phase.
    2. *Provide all extrusion and accessories in lengths and quantities as required.

2. **Luminaire type L1 (LED tapelight)**

1. ***Description:*** Flexible linear fixed 2700K white LED tapelight for insertion and adhesion to aluminum extrusion. LED spacing is every 10mm, and tapelight is field-cuttable every 63.5mm for custom-length according to installation requirements and extrusion length. Fixture comes at required length, per specifications and as site conditions and installation contractor require.
2. ***Fixture dimensions:*** Fixture is available up to 14,640mm (48’-0”) length, 11.4mm in width, and 2.3mm in height
3. ***Voltage:*** 120v to remote ELV power supply (up to 4 x 96w), 24V DC to LED tape
4. ***Wattage:*** 2.50 w/ft on average
5. ***Light characteristics:*** fixed 2700K white, with approx. 185 delivered lumens per foot (at 3,100K at max. output), and a CRI rating of min. 80
11. ***Mounting:*** Land Entry stair - integrated onto kick plate curb for lighting at stairs. LED is attached to aluminum extrusion using adhesive back and specified heat sink tape, and additionally secured at not more than every 152.5 mm intervals using an approved additional adhesive for the LED strip tape backing and additional heat sink tape attachment to the aluminum extrusion. Specified tapelight aluminum extrusion comes complete with flat mounting clip onto which the main extrusion can snap into place for secure retention of extrusion to bracket. LED extrusion or clip is attached to kickplate curb with nutted stainless steel machine bolt, per mounting details.

Optimal installation method to be coordinated and determined by contractor with project design and manager team. Extrusion with LED is completed with proper lens type to enclose LED strip.

6. ***Control:*** LED tape is controlled through ELV dimming signal to its corresponding driver, as part of the local control system
7. ***Special features:*** LED tape is IP65 wet location listed, within an outdoor wet location rated extrusion, for use at the defined locations on site. Max. continuous length of LED tape, without interruption and within operational tolerances is 14.64m (48'-0") as a maximum run length (in series) and operation with its driver. Tapelight is field cuttable every 63.5mm for accurate run lengths continuous from one end of kickplate to opposite end, with soldered leads as end electrical connections
8. ***Finish:*** n/a, as implemented into luminaire L1 extrusion
9. ***Acceptable materials:***
    1. Luminii LineLED Wet #LL30WET-27K-SL-SL-various lengths *designated in metres on site lighting layout drawings (ie. L1-x.x m) with power supply Dimming ELV #CVE-*-24V-blank (120v) *as required by electrical drawings/loads

3. **Luminaire type L2a**

    1. ***Description:*** Low-profile ELV dimmable standard IP66 rated LED bollard, with type IV (forward throw) optical distributions, and B0-U0-G0 (BUG) ratings for light cutoff and glare considerations
    2. ***Fixture dimensions:*** Nominal 915mm height, 129mm width (front elevation), and 145mm depth (side elevation) of fixture head atop a same width pole base of 129mm width (front elevation) and 76mm depth (side elevation)
    3. ***Voltage:*** 120v to integral driver (120-277v UNV standard), IP66 rated assembly
    4. ***Wattage:*** 8.5W, at max. output
    5. ***Light characteristics:*** fixed 2700K white (Rebel ES LED chip), with approx. 351-361 delivered lumens (dependent on optic type/distribution)
    6. ***Mounting:*** Bollard is mounted atop a concrete mounting pad/footing, per detail drawings. The adjustable mounting bollard base is attached with its own leveling system
    7. ***Control:*** ELV phase dimmable control, with specified ELV control equipment on circuit for optimizing light output/light levels
    8. ***Special features:*** standard IP66 rated, as L2a fixtures are mounted at higher elevations than the 10 year high water elevation of 43.29m. Fixture's B0-U0-G0 ratings ensure full downward casting light and visual comfort
    9. ***Finish:*** Luminaire and mounting base are double protected by a RoHS compliant chemical film undercoating and polyester powdercoat paint finish. Fixture colour is GM-graphite metallic as per previous phase equipment and client and design team preferences
    10. ***Acceptable materials:***
        1. Cooper Lighting Eaton Lumiere Eon LED bollard #303-B1-LEDB1 – 2700 – UNV – T4 – DIMELV – GM – 36 – no options

4. **Luminaire type L2b**

    1. ***Description:*** Low-profile ELV dimmable standard IP66 rated LED bollard, with type II (lateral throw) optical distributions, and B0-U0-G0 (BUG) ratings for light cutoff and glare considerations
    2. ***Fixture dimensions:*** Nominal 915mm height, 129mm width (front elevation), and 145mm depth (side elevation) of fixture head atop a same width pole base of 129mm width (front elevation) and 76mm depth (side elevation)

3. ***Voltage:*** 120v to integral driver, IP66 rated assembly
4. ***Wattage:*** 8.5W, at max. output
5. ***Light characteristics:*** fixed 2700K white (Rebel ES LED chip), with approx. 351-361 delivered lumens (dependent on optic type/distribution)
6. ***Mounting:*** Bollard is mounted atop a concrete mounting pad/footing, per detail drawings. The adjustable mounting bollard base is attached with its own leveling system
7. ***Control:*** ELV phase dimmable control, with specified ELV controller on circuit for optimizing light output/light levels
8. ***Special features:*** standard IP66 rated, as L2b fixtures are mounted at higher elevations than the 10 year high water elevation of 43.29m. Fixture's B0-U0-G0 ratings ensure full downward casting light and visual comfort
9. ***Finish:*** Luminaire and mounting base are double protected by a RoHS compliant chemical film undercoating and polyester powdercoat paint finish. Final fixture colour t.b.d. at shop drawings, but GM-graphite metallic is preferred by designer
10. ***Acceptable materials:***
    1. Cooper Lighting Eaton Lumiere Eon LED bollard #303-B1-LEDB1 – 2700 – UNV – T2 – DIMELV – GM – 36 – no options

5. **Luminaire type L2c**

1. ***Description:*** Low-profile ELV dimmable standard IP66 rated LED bollard, with type IV (forward throw) optical distributions, and B0-U0-G0 (BUG) ratings for light cutoff and glare considerations
2. ***Fixture dimensions:*** Nominal 305mm height, 129mm width (front elevation), and 145mm depth (side elevation) of fixture head atop a same width pole base of 129mm width (front elevation) and 76mm depth (side elevation)
3. ***Voltage:*** 120v to integral driver, IP66 rated assembly
4. ***Wattage:*** 8.5W, at max. output
5. ***Light characteristics:*** fixed 2700K white (Rebel ES LED chip), with approx. 351-361 delivered lumens (dependent on optic type/distribution)
6. ***Mounting:*** Bollard is mounted atop concrete wall, near to bench wall, per site layout and detail drawings
7. ***Control:*** 0-10v dimmable control, with specified 0-10v controller on circuit for optimizing light output/light levels
8. ***Special features:*** standard IP66 rated, as L2c fixtures are mounted at higher elevations than the 10 year high water elevation of 43.29m. Fixture's B0-U0-G0 ratings ensure full downward casting light and visual comfort
9. ***Finish:*** Luminaire and mounting base are double protected by a RoHS compliant chemical film undercoating and polyester powdercoat paint finish. Final fixture colour t.b.d. at shop drawings, but GM-graphite metallic is preferred by designer
10. ***Acceptable materials:***
    1. Cooper Lighting Eaton Lumiere Eon LED bollard #303-B1-LEDB1 – 2700 – UNV – T2 – DIMELV – GM – 12 – no options

6. **Luminaire type L2d**

1. ***Description:*** Low-profile ELV dimmable standard IP66 rated LED bollard, with type II (lateral throw) optical distributions, and B0-U0-G0 (BUG) ratings for light cutoff and glare considerations

2. ***Fixture dimensions:*** Nominal 610mm height, 129mm width (front elevation), and 145mm depth (side elevation) of fixture head atop a same width pole base of 129mm width (front elevation) and 76mm depth (side elevation)
3. ***Voltage:*** 120v to integral driver, IP66 rated assembly
4. ***Wattage:*** 8.5W, at max. output
5. ***Light characteristics:*** fixed 2700K white (Rebel ES LED chip), with approx. 351-361 delivered lumens (dependent on optic type/distribution)
6. ***Mounting:*** Bollard is mounted atop a concrete mounting pad/footing, per detail drawings. The adjustable mounting bollard base is attached with its own leveling system
7. ***Control:*** ELV phase dimmable control, with specified ELV controller on circuit for optimizing light output/light levels
8. ***Special features:*** standard IP66 rated, as L2d fixtures are mounted at higher elevations than the 10 year high water elevation of 43.29m. Fixture's B0-U0-G0 ratings ensure full downward casting light and visual comfort
9. ***Finish:*** Luminaire and mounting base are double protected by a RoHS compliant chemical film undercoating and polyester powdercoat paint finish. Final fixture colour t.b.d. at shop drawings, but GM-graphite metallic is preferred by designer
10. ***Acceptable materials:***
    1. Cooper Lighting Eaton Lumiere Eon LED bollard #303-B1-LEDB1 – 2700 – UNV – T2 – DIMELV – GM – 24 – no options

7. **Luminaire type L3**

    1. ***NOT USED***

8. **Luminaire type L4a (Extrusion with lens)**

    1. ***Description:*** Custom length linear aluminum extrusion complete with lens options. Extrusion is compatible with LED strips up to 14mm width. Extrusion ends are near end of slot, approx. 152.5mm from end of bench itself, and allow enough space at end of slot to accommodate end-feed wiring into LED tape.
    2. ***Fixture dimensions:*** Available in custom length sections between 50mm and 6,000mm, with lengths to be determined as best suits installation condition, and finalized during or before final shop drawing review.
    3. ***Voltage:*** n/a
    4. ***Wattage:*** n/a
    5. ***Light characteristics:*** Extrusion available with identified lens types as well as other lens types, offering versatile and customizable optical control of the LED tapelight within the extrusion. Final lens decided at shop drawing review.
    6. ***Mounting:*** Integrated into detailed slot at underside of concrete bench. Fixture comes complete with bracket onto which the main extrusion can snap into place for secure retention of extrusion to bracket. LED extrusion or clip is attached to concrete with nutted anchored stud, or with other proper and suitable anchorage hardware. Preferred installation is directly through backside of extrusion into concrete directly. Optimal installation method to be coordinated and determined by contractor with project design and manager team.
    7. ***Control:*** n/a
    8. ***Special features:*** Versatile optics with 6 available lens types, customizable extrusion lengths with a kit of parts available to fully complete a single extrusion fixture length between 50mm and 6,000mm, or a continuous running extrusion length, and with brackets that accommodate adjustments in attachment location

along extrusion length, with lenses that accommodate different desired beam distributions

9. ***Finish:*** ALCOA 6063 T-5 aluminum alloy finish, in natural unpainted finish or available in black painted finish. Use of natural finish for this project. Where dissimilar metals exist between extrusion and mounting location or hardware, appropriate gasketing is to be used to elimate possible galvanic reactions
10. ***Acceptable materials:***
    1. Luminergie LumenTruss 1000 series, 1500 Profile #1500 (1500 profile-LM22230-01) – 1263 (standard opal lens-LM22292) or 1261 (standard optiflex lens-LM22290) - 1571 (standard endcaps-LM22305-85) – 1280 (flat bracket-LM22306) – 1325 (straight joiner-LM22335-01) – lengths and quantities to be determined by contractor, confirmed at shop drawing phase, based on total continuous fixture length as shown on drawings, locations for mounting, and any limitations on tapelight continuous run length.
    2. *Provide all extrusion and accessories in lengths and quantities as required.

9. **Luminaire type L4a (LED tapelight)**

1. ***Description:*** Flexible linear fixed 2700K white LED tapelight for insertion and adhesion to aluminum extrusion. LED spacing is every 10mm, and tapelight is field-cuttable every 63.5mm for custom-length according to installation requirements and extrusion length. Fixture comes at required length, per specifications and as site conditions and installation contractor require.
2. ***Fixture dimensions:*** Fixture is available up to 14,640mm (48’-0”) length, 11.4mm in width, and 2.3mm in height
3. ***Voltage:*** 120v to remote ELV power supply (up to 4 x 96w), 24V DC to LED tape
4. ***Wattage:*** 2.50 w/ft on average
5. ***Light characteristics:*** fixed 2700K white, with approx. 185 delivered lumens per foot (at 3,100K at max. output), and a CRI rating of min. 80
6. ***Mounting:*** Integrated into detailed slot at underside of concrete bench. LED tape is attached to aluminum extrusion using provided adhesive tape back, and additionally secured at not more than every 152.5 mm intervals using an approved additional adhesive for the tape attachment to the aluminum extrusion. Fixture comes complete with bracket onto which the main extrusion can snap into place for secure retention of extrusion to bracket. LED extrusion or clip is attached to concrete with nutted anchored stud, or with other proper and suitable anchorage hardware. Preferred installation is directly through backside of extrusion into concrete directly. Optimal installation method to be coordinated and determined by contractor with project design and manager team. Extrusion with LED is completed with proper lens type to enclose LED strip
7. ***Control:*** LED tape is controlled through ELV dimming signal to its corresponding driver, as part of the local control system
8. ***Special features:*** LED tape is IP65 wet location listed, within an outdoor wet location rated extrusion, for use at the defined locations on site. Max. continuous length of LED tape, without interruption and within operational tolerances is 14.64m (48’-0”) as a maximum run length (in series) and operation with its driver. Tapelight is field cuttable every 63.5mm for accurate run lengths continuous from one end of kickplate to opposite end, with soldered leads as end electrical connections
9. ***Finish:*** n/a, as implemented into luminaire L1 extrusion
10. ***Acceptable materials:***
    1. Luminii LineLED Wet #LL30WET-27K-SL-SL-various lengths *designated in metres on site lighting layout drawings (ie. L1-x.x m) with power supply Dimming ELV #CVE-*-24V-blank (120v) *as required by electrical drawings/loads

10. **Luminaire type L5**

    1. ***NOT USED***

11. **Luminaire type L6**

    1. REMOVED Type LS FIXTURES 'Core Park' post-top lights. L6 fixtures are removed LS fixtures, relocated to locations per site lighting layout, complete with proper footing and anchorage details as per existing condition or improved upon for new locations.

2.7 CONTROL SYSTEM

1. See 2.3 DIMMERS

2.8 EXECUTION

1. INSTALLATION

1. Remove existing core park lights and relocate appropriate quantity to locations indicated as Fixture type L6

2. Locate and install luminaires as indicated.

3. Luminaire installation is to proceed by dry-fitting Linear LED tapelight and extrusion, before final installation into concrete or steel, as per mounting location. Installation to ensure the easy removal of product (for any future replacement) without damage to or compromising the mounting location.

4. Luminaire locations shall not deviate from designed locations shown on drawing elevations, unless directed and/or approved by lighting designer in consultation with project architect and construction manager. Contractor shall gain written direction from authority on this decision, prior to any installed location deviation. If a fixture or wiring has been mistakenly installed in an improper location, then installer shall relocate to proper locations without compromising integrity of fixture, wiring, or building condition and re-instate to proper required or previous condition, if different and whichever best serves project and building considerations, for any changes as part of this installation error.

2. WIRING

1. Wiring connections to LED drivers shall be per installation instructions on corresponding equipment sheets, or per best practice for integrity and durability of electrical installation and for field maintenance considerations.

3. LUMINAIRE ALIGNMENT

1. Luminaires are to be mounted centred within their shown locations on the drawings, and per any drawn details, represented by properly scaled luminaire symbols.

2. Bollard luminaires are to be mounted such that front edge of bollard pole base is to be directly adjacent to edge or path

3. Align luminaires mounted in continuous rows to form straight uninterrupted line unless otherwise specified on plans.

4. CLEANING

1. Clean in accordance with Section 01 74 11 - Cleaning.

2. Remove surplus materials, excess materials, rubbish, tools and equipment.

3. Waste Management: separate waste materials for reuse and/or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal

END OF SECTION

Part 1 GENERAL

1.1 Related Sections

.1 Section 01 33 00 - Submittal procedures

.2 Section 32 11 16.01 - Granular sub-base

1.2 References

.1 ASTM International

.1 ASTM D4791-10, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.2 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.3 Ontario Provincial Standard Specification (OPSS):

.1 OPSS 1010 Material Specification for Aggregates – Granular A, B, M, and Select Subgrade Material.

1.3 Action and Informational Submittals

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for aggregate materials and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

.3 Submit one 30kg sample.

.4 Allow continual sampling by NCC Representative during production.

.5 Provide NCC Representative with access to source and processed material for sampling.

.6 Install sampling facilities at discharge end of production conveyor, to allow NCC Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by NCC Representative to permit full cross section sampling.

.7 Provide front end loader or other suitable equipment including trained operator for stockpile sampling as necessary. Move samples to storage place as directed by NCC Representative.

.8 Supply new or clean sample bags or containers according appropriate to aggregate materials.

.9 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

1.4 Delivery, Storage and Handling

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements

.2 Transportation and Handling: handle and transport aggregates to avoid segregation, contamination and degradation.

.3 Storage: store washed materials or materials excavated from underwater 24 hours minimum to allow free water to drain and for materials to attain uniform water content.

1.5 Basis of Payment

.1 No separate payment shall be made for asphalt paving removal. Payment for asphalt paving removal shall be deemed to be included in the lump sum price for the Temporary Staging Area 1, Temporary Staging Area 2, and Pathway Connection to Structure.

.2 The aggregates are measured and paid within the different items in the Price Table that include granular sub-bases, porous stone or stone dust

Part 2 PRODUCTS

2.1 Materials

.1 Granular ‘A’: Granular A shall be produced by crushing one or more of the following:

.1 Quarried bedrock.

.2 Boulders, cobbles, gravel, sand, and fines from naturally formed deposits. Page 4 Rev. Date: 11/2013 OPSS.MUNI 1010

.3 RAP up to 30% by mass.

.4 RCM up to 100% by mass.

.2 Select Subgrade Material (Earth Borrow): Select subgrade material shall only be produced from natural deposits of non-plastic silt, sand, and gravel material. Reclaimed materials of any type shall not be used.

.3 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, free from adherent coatings and injurious amounts of disintegrated pieces or other deleterious substances.

.4 Flat and elongated particles of coarse aggregate: to ASTM D4791.

.1 Greatest dimension to exceed 5 times least dimension.

.5 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

.1 Natural Sand

.2 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

.3 Reclaimed asphalt pavement.

.4 Reclaimed concrete material.

.6 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

.1 Crushed rock.

.2 Gravel composed of naturally formed particles of stone.

.3 Light weight aggregate, including slag and expanded shale.

.4 Reclaimed asphalt pavement.

.5 Reclaimed concrete material.

.7 Granular Materials:

.1 All granular materials used for the foundations must respect the requirements and specifications outlined in the Ontario Provincial Standard Specifications (OPSS).

.2 Gradations to be within limits specified when tested to ASTM C136-06 and ASTM C117-04. Sieve sized to CAN/CGSB-8.1-88

.8 Clear Stone:

.1 This material shall be 19mm diameter clear stone, free draining (washed) crushed limestone free of any particles.

.9 Stone Dust:

Sieve		% Passing
10	mm	- 100
5	mm	50 - 100
1.25	mm	20 - 55
0.315	mm	10 - 30
0.08	mm	0 - 8

2.2 Source Quality Control

.1 Inform NCC Representative of proposed source of aggregates and provide access for sampling 2 weeks minimum before starting production.

.2 If materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate alternative source.

.3 Advise NCC Representative 2 weeks minimum in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions are acceptable for topsoil stripping.

.1 Visually inspect substrate in presence of NCC Representative.

.2 Inform NCC Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with topsoil stripping only after unacceptable conditions have been remedied.

3.2 Preparation

.1 Topsoil stripping:

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.

.2 Begin topsoil stripping of areas as indicated after area has been cleared of brush and removed from site.

.3 Strip topsoil to depths as indicated. Avoid mixing topsoil with subsoil.

.4 Dispose of topsoil as directed by NCC Representative.

.2 Aggregate source preparation:

.1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as approved by authority having jurisdiction.

.2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.

.3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.

.4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.

.5 Trim off and dress slopes of waste material piles and leave site in neat condition.

.6 Provide silt fence or other means to prevent contamination of existing watercourse or natural wetland features.

.3 Processing:

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, as required, including reclaimed materials that meet physical requirements of specification is permitted in order to satisfy gradation requirements for material and, percentage of crushed particles, or particle shapes specified.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate gradation.

.5 Where necessary, screen, crush, wash, classify and process aggregates with suitable equipment to meet requirements.

.6 Stockpiling:

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by NCC Representative. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by NCC Representative within 48 hours of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:

.1 Maximum 1.5 m for coarse aggregate and base course materials.

.2 Maximum 1.5 m for fine aggregate and sub-base materials.

.3 Maximum 1.5 m for other materials.

.8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.9 Do not cone piles or spill material over edges of piles.

.10 Do not use conveying stackers.

.11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.3 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.4 Leave any unused aggregates in neat compact stockpiles as directed by NCC Representative.

.5 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

.6 Restrict public access to temporary or permanently abandoned stockpiles by means acceptable to NCC Representative.

END OF SECTION

31 11 00 - CLEARING AND GRUBBING

Part 1 General

1.1 MEASUREMENT PROCEDURES

.1 Measurement and Payment:

.1 Measurement Procedures: in accordance with Summary of paid items as listed in the price table.

1.2 REFERENCES

.1 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

.1 Clearing consists of cutting off trees and brush vegetative growth to not more than specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.

.2 Close-cut clearing consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.

.3 Clearing isolated trees consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.

.4 Underbrush clearing consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.

.5 Grubbing consists of excavation and disposal of stumps and roots, boulders and rock fragments, to not less than specified depth below existing ground surface.

1.4 SUBMITTALS

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

.2 Samples:

.1 Submit one (1) sample of each material listed below for approval prior to delivery of materials to project site.

.2 Tree wound paint: one liter can with manufacturer's label.

.3 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Submit manufacturer's installation instructions.

1.5 QUALITY ASSURANCE

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

1.6 STORAGE AND PROTECTION

.1 Prevent damage to existing vegetation, buildings, site surfaces and features which are to remain.

.1 Repair damaged items to approval of NCC Representative.

.2 Replace trees designated to remain, if damaged, as directed by NCC Representative.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling when passible.

Part 2 Products

2.1 MATERIALS

.1 Not used

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to the Contract Drawings and requirements of authorities having jurisdiction.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

.1 Inspect site and verify with NCC Representative items designated to remain.

.2 Locate and protect utility lines: preserve in operating condition active utilities traversing site.

.1 Notify NCC Representative immediately of damage to or when unknown existing utility lines are encountered.

.2 When utility lines which are to be removed are encountered within area of operations, notify NCC Representative in ample time to minimize interruption of service.

.3 Notify utility authorities before starting clearing and grubbing.

.4 Keep roads and walks free of dirt and debris.

3.3 CLEARING

.1 Clearing includes felling, trimming, and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within cleared areas.

.2 Clear as indicated by NCC Representative by cutting at height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.

.3 Cut off branches overhanging area cleared as directed by NCC Representative.

.4 Cut off unsound branches on trees designated to remain as directed by NCC Representative.

3.4 CLOSE CUT CLEARING

.1 Close cut clearing to ground level, unless otherwise indicated.

.2 Cut off branches overhanging area cleared as directed by NCC Representative.

.3 Cut off unsound branches on trees designated to remain as directed by NCC Representative.

3.5 ISOLATED TREES

.1 Cut off isolated trees as indicated by NCC Representative at height of not more than 300 mm above ground surface.

.2 Grub out isolated tree stumps.

.3 Prune individual trees as indicated.

.4 Trim trees designated to be left standing within cleared areas of dead branches; and trim branches to heights as indicated.

.5 Cut limbs and branches to be trimmed close to bole of tree or main branches.

.6 Paint cuts more than 10 cm in diameter with approved tree wound paint.

3.6 UNDERBRUSH CLEARING

.1 Clear underbrush from areas to ground level, unless otherwise indicated.

3.7 GRUBBING

.1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.

.2 Grub out stumps and roots to not less than 300 mm below ground surface.

.3 Grub out visible rock fragments and boulders, greater than 150 mm in greatest dimension.

.4 Fill depressions made by grubbing with suitable material and ensure that the surface is level with existing adjacent ground surface.

3.8 REMOVAL AND DISPOSAL

.1 Stumps and roots removed as part of this project are to be treated as contaminated waste and must be disposed of at an approved landfill.

.2 Remove and dispose of cleared materials off site, unless otherwise indicated.

.3 Remove diseased trees identified by NCC Representative and dispose of this material to approval of NCC Representative.

3.9 FINISHED SURFACE

.1 Leave ground surface in condition suitable for immediate grading operations to approval of NCC Representative.

3.10 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 1 GENERAL

1.1 Related Requirements

.1 Section 31 11 00 – Clearing and Grubbing.

.2 Section 31 23 33.01 – Excavation, Trenching and Backfilling.

1.2 References

.1 ASTM International

.1 ASTM D698-07e1, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m^3).

1.3 Action and Informational Submittals

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

1.4 Existing Conditions

.1 Examine subsurface investigation report which is available from the NCC Representative upon written request.

.2 Known underground and surface utility lines and buried objects are as indicated on site plan.

.3 Refer to dewatering in Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.5 Protection

.1 Protect elements which are to remain as directed by NCC Representative. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

1.6 Basis of Payment

.1 No separate payment shall be made for asphalt paving removal. Payment for asphalt paving removal shall be deemed to be included in the lump sum price for the Pathway Connection to Structure.

Part 2 PRODUCTS

2.1 Materials

.1 Excavated or graded material existing on site suitable to use as fill for grading work if approved by NCC Representative.

.2 Fill material: Type Class B in accordance with of Section 31 23 33.01 - Excavating, Trenching and Backfilling

Part 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for rough grading installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of NCC Representative.

.2 Inform NCC Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative.

3.2 Stripping Of Topsoil

.1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected as determined by NCC Representative.

.2 Commence topsoil stripping of areas as indicated after area has been cleared of brush, weeds and grasses and removed from site.

.3 Strip topsoil to depths as indicated. Rototill weeds and grasses and retain as topsoil on site. Avoid mixing topsoil with subsoil.

.4 Stockpile in locations as directed by NCC Representative. Stockpile height not to exceed 2 m.

.5 Dispose of unused topsoil off site.

3.3 Grading

.1 Rough grade to levels, profiles, and contours allowing for surface treatment as indicated.

.2 Slope rough grade away from building as indicated.

.3 Grade ditches to depth as indicated.

.4 Rough grade to following depths below finish grades, unless otherwise indicated:

.1 150 mm for grassed areas.

.2 500 mm for flowerbeds.

.3 500 mm for gravel paving.

.4 555 mm for concrete precast paving unit walkways.

.5 450 mm for concrete slabs and walkways.

.6 350 mm for asphalt pathways

.5 Prior to placing fill over existing ground, scarify surface to depth of 150 mm minimum before placing fill over existing ground. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

.6 Compact filled and disturbed areas to maximum dry density to ASTM D698, as follows:

.1 90% under landscaped areas.

.2 95% under paved and walk areas.

.7 Do not disturb soil within branch spread of trees or shrubs to remain.

3.4 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 Protection

.1 Protect existing fencing, trees, landscaping, natural features, bench marks, buildings, pavement, surface or underground utility lines which are to remain as directed by NCC Representative. If damaged, restore to original or better condition unless directed otherwise.

.2 Maintain access roads to prevent accumulation of construction related debris on roads.

3.6 Testing

.1 Inspection and testing of soil compaction will be carried out by testing laboratory designated by ULC. Costs of tests will be paid by NCC.

3.7 Surplus Material

.1 Remove surplus material and material unsuitable for fill, grading or landscaping off site.

END OF SECTION

31 23 33.01 - EXCAVATING, TRENCHING AND BACKFILLING

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 35 13.43 Special procedures for contaminated sites

.2 Section 03 30 00 - Cast-in-Place Concrete

.3 Section 31 22 13 - Rough Grading

1.2 MEASUREMENT PROCEDURES

.1 No measurement for payment will be made for the item "Excavation and disposal of contaminated soils". Payment shall be by lump sum. Include all costs for labour, materials and equipment necessary for the completion of the work of this item, to the limits as shown on the drawings and as directed by the NCC Representative.

.2 The work of the item " Excavation and disposal of contaminated soils" also includes all costs for the disposal of contaminated soils off site (note that all excavated materials are considered to be contaminated).

.3 Backfilling, will be included in articles of the Price Table that include any backfilling of trench or foundation work.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series, non-metric.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, metric.

1.4 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock: solid material in excess of 1.00 m^3 and which cannot be removed by means of heavy duty mechanical excavating. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.

.3 Topsoil:

.1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters.

.4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.

.7 Unsuitable materials:

.1 Weak, chemically unstable, and compressible materials.

.2 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422-63(2007) and ASTM C136-14 : Sieve sizes to CAN/CGSB-8.1-88.

.2 Table:

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse, when possible.

.2 Dispose of all non-compliant materials off site.

1.6 EXISTING CONDITIONS

.1 Examine the geotechnical report, if available, in the appendix of this specification.

.2 Buried services:

.1 Before commencing work verify location of buried services on and adjacent to site.

.2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.

.3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.

.4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.5 Record location of maintained, re-routed and abandoned underground lines.

.6 Confirm locations of recent excavations adjacent to area of excavation.

.3 Existing buildings and surface features:

.1 Conduct, with NCC Representative condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by NCC Representative.

.3 Protect existing features from damage while work is in progress. Existing risk management measures include soil caps at some locations on Richmond Landing. Contractor must ensure that cap is not damaged by the work. In event of damage, immediately make repair to approval of the Engineer.

.4 Install protection fences on ground around trees located nearby the construction site to prevent damage to their root systems. These fences shall be installed at the vertical limit of tree crown to be protected.

.5 If the death and/or removal of trees and vegetation cannot be avoided, compensation shall be established based on the monetary value following a tree assessment to be undertaken by an NCC apointed qualified arborist based on a context sensitive basis which considers the size, health, and age of each specimen to be adversely affected; the significance of the location of the affected area to the Capital; the affected area's relative landscape contribution to the quality of the Capital's setting; and the relative impact of the anticipated loss of ecosystem function.

.6 Except for trees shown on drawings, trees (with outside diameter larger than 10cm) shall not be cut. If cutting of trees with outside diameter larger than 10cm is required, an authorization from NCC Project Manager shall be obtained by Contractor.

.7 All tree pruning activities (including root pruning) must be conducted under the supervision of a certified arborist.

.8 The residues of pruning, branches or tree parts that present signs of disease or pest infestation must be disposed of properly in accordance with all federal, provincial and local regulations to minimize the spread of disease (e.g., Dutch elm disease, Emerald ash borer, etc.).

.9 If any breeding birds are observed, a mitigation plan (which may include establishing appropriate buffers around active nests) must be developed to address potential impacts to migratory birds or their active nests. This must be carried out in consultation with the Canadian Wildlife Services.

.10 If trees are accidentally damaged or removed as a result of the works, the contractor will plant two trees for each tree damaged or removed (a 2:1

ratio). Contractor shall get a planting plan approved by NCC before the planting of trees. Contractor will monitor the success of all plantings and re-vegetation for two years and will undertake any remedial actions that may be required.

.11 Workers must be formally informed that it is forbidden to harm wildlife. If animals are encountered, workers must allow the animal to leave the premises on its own by walking slowly towards the animal.

.4 Pollution Control:

.1 According to section 01 35 43 Environmental Procedures. Any environmental spills (biological, chemical or petroleum based) must be reported to the NCC 24 Hour Emergency Communication Service at 613-239-5353.

.5 Restoration:

.1 Contractor shall be responsible for the re-instatement of all areas of fauna habitat in and around the site that has been degraded as a result of the Work.

1.7 PROTECTIVE MEASURES FOR EXCAVATION OF CONTAMINATED MATERIALS

.1 Establish methods and maintain facilities to ensure that contaminated soil/materials and ground water are managed in accordance with applicable legislation. Do not allow discharge of contaminants or pollutants from the excavation area or shore line activities, to surrounding soil or surface water.

.2 Establish and maintain dust, erosion and sediment control measures to prevent the release of contaminants from the work area. Contractor is responsible to satisfactorily address any complaints related to the construction activities, including dust.

.3 Establish and maintain spill response equipment for the intended work and known potential for contamination in soil and groundwater.

.4 Establish and maintain a health and safety plan for the protection of the workers and the public. The plan must include measures associated with the known contaminants identified in the environmental reports (copies of which are available from NCC on request). Worker protection is to include training in the risks and hazards of the work, use and maintenance of appropriate personnel protective equipment, incorporation of hygiene and site maintenance. Protection of the public is to be achieved by controlling exposure to contaminants from the work area.

Part 2 Products

2.1 MATERIALS

.1 Granular ‘A’ and granular ‘B’ type II fill: properties to OPSS1010 and Section 31 05 16 - Aggregate Materials and the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to current norms and regulations. Sieve sizes to CAN/CGSB-8.1.

.3 Table:

Sieve Designation	% Passing	
	Granular 'A'	Granular 'B' type II
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

.2 Class B fill: selected material from other sources, approved by NCC Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials. Any and all soil brought to the site must meet the most stringent of MOECC Table 1 and MOECC Table 9 standards.

No soil (including existing topsoil) is to be reused on-site. All excavated soil (including topsoil) must be sent to an approved landfill as contaminated waste.

.3 Clear stone, 19 mm Type I, in accordance with OPSS 1004 Table 2, and Section 31 05 16.

.4 Geotextiles: to Section 31 32 19.01 - Geotextiles.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways or the stormwater management system in accordance with section 01 35 43 Environmental Procedures.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Establish any protection measures for the control of contaminants during excavation and disposal.

.3 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13 - Selective Site Demolition.

3.3 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.4 Protect buried services that are required to remain undisturbed.

3.4 COFFERDAMS, SHORING, BRACING AND UNDERPINNING

.1 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Act.

.2 During backfill operation:

.1 Unless otherwise indicated or directed by NCC Representative remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.

.3 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.4 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

.2 Remove excess materials from site and restore watercourses as indicated by NCC Representative.

3.5 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress. All groundwater encountered during excavations is to be considered as contaminated and non-hazardous. It must be managed according to the Environmental Protection Plan as specified in section 01-35-43 Environmental Procedures.

.2 Provide the details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in manner not detrimental to public and private property, or portion of Work completed or under construction.

.1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, watercourses or drainage areas.

3.6 EXCAVATION

.1 Excavation

.1 Excavate down to the bed. Excavate according to a straight and regular contour to reduce the necessity of adding fill materials.

.2 The bottom of the excavation must be level and free of detached rock to provide uniform continuous bearing and support for the proposed work.

.2 Removal of Obstacles

.1 Remove any detached concrete and material causing any kind of obstruction and restriction encountered.

.3 Dewatering

.1 Remove the water from the bottom of the excavations as the work progresses and keep pumps available on the site.

.4 Disposal of Excavation Material

.1 Unfit or excess materials must be transported off site immediately.

.2 All waste material and excess excavated material is to be considered as contaminated and shall be disposed of as solid, non-hazardous waste in accordance with Ontario Regulation 347 – General Waste, made under the Environmental Protection Act. Confirmation of waste characterization is to be obtained by Contractor at project initiation through a representative sample submitted for TCLP analysis, including those parameters required by the intended waste receiving site and at a minimum: metals and inorganics, petroleum hydrocarbon compounds, polycyclic aromatic hydrocarbons and volatile organic compounds. Sampling conducted at nearby locations, as documented in the Environmental Reports provided by NCC indicated the contaminated soil can be managed as solid, non-hazardous waste.

.5 Unauthorized Excavation

.1 When the excavation is too deep, backfill the unauthorized excavation at the Contractor's expense, in accordance with the instructions of the NCC's Representative.

.6 Backfill Material

.1 Backfill with granular material.

.2 The areas to be backfilled must be free of debris and water. It is forbidden to use backfill material that is frozen or contains ice or debris. The bottom of the excavations must be compacted before backfilling.

.3 Place backfill material in uniform layers not to exceed 300 mm compacted thickness.

.7 Backfill with Granular Material "B"

.1 Place granular material in layers of 150 mm compacted thickness.

.8 Compaction

.1 Backfill materials: compacted to 95% maximum dry density obtained by the modified Proctor test.

3.7 HAULING AND DISPOSAL

.1 Haul all contaminated material from the work area in accordance with municipal and provincial regulations. Use approved vehicles licensed by Ontario Ministry of the Environment and Climate Change. Travel on approved truck routes in a manner to prevent release of any contaminants to the environment. Contractor is responsible to amend any wet excavated material as necessary to allow transport and disposal within applicable regulations and guidelines.

.2 The contractor is responsible for the effective management of contaminated materials once removed from the work area. Disposal of contaminated materials must be at an approved waste management facility licensed to accept soli/materials as solid, non-hazardous waste.

3.8 FILL TYPES AND COMPACTION

.1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities, in accordance with the standards in force.

3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated.

.2 The bedding and surround materials placed must not be frozen.

3.10 BACKFILLING

.1 Do not proceed with backfilling operations until NCC Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations:

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading.

3.11 RESTORATION

.1 Upon completion of Work, remove waste materials and debris.

.2 Clean and reinstate areas affected by Work as directed by NCC Representative.

.3 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.

.4 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Approved: 2011-06-30

Part 1 GENERAL

1.1 Section Includes

.1 Supply and installation of polymer geotextiles to the construction of protective filtration or drainage structures, roadbeds and rail platforms, for one or the other of the following purposes.

.1 Separate and prevent mixing of granular materials of different grading.

.2 Act as hydraulic filters permitting passage of water while retaining soil strength of granular structure.

1.2 Related Requirements

.1 Section 01 33 00 - Submittal Procedures

.2 Section 03 30 00 - Cast-in-Place Concrete

.3 Section 31 23 33.01 - Excavating, Trenching and Backfilling

1.3 Measurement Procedures

.1 Geotextiles will be included in articles of the Price Table that include geotextiles.

1.4 References

.1 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 1860-April 2012, Material Specification for Geotextiles.

.2 American Society for Testing and Materials International, (ASTM)

.1 ASTM D4491-99a, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

.2 ASTM D4595-86 (2001), Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

.3 ASTM D4716-01, Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

.4 ASTM D4751-99a, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-4.2 No. 11.2-M89 (April 1997), Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).

.2 CAN/CGSB-148.1, Methods of Testing Geotextiles and Complete Geomembranes.

.1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.

.2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.

.3 No.6.1-93, Methods of Testing Geotextiles and Geomembranes - Bursting Strength of Geotextiles Under No Compressive Load.

.4 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.

.5 No. 10-94, Methods of Testing Geosynthetics - Geotextiles - Filtration Opening Size.

.4 Canadian Standards Association (CSA International)

.1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA-G164-M92 (R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.

1.5 Action and Informational Submittals

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

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for geotextiles and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Samples:

.1 Submit following samples 4 weeks prior to beginning Work.

.1 A sample of at least 300 x 300 mm.

.2 Methods of joining.

.4 Test and Evaluation Reports:

.1 Submit copies of mill test data and certificate at least 4 weeks prior to start of Work.

1.6 Delivery, Storage and Handling

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

.2 Store and protect geotextiles from direct sunlight and UV rays.

.3 Replace defective or damaged materials with new.

1.7 Waste Management and Disposal

.1 Separate waste materials when possible.

.2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.

Part 2 PRODUCTS

2.1 Material

.1 Geotextile: woven or non-woven synthetic fibre fabric, supplied in rolls.

.1 Width: 3.5 m minimum.

.2 Length: 150 m minimum.

.3 Composed of: minimum 85% by mass of polypropylene with inhibitors added to base plastic to resist deterioration by ultraviolet and heat exposure.

.2 Geotextile fibre or yarn shall be composed of at least 95% by mass of polypropylene, polyethylene, polyester, or other synthetic polymers, excluding polyamides. Geotextiles shall contain stabilizers or inhibitors, if necessary, to make the filaments resistant to deterioration by excessive ultraviolet (UV) light and heat exposure. Geotextiles shall be resistant to acid and alkali action and shall be unaffected by micro-organisms and insects.

.3 Physical properties:

.1 Thickness: minimum 0.9 mm in accordance with ASTM D5 199.

.2 Grab tensile strength and elongation:

.1 Breaking force: minimum 250 N, wet condition.

.2 Elongation at future: 45-105%.

.3 Ball burst strength at least 1 585 kPa in wet condition in accordance with CAN/CGSB-148.1, No.6.1.

.4 Table 1 – Physical Requirements for woven and Non-Woven Geotextiles

			Geotextile Class			
			Class I		**Class II**	
Property	**Test Method**	**Unit**	**Woven**	**Non-Woven**	**Woven**	**Non-Woven**
Tensile strength, MARV, minimum	CAN/CGSB 148.1, Method No. 7.3	N	800	330	1100	660
Elongation at break, typical		%	<25	>50	<25	>50
Tear strength, MARV, minimum	CAN/CGSB 4.2, Method No. 12.2	N	300	180	400	250
Puncture strength, MARV, minimum	ASTM D 6241	N	1650	990	2200	1375
Permittivity, minimum	CAN/CGSB 148.1, Method No. 4	S^{-1}	0.05			
Filtration opening size	CAN/CGSB	µm	As specified in the Contract Documents			

(FOS), typical	148.1, Method No. 10		or purchasing order
Ultraviolet stability, minimum	ASTM D 4355	%	50% retained tensile strength at 500 hours

.4 Hydraulic properties:

.1 Apparent opening size (AOS): to ASTM D4751, 180 micrometres.

.2 Permittivity: 0.23 cm/second, in accordance with ONGC 148.1 no 4.

.3 Permittivity: 0.134 cm/second, in accordance with ONGC 148.1 no 4.

.5 Securing pins and washers: to CSA G40.21, Grade 300W, hot-dipped galvanized with minimum zinc coating of 600 g/$m^2$to ASTM A123/A123M.

.6 Factory seams: sewn in accordance with manufacturer's recommendations.

.7 Thread for sewn seams: equal or better resistance to chemical and biological degradation than geotextile.

Part 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of NCC Representative.

.2 Inform NCC Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative.

3.2 Installation

.1 Place geotextile material by unrolling onto graded surface in orientation, manner and locations indicated.

.2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.

.3 Place geotextile material on sloping surfaces in one continuous length from toe of slope to upper extent of geotextile.

.4 Overlap each successive strip of geotextile 600 mm over previously laid strip.

.5 Join successive strips of geotextile by sewing.

.6 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.

.7 After installation, cover with overlying layer within 4 hours of placement.

.8 Replace damaged or deteriorated geotextile to approval of NCC Representative.

.9 Place and compact overlaying material according to the situation.

3.3 Cleaning

.1 Clean in accordance with Section 01 74 11 - Cleaning. Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.4 Protection

.1 Vehicular traffic not permitted directly on geotextile.

END OF SECTION

31 37 00 - RIP-RAP AND STONE WORK

Part 1 General

1.1 RELATED SECTIONS

.1 Section 31 32 19.01 - Geotextiles.

1.2 MEASUREMENT PROCEDURES

.1 Measurement and Payment:

.1 Measurement Procedures: in accordance with Summary of paid items as listed in the price table.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C144-99, Standard Specification for Aggregate for Masonry Mortar.

.2 ASTM C618-00, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

.2 Canadian Standards Association (CSA)

.1 CAN/CSA-A23.1-00, Concrete Materials and Methods of Concrete Construction.

.2 CAN/CSA-A3000-98, Cementitions Materials Compendium.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials when possible.

.2 Fold up metal banding, flatten and place in designated area for recycling.

.3 Divert left over aggregate materials from landfill to local quarry for reuse as approved by NCC Representative.

Part 2 Products

2.1 STONE

.1 Hard, dense, durable quarry stone, free from seams, cracks or other structural defects, to meet following size distribution for use intended:

.1 Armour rip-rap:

.1 Not more than 10% of total volume of stones with individual volume less than 0.03 m^3.

.2 Not less than 50% of total volume of stones with individual volume of 0.022 m^3 or more.

.3 Remaining percentage of total volume to have uniform distribution of stones between 0.03 and 0. 022 m^3 size.

.2 Heavy rip-rap:

.1 Not more than 10% of total volume of stones with individual volume less than 0.03 m^3.

.2 Not less than 50% of total volume of stones with individual volume of 0.14m^3 or more.

.3 Remaining percentage of total volume to have uniform distribution of stones between 0.03 and 0.14 m^3 size.

.3 Random rip-rap:

.1 Not more than 10% of total volume of stones with individual volume less than 0.015 m^3.

.2 Not less than 50% of total volume of stones with individual volume of 0.085 m^3 or more.

.3 Remaining percentage of total volume to have uniform distribution of stones between 0.015 and 0.085 m^3 size.

.4 Hand placed rip-rap:

.1 Minimum size of individual stones 0.01 m^3.

.2 Not less than 75% of total volume of stones with individual volume of 0.025 m^3 or more.

.3 Supply rock spalls or cobbles to fill open joints.

.5 Boulders:

.1 Boulders must be heavy enough to be unmovable by hand. They must be durable and resistant, of a density equal to or greater than 2600 kg/m3 and free from seams, cracks or other structural defects. Do not use boulders that change easily (e.g.: shale). Boulders shall be fairly rectangular. They shall also meet the following size distribution requirements.

.2 At least 60% of total volume must be formed by boulders that have a minimum thickness of 450 X 600 X 400 mm.

.3 The remaining percentage of the total volume needed must be composed of boulders with minimum thickness of 300 X 400 X 300 mm, distributed in a uniformed manner.

.4 Smaller boulders must not represent more than 10% of the total volume of boulders required.

.6 Armour stones:

.1 Armour stones are particular size boulders, dimensions as specified in the Contract Drawings. They must be durable and resistant, of a density equal to or greater than 2600 kg/m3 and free from seams, cracks or other structural defects. Do not use stones that change easily (e.g.: shale). Armour stones shall be fairly rectangular so they could be assembled one on the other and one beside the other.

.7 River cobbles and pebbles:

.1 River cobbles and pebbles shall be cleaned, rounded and shall meet the following size requirements:

.1 Cobbles (60-550mm): category 50kg;

.2 Peebles (60-350mm): category 10kg;

.3 Dimensions table:

	Dimensions (mm)		
% passing	<10kg	10 kg	50kg
100	300	350	550
50-85	190	230	390
25-40	106	160	270
0-10	63	70	120
Nominal thickness (mm)	300	350	550

.8 Small pebles or natural gravel

.1 Size 8 to 15mm;

.9 Flat stones:

.1 Large, flat, resistant and durable stones for walkways or other walkable surfaces, dimensions as specified in the Contract Drawings.

2.2 CEMENT MORTAR

.1 Only when specified on construction details.

.2 Cement: to CAN/CSA-A3000, type 10.

.3 Sand for mortar: to ASTM C144.

.4 Mortar mix: 1 part by volume of cement to 3 parts sand, to consistency approved by NCC Representative.

.5 Fly ash cement: to ASTM C618.

2.3 GEOTEXTILE FILTER

.1 Geotextile: in accordance with Section 31 32 19.01 - Geotextiles.

2.4 AGGREGATE

.1 Size 3 to 5mm as joint between flat stones.

Part 3 Execution

3.1 STONE PLACING

.1 Where stone work is to be placed on slopes, excavate trench at toe of slope to dimensions as indicated.

.2 Fine grade area to uniform, even surface. Fill depressions with suitable material and compact to provide firm bed.

.3 Place geotextile on prepared surface in accordance with Section 31 32 19.01- Geotextiles and as indicated. Avoid puncturing geotextile. Vehicular traffic over geotextile not permitted.

.4 Place stones to thickness and details as indicated.

.5 Use larger stones for lower courses and as headers for subsequent courses.

.6 Stagger vertical joints and fill voids with rock spalls or cobbles.

.7 Finish surface evenly, free of large openings and neat in appearance, in manner approved by NCC Representative to secure surface and create a stable mass.

.8 Joints:

.1 Use aggregates to fill in joints between stones, use water to compact in place.

.2 See construction details for type of gravel and level of finish.

3.2 MORTAR

.1 Where indicated, use mortar within one hour after water has been added. Do not add additional water after initial mixing.

.2 Begin applying mortar at bottom courses, above water line and work upwards completely filling voids except for sub drainage relief holes as indicated, and leaving outer faces of stones exposed. Remove excess mortar to expose faces of stones as indicated.

.3 Cure and protect mortar in accordance with CAN/CSA-A23.1 by keeping fabric continuously wet.

3.3 EXCESS MATERIAL

.1 Remove excess material off site.

END OF SECTION

32 11 16.01 - GRANULAR SUB-BASE

Part 1 General

1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete

.2 Section 31 23 33.01 - Excavating, Trenching and Backfilling

.3 Section 31 32 19.01 - Geotextile

1.2 MEASUREMENT PROCEDURES

.1 Production of the granular foundation layers is included in different items in the Price Table.

1.3 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.

.2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.4 ASTM D422-63(1998), Standard Test Method for Particle-Size Analysis of Soils.

.5 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

.6 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft^3) (2,700kN-m/m^3).

.7 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

.8 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series, Non Metric.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit required documents and samples specified in Submittals section at least 4 weeks prior to beginning work.

Part 2 Products materials

.1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

.3 Table

Sieve Designation	% Passing			
100 mm	-	-	-	-
75 mm	100	100	100	-
50 mm	-	-	-	100
37.5 mm	-	-	-	-
25 mm	55-100	-	-	60-100
19 mm	-	-	-	-
12.5 mm	-	-	-	38-70
9.5 mm	-	-	-	-
4.75 mm	25-100	25-85	-	22-55
2.00 mm	15-80	-	-	13-42
0.425 mm	4-50	5-30	0-30	5-28
0.180 mm	-	-	-	-
0.075 mm	0-8	0-10	0-8	2-10

.4 Other Properties as follows:

.1 Liquid Limit: to ASTM D4318, Maximum 25.

.2 Plasticity Index: to ASTM D4318, Maximum 6.

.3 Los Angeles degradation: to ASTM C131. Max% Loss by mass: 40.

.4 Particles smaller than 0.02 mm: to ASTM D422, Maximum 3%.

.5 Soaked CBR: to ASTM D1883, Min 40 when compacted to 100% of ASTM D1557.

Part 3 Execution

3.1 PLACING

.1 Place granular sub-base after subgrade is inspected and approved by NCC Representative.

.2 Construct granular sub-base to depth and grade in areas indicated.

.3 Ensure no frozen material is placed.

.4 Place material only on clean unfrozen surface, free from snow or ice.

.5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. The City's Representative may allow placement of thicker layers if this greater thickness does not prevent the prescribed compacted thickness from being obtained.

.6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.

.7 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

.1 Compaction equipment to be capable of obtaining required material densities.

.2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from NCC Representative before use.

.3 Equipped with device that records hours of actual work, not motor running hours.

.4 Except when otherwise indicated, compact to obtain densities indicated below:

.1 Granular sub-base: 95% of the Modified Proctor maximum dry density;

.2 Granular Foundation: 95% of the Modified Proctor maximum dry density;

.3 Granular topping: 95% of the Modified Proctor maximum dry density.

.5 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.

.6 Apply water as necessary during compaction to obtain specified density.

.7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by NCC Representative.

.8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 SITE TOLERANCES

.1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

.2 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.4 PROTECTION

.1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by NCC Representative.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with the Cleaning section.

END OF SECTION

Approved: 2011-06-30

Part 1 GENERAL

1.1 Section Includes

.1 Materials and installation for asphalt concrete paving for roads and airport runways.

1.2 Related Requirements

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 02 41 13 - Selective Site Demolition.

.3 Section 31 05 16 - Aggregate Materials.

1.3 Basis Payment

.1 No separate payment shall be made for asphalt paving removal. Payment for asphalt paving removal shall be deemed to be included in the lump sum price for demolition of surfaces.

1.4 References

.1 American Association of State Highway and Transportation Officials (AASHTO)

.1 AASHTO M320-10, Standard Specification for Performance Graded Asphalt Binder.

.2 AASHTO R29-02, Standard Specification for Grading or Verifying the Performance Graded of an Asphalt Binder.

.3 AASHTO T245-97(2004), Standard Method of Test for Resistance to Plastic flow of Bituminous Mixtures Using Marshall Apparatus.

.2 Asphalt Institute (AI)

.1 AI MS-2-1994 Sixth Edition, Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.

.3 ASTM International

.1 ASTM C88-05, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulphate or Magnesium Sulphate.

.2 ASTM C117-04, Standard Test Method for Material Finer Than 0.075mm (No.200) Sieve in Mineral Aggregates by Washing.

.3 ASTM C123-04, Standard Test Method for Lightweight Particles in Aggregate.

.4 ASTM C127-07, Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.

.5 ASTM C128-07a, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate.

.6 ASTM C131-06, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

.7 ASTM C136-06, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.

.8 ASTM C207-2006, Standard Specification for Hydrated Lime for Masonry Purposes.

.9 ASTM D995-95b (2002), Standard Specification for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.

.10 ASTM D2419-09, Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.

.11 ASTM D3203-94 (2005), Standard Test Method for Percent Air Voids in Compacted Dense and Open Bituminous Paving Mixtures.

.12 ASTM D4791-05e1, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.

.3 CAN/CGSB-16.3- M90, Asphalt Cements for Road Purposes.

.5 U.S. Environmental Protection Agency (EPA) / Office of Water

.1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

.6 Ontario Provincial Standard Specifications (OPSS)

.1 OPSS 302-April 1999, Construction Specification for Primary Granular Base.

.2 OPSS 310-March 1993, Construction Specification for Hot Mixed, Hot Laid Asphaltic Concrete Paving and Hot Mix Patching.

.3 OPSS 314-December 1993, Construction Specification for Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling.

.4 OPSS 1010-March 1993, Material Specification for Aggregates, Granular A, B, M and Select Subgrade Material.

.5 OPSS 1103-February 1996, Material Specification for Emulsified Asphalt.

.6 OPSS 1150-November 2010, Material Specification for Hot Mix Asphalt.

1.5 Action and Informational Submittals

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

.2 Product Data:

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

.2 Submit manufacturer's instructions, printed product literature and data sheets for asphalt mixes and aggregate and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Submit viscosity-temperature chart for asphalt cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175 degrees C 4 weeks prior to beginning Work.

.3 Samples:

.1 Inform NCC Representative of proposed source of aggregates and provide access for sampling 4 weeks prior to beginning Work.

.2 Submit samples of following materials proposed for use 4 weeks prior to beginning Work.

.1 One 5 L container of asphalt cement.

.2 1 kg of hydrated lime.

.4 Test and Evaluation Reports:

.5 Certificates:

.1 Certification to be marked on pipe.

.6 Test and Evaluation Reports:

.1 Submit manufacturer's test data and certification that asphalt cement meets specification requirements.

.2 Submit manufacturer's test data and certification that hydrated lime meets specified requirements.

.3 Submit asphalt concrete mix design and trial mix test results to NCC Representative for approval at least 4 weeks prior to beginning Work.

.4 Submit printed record of mix temperatures at end of each day.

.7 Sustainable Design Submittals:

.1 Erosion and Sedimentation Control: submit copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.

.2 Construction Waste Management:

.1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

.2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.

.3 Recycled Content:

.1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-industrial content, and total cost of materials for project.

.2 Submit evidence, when Supplementary Cementing Materials (SCMs) are used, to certify reduction in cement from Base Mix to Actual SCMs Mix, as percentage.

.4 Regional Materials: submit evidence that project incorporates required percentage of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.6 Delivery, Storage and Handling

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and stockpile aggregates in accordance with Section 31 05 16 - Aggregate Materials and erosion and sedimentation control plan. Stockpile minimum 50 % of total amount of aggregate required before beginning asphalt mixing operation.

.3 When necessary to blend aggregates from one or more sources to produce required gradation, do not blend in stockpiles.

.4 Stockpile fine aggregate separately from coarse aggregate, although separate stockpiles for more than two mix components are permitted.

.5 Provide approved storage, heating tanks and pumping facilities for asphalt cement.

.6 Submit to NCC Representative copies of freight and waybills for asphalt cement as shipments are received.

.1 NCC Representative reserves right to check weights as material is received.

.7 Stockpile crushed RAP separately in accordance with Section 31 05 16 - Aggregate Materials where directed by NCC Representative.

.8 Protect and cover stockpiles of crushed RAP from rain to approval of NCC Representative in accordance with erosion and sedimentation control plan.

Part 2 Products

2.1 Materials

.1 Performance graded asphalt cement: to AASHTO M320, grade PG 58 28 when tested to AASHTO R29.

.2 RAP:

.1 Crushed and screened to ensure 100% of RAP material passes 50 mm screen before mixing.

.3 Aggregates: in accordance with Section 31 05 16 - Aggregate Materials: General and requirements as follows:

.1 Crushed stone or gravel.

.2 Gradations: within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

.3 Coarse aggregate: aggregate retained on 4.75 mm sieve and fine aggregate is aggregate passing 4.75 mm sieve when tested to ASTM C136.

.4 When dryer drum plant or plant without hot screening is used, process fine aggregate through 4.75 mm sieve and stockpile separately from coarse aggregate.

.5 Separate stockpiles for coarse and fine aggregates not required for sheet asphalt.

.6 Do not use aggregates having known polishing characteristics in mixes for surface courses.

.7 Sand equivalent: ASTM D2419. Min: 50.

.8 Magnesium Sulphate soundness: to ASTM C88. Max % loss by mass:

.1 Coarse aggregate surface course: 12 %.

.2 Coarse aggregate lower course: 12 %.

.3 Fine aggregate, surface course: 16 %.

.4 Fine aggregate, lower course: 16 %.

.9 Los Angeles degradation: Grading B, to ASTM C131. Max % loss by mass:

.1 Coarse aggregate, surface course: 25 %.

.2 Coarse aggregate, lower course: 35 %.

.10 Absorption: to ASTM C127. Max % by mass:

.1 Coarse aggregate, surface course: 1.75 %.

.2 Coarse aggregate, lower course: 2.00 %.

.11 Loss by washing: to ASTM C117. Max % passing 0.075 mm sieve:

.1 Coarse aggregate, surface course: 1.5 %.

.2 Coarse aggregate, lower course: 2.0 %.

.12 Lightweight particles: to ASTM C123. Max % by mass less than 1.95 relative density:

.1 Surface course: 1.5 %.

.2 Lower course: 3.0 %.

.13 Flat and elongated particles: to ASTM D4791, (with length to thickness ratio greater than 5): Max % by mass:

.1 Coarse aggregate, surface course: 15 %.

.2 Coarse aggregate, lower course: 15 %.

.14 Crushed fragments: at least 60 % of particles by mass within each of following sieve designation ranges, to have 1 minimum freshly fractured face. Material to be divided into ranges, using methods of ASTM C136.

.15 Regardless of compliance with specified physical requirements, fine aggregates may be accepted or rejected on basis of past field performance.

.4 Mineral filler:

.1 Ensure finely ground particles of limestone, hydrated lime, Portland cement or non-plastic mineral matter approved by NCC Representative are thoroughly dry and free from lumps.

.2 Add mineral filler when necessary to meet job mix aggregate gradation or as directed by NCC Representative to improve mix properties.

.3 Ensure mineral filler is dry and free flowing when added to aggregate.

.5 Anti-stripping agent: hydrated lime to ASTM C207 type N.

.1 Add lime at rate of approximately 2-3 % of dry weight of aggregate.

.6 Water: to approval of NCC Representative.

2.2 Equipment

.1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.

.2 Rollers: sufficient number minimum of 3 per paver of type and weight to obtain specified density of compacted mix.

.3 Vibratory rollers:

.1 Drum diameter: 1200 mm minimum.

.2 Amplitude of vibration (machine setting): 0.5 mm maximum for lifts less than 40 mm thick.

.4 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:

.1 Boxes with tight metal bottoms.

.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.

.3 In cool weather or for long hauls, insulate entire contact area of each truck box.

.4 Use only trucks which can be weighed in single operation on scales supplied.

.5 Hand tools:

.1 Lutes or rakes with covered teeth for spreading and finishing operations.

.2 Tamping irons having mass 12 kg minimum and bearing area not exceeding 310 cm^2 for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by NCC Representative, may be used instead of tamping irons.

.3 Straight edges, [4.5] m in length, to test finished surface.

.6 Plant testing facility: provide laboratory space at plant site for exclusive use of NCC Representative, for performing tests, keeping records and making reports.

2.3 Mix Design

.1 Mix design to be approved in writing by NCC Representative.

.2 Mix design to be developed by testing laboratory approved in writing by NCC Representative.

.3 Mix to contain maximum 50% by mass of RAP. NCC Representative may approve higher proportion of RAP if Contractor demonstrates ability to produce mix meeting requirements of specification.

.4 Design of mix: by Marshall Method to requirements below.

.1 Compaction blows on each face of test specimens: [50] [75].

.2 Mix physical requirements:

Property	Airfield Pavements	Roads	Sheet Asphalt
Marshall Stability at 60 degrees C kN min	7.0	5.5 surface course/4.5 lower course	3.0
Flow Value mm	2-4	2-4	2-5
Air Voids in Mixture, %	3-5	3-5 surface course/2-6 lower course	3-5
Voids in Mineral Aggregate, % min	15 surface course/13 lower course	15 surface course/13 lower course	16
Index of Retained Stability % minimum	75	75	75

.3 Measure physical requirements as follows:

.1 Marshall load and flow value: to AASHTO T245.

.2 Compute void properties on basis of bulk specific gravity of aggregate to ASTM C127 and ASTM C128. Make allowance for volume of asphalt absorbed into pores of aggregate.

.3 Air voids: to ASTM D3203.

.4 Voids in mineral aggregates: to AI MS2.

.5 Index of Retained Stability: measure in accordance with Section 32 12 10 - Marshall Immersion Test for Bitumen.

.4 Do not change job-mix without prior approval of NCC Representative. When change in material source proposed, new job-mix formula to be approved by NCC Representative.

.5 Return plant dust collected during processing to mix in quantities acceptable to NCC Representative.

Part 3 EXECUTION

3.1 Examination

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of NCC Representative.

.2 Inform NCC Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from NCC Representative.

3.2 Plant and Mixing Requirements

.1 Batch and continuous mixing plants:

.1 To ASTM D995.

.2 Feed aggregates from individual stockpiles through separate bins to cold elevator feeders.

.1 Do not load frozen materials into bins.

.3 Feed cold aggregates to plant in proportions to ensure continuous operations.

.4 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.

.5 Before mixing, dry aggregates to moisture content not greater than 1 % by mass or to lesser moisture content if required to meet mix design requirements. Heat to temperature required to meet mixing temperature as directed by NCC Representative after combining with RAP.

.6 Immediately after drying, screen aggregates into hot storage bins in sizes to permit recombining into gradation meeting job-mix requirements.

.7 Store hot screened aggregates in manner to minimize segregation and temperature loss.

.8 Heat asphalt cement and aggregate to mixing temperature directed by NCC Representative. Do not heat asphalt cement above maximum temperature indicated on temperature-viscosity chart.

.9 Make available current asphalt cement viscosity data at plant. With information relative to viscosity of asphalt being used, NCC Representative to approve temperature of completed mix at plant and at paver after considering hauling and placing conditions.

.10 Maintain temperature of materials within 5 degrees C of specified mix temperature during mixing.

.11 Mixing time:

.1 In batch plants, both dry and wet mixing times as directed by NCC Representative. Continue wet mixing as long as necessary to obtain thoroughly blended mix but not less than 30s or more than 75s.

.2 In continuous mixing plants, mixing time as directed by NCC Representative but not less than 45s.

.3 Mixing time as directed by NCC Representative.

.12 Where RAP is to be incorporated into mix:

.1 Feed from separate cold feed bin specially designed to minimize consolidation of material.

.1 Provide 50 mm scalping screen on cold feed to remove oversized pieces of RAP.

.2 Ensure positive and accurate control of RAP cold feed by use of hydraulic motor or electric clutch and equip with anti rollback device to prevent material from sliding backward on feed belt.

.3 Combine RAP and new aggregates in proportions as directed by NCC Representative. Dry mix thoroughly, until uniform temperature within plus or minus 5 degrees C of mix temperature, as directed by NCC Representative, is achieved prior to adding new asphalt cement.

.1 Do not add new asphalt cement where temperature of dried mix material is above 160 degrees C.

.2 Dryer drum mixing plant:

.1 To ASTM D995.

.2 Load aggregates from individual stockpiles to separate cold feed bins. Do not load frozen materials into bins.

.3 Feed aggregates to burner end of dryer drum by means of multi-bin cold feed unit and blend to meet job-mix requirements by adjustments of variable speed feed belts and gates on each bin.

.4 Where RAP is to be incorporated into mix, dryer drum mixer is to be designed to prevent direct contact of RAP with burner flame or with exhaust gases hotter than 180 degrees C.

.5 Feed RAP from separate cold feed bin designed to minimize reconsolidation of material.

.6 Meter total flow of aggregate and RAP using electronic weigh belt system with indicator that can be monitored by plant operator and which is interlocked with asphalt pump to ensure proportions of aggregate, RAP and asphalt entering mixer remain constant.

.7 Allow for easy calibration of weighing systems for aggregates and RAP without having material enter mixer.

.8 Calibrate bin gate openings and conveyor speeds to ensure mix proportions are achieved.

.1 Calibrate weigh bridge on charging conveyor by weighing amount of aggregate passing over weigh bridge in set amount of time.

.2 Difference between this value and amount shown by plant computer system to differ by not more than plus or minus 2 %.

.9 Make provision for conveniently sampling full flow of materials from cold feed.

.10 Provide screens or other suitable devices to reject oversize particles or lumps of aggregate and RAP from cold feed prior to entering drum.

.11 Provide system interlock stop on feed components if either asphalt or aggregate from bin stops flowing.

.12 Accomplish heating and mixing of asphalt mix in approved parallel flow dryer-mixer in which aggregate enters drum at burner end and travels parallel to flame and exhaust gas stream.

.1 Control heating to prevent fracture of aggregate or excessive oxidation of asphalt.

.2 Equip system with automatic burner controls and provide for continuous temperature sensing of asphalt mixture at discharge, with printing recorder that can be monitored by plant operator.

.3 Submit printed record of mix temperatures at end of each day.

.13 Ensure mixing period and temperature to produce uniform mixture in which particles are thoroughly coated, and moisture content of material as it leaves mixer is 2 % maximum.

.3 Temporary storage of hot mix:

.1 Provide mix storage of sufficient capacity to permit continuous operation and designed to prevent segregation.

.2 Do not store asphalt mix in storage bins in excess of 3 hour.

.4 While producing asphalt mix for this Project, do not produce mix for other users unless separate storage and pumping facilities are provided for materials supplied to this project.

.5 Mixing tolerances:

.1 Permissible variation of asphalt cement from job mix: 0.25%.

.2 Permissible variation of mix temperature at discharge from plant: 5 degrees C.

.6 Addition of anti-stripping agent:

.1 Plant to be equipped with pug mill to thoroughly mix aggregates and lime prior to entering the plant.

.2 Plant to be equipped with suitable conveyor systems capable of supplying aggregates and lime at constant rate.

.3 Plant and equipment used for addition of lime to be equipped with covers to control loss of lime.

.4 Plant to be equipped to control rate of lime incorporation to within 1/4%.

.5 Add water to aggregate prior to entering pug mill.

.6 Add water to lime sufficiently in advance to permit time to slake prior to entering pug mill.

3.3 Preparation

.1 Temporary Erosion and Sedimentation Control:

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with EPA 832/R-92-

005 or requirements of authorities having jurisdiction, whichever is more stringent.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Reshape asphalt pavement in accordance with Section 32 01 16.13 - Reshaping Asphalt Pavement.

.3 When paving over existing asphalt surface, clean pavement surface in accordance with Section 32 01 11.01 - Pavement Cleaning and Marking Removal.

.1 When levelling course is not required, patch and correct depressions and other irregularities to approval of NCC Representative before beginning paving operations.

.4 Apply tack coat in accordance with Section 32 12 13.16 - Asphalt Tack Coats prior to paving.

.5 Prior to laying mix, clean surfaces of loose and foreign material.

3.4 Transportation Of Mix

.1 Transport mix to job site in vehicles cleaned of foreign material.

.2 Paint or spray truck beds with limewater, soap or detergent solution, or non petroleum based commercial product, at least daily or as required.

.1 Raise truck bed and thoroughly drain, and ensure no excess solution remains in truck bed.

.3 Schedule delivery of material for placing in daylight, unless NCC Representative approves artificial light for night placing.

.4 Deposit mix from surge or storage silo to trucks in multiple drops to reduce segregation.

.1 Do not dribble mix into trucks.

.5 Deliver material to paver at uniform rate and in an amount within capacity of paving and compacting equipment.

.6 Deliver loads continuously in covered vehicles and immediately spread and compact.

.1 Deliver and place mixes at temperature within range as directed by NCC Representative, but not less than 135 degrees C.

3.5 Test Strip

.1 Construct and test test strip to approval of NCC Representative.

.2 For airfield pavement, construct test strip in non-critical area to resolve anticipated problems with equipment, mix behaviour or compaction, prior to starting paving operation.

.3 Construct test strip with at least 500 tonnes of mix, and involving more than one lane, so that joint finishing techniques can be established.

.4 During construction of test strip, NCC Representative will establish optimum rolling pattern by taking nuclear densimeter readings and observations to:

.1 Determine sequence and number of passes.

.2 Determine correct operating characteristics of vibratory rollers.

.3 Determine maximum density of asphalt mix.

.4 Ensure smooth surface finish.

.5 Establish actual density achieved by coring in order to determine if additional or other rolling equipment is required to achieve density of not less than 98 % of density obtained with Marshall specimens prepared from samples of mix being used.

3.6 Placing

.1 Obtain NCC Representative's approval of base prior to placing asphalt.

.2 Place asphalt concrete to thicknesses, grades and lines as directed by NCC Representative.

.3 Placing conditions:

.1 Place asphalt mixtures only when air temperature is 5 degrees C minimum.

.2 When temperature of surface on which material is to be placed falls below 10 degrees C, provide extra rollers as necessary to obtain required compaction before cooling.

.3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.

.4 Place asphalt concrete in compacted lifts of thickness as follows:

.1 Levelling course[s] to thicknesses required but not exceeding 50 mm.

.5 Where possible do tapering and levelling where required in lower lifts. Overlap joints by not less than 300 mm.

.6 Place individual strips no longer than 500 m.

.7 Spread and strike off mixture with self propelled mechanical finisher.

.1 Construct longitudinal joints and edges true to line markings.

.1 NCC Representative to establish lines for paver to follow parallel to centerline of proposed pavement. Position and operate paver to follow established line closely.

.2 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver.

.1 Work pavers as close together as possible and in no case permit them to be more than 30 m apart.

.3 Maintain constant head of mix in auger chamber of paver during placing.

.4 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.

.5 Correct irregularities in alignment left by paver by trimming directly behind machine.

.6 Correct irregularities in surface of pavement course directly behind paver.

.1 Remove excess material forming high spots using shovel or lute.

.1 Fill and smooth indented areas with hot mix.

.2 Do not broadcast material over such areas.

.7 Do not throw surplus material on freshly screeded surfaces.

.8 When hand spreading is used:

.1 Use approved wood or steel forms, rigidly supported to assure correct grade and cross section.

.1 Use measuring blocks and intermediate strips to aid in obtaining required cross-section.

.2 Distribute material uniformly without broad casting material.

.3 During spreading operation, thoroughly loosen and uniformly distribute material by lutes or covered rakes.

.1 Reject material that has formed into lumps and does not break down readily.

.4 After placing and before rolling, check surface with templates and straightedges and correct irregularities.

.5 Provide heating equipment to keep hand tools free from asphalt.

.1 Control temperature to avoid burning material.

.2 Do not use tools at higher temperature than temperature of mix being placed.

3.7 Compacting

.1 Roll asphalt continuously using established rolling pattern for test strip and to density of not less than 100 % of maximum density determined for test strip.

.2 Do not change rolling pattern unless mix changes or lift thickness changes.

.1 Change rolling pattern only as directed by NCC Representative.

.3 General:

.1 Provide at least 2 rollers and as many additional rollers as necessary to achieve specified pavement density. When more than 2 rollers are required, 1 roller must be pneumatic tired type.

.2 Start rolling operations as soon as placed mix can bear weight of roller without excess displacement of material or cracking of surface.

.3 Operate roller slowly initially to avoid displacement of material. Do not exceed 5 km/h for breakdown and intermediate rolling for static steel-wheeled and pneumatic tired rollers. Do not exceed 9 km/h for finish rolling.

.4 Use static compaction for levelling coarse less than 25 mm thick.

.5 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 25 impacts per metre of travel. For lifts less than 50 mm thick, impact spacing not to exceed compacted lift thickness.

.6 Overlap successive passes of roller by minimum of 200 mm and vary pass lengths.

.7 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.

.8 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.

.9 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.

.10 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.

.1 Ensure that all points across width of pavement receive essentially equal numbers of passes of compactors.

.11 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll when joint between lanes is rolled.

.12 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.

.4 Breakdown rolling:

.1 Begin breakdown rolling with vibratory roller immediately following rolling of transverse and longitudinal joint and edges.

.2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.

.3 Operate breakdown roller with drive roll or wheel nearest finishing machine. When working on steep slopes or super-elevated sections use operation approved by NCC Representative.

.4 Use only experienced roller operators.

.5 Intermediate rolling:

.1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.

.2 Rolling to be continuous after initial rolling until mix placed has been thoroughly compacted.

.6 Finish rolling:

.1 Accomplish finish rolling with two-axle or three-axle tandem steel wheeled rollers while material is still warm enough for removal of roller marks.

.1 If necessary to obtain desired surface finish, use pneumatic-tired rollers as directed by NCC Representative.

.2 Conduct rolling operations in close sequence.

.7 Dust entire area of sheet asphalt pavements with hydrated lime immediately after rolling to eliminate tendency to pick-up under traffic.

3.8 Joints

.1 General:

.1 Remove surplus material from surface of previously laid strip.

.1 Do not deposit on surface of freshly laid strip.

.2 Construct joints between asphalt concrete pavement and Portland cement concrete pavement as indicated.

.3 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

.2 Transverse joints:

.1 Offset transverse joint in succeeding lifts by at least 600 mm.

.2 Cut back to full depth vertical face and tack face with thin coat of hot asphalt prior to continuing paving.

.3 Compact transverse joints to provide smooth riding surface. Use methods to prevent rounding of compacted surface at joints.

.3 Longitudinal joints:

.1 Offset longitudinal joints in succeeding lifts by at least 150 mm.

.2 Cold joint is defined as joint where asphalt mix is placed, compacted and left to cool below 100 degrees C prior to paving of adjacent lane.

.1 If cold joint can not be avoided, cut back by saw cutting previously laid lane, by at least 150 mm, to full depth vertical face, and tack face with thin coat of hot asphalt of adjacent lane.

.3 Overlap previously laid strip with spreader by 25 to 50 mm.

.4 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with lute or rake.

.5 Roll longitudinal joints directly behind paving operation.

.6 When rolling with static or vibratory rollers, have most of drum width ride on newly placed lane with remaining 150 mm extending onto previously placed and compacted lane.

.4 Construct feather joints so that thinner portion of joint contains fine graded material obtained by changed mix design or by raking out coarse aggregate in mix.

.1 Place and compact joint to ensure joint is smooth and without visible breaks in grade.

.2 Locate feather joints as indicated.

.5 Construct butt joints as indicated.

3.9 Finish Tolerances

.1 Finished asphalt surface to be within 5 mm of design elevation but not uniformly high or low.

.2 Finished asphalt surface not to have irregularities exceeding 5 mm when checked with [4.5] m straight edge placed in any direction.

3.10 Defective Work

.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required.

.1 If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form true and even surface and compact immediately to specified density.

.2 Repair areas showing checking, rippling, or segregation.

.3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

3.11 Cleaning

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

32 37 00 - EXTERIOR SITE FURNISHINGS

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation of custom equipment and furniture, or standard manufactured catalogue items, such as, waste containers, benches, handrails, walkways, removable bollards, planters, tables, bike racks and playground equipment.

.2 The related work required by this section, including the concrete bases (installed under the pavement when necessary), the anchors, plates and accessories, the granular sub-bases and the geotextiles.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.3 SUBMITTALS

.1 Submit product data and shop drawings required in accordance with Section 01 33 00 - Submittal Procedures within 10 business days after the order to start the work.

.2 Indicate dimensions, sizes, colour, assembly, anchorage and installation details for each furnishing specified.

.3 Provide maintenance data for care and cleaning of equipment to the NCC.

1.4 TERMS OF PAYMENT

.1 Supply and installation of the devices and equipment will be paid by the unit, for each type prescribed and actually installed, with the other work necessary as indicated in the description of items in the Price Table.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.2 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 EQUIPMENT AND FURNITURE

.1 The complete list of urban equipment is found in the Summary of Paid Items as Listed in the Price Table. Refer to it for the models, dimensions, finishes and colours specific to the project.

.2 Fastening devices and hardware: except where otherwise indicated, in galvanized steel compliant with CAN/CSA B111-1974 and CAN/CSA G164-M92.

.3 Bolts, anchor bolts, nuts and washers in galvanized steel, compliant with ASTM A307.

Part 3 Execution

3.1 INSTALLATION

.1 Prepare the necessary concrete bases according to the situation, including the sub-bases and the geotextile.

.2 The cast-in-place concreting shall comply with the prescriptions of these specifications.

.3 Assemble furnishings in accordance with manufacturer's instructions, when necessary.

.4 Install furnishing true, plumb, anchored firmly supported as indicated by NCC Representative and the supplier’s specifications.

.5 Touch-up damaged finishes to approval of NCC Representative.

END OF SECTION

32 91 19.13 - TOPSOIL PLACEMENT AND GRADING

Part 1 General

1.1 RELATED SECTIONS

.1 32 92 23 - Sodding

.2 32 93 10 - Trees, Shrubs and Ground Cover Planting

1.2 MEASUREMENT PROCEDURES

.1 Topsoil placement and grading is measured and paid within the different items in the Price Table that include topsoil.

1.3 PAYMENT PROCEDURES

.1 Testing of topsoil: NCC will pay for cost of tests as specified in Section 01 45 00 - Quality Control.

1.4 REFERENCES

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment

.1 PN1340-2005, Guidelines for Compost Quality.

.2 Pollution Prevention Plans and Best Management Practices.

1.5 DEFINITIONS

.1 Compost:

.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.

.2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.

.3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminates.

.4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.6 SUBMITTALS

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

.2 Quality control submittals:

.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 SCHEDULING OF WORK

.1 Spreading of amended topsoil and planting soil and the finishing earthworks must be done in a timely manner to allow sodding, seeding and planting to be undertaken under the best possible conditions, within 10 days after the end of the first spreading work.

Part 2 Products

2.1 TOPSOIL

.1 Soil used for seeding, sodding or planting:

.1 Contain no toxic elements or growth inhibiting materials.

.2 Finished surface free from:

.1 Debris and stones over 50 mm diameter.

.2 Coarse vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

.3 Consistence: friable when moist.

.2 Topsoil: natural or amended soil that comes from a meadow, cultivated soil, a wooded area, or a grassy area.

.3 Coarse sand: hard, granular, and compliant with the prescriptions of CSA A82.56-M1976, well cleaned with all impurities, chemical products or organic materials removed.

.4 Organic fertilizer: rooting fertilizer, composition to be determined according to the analyses, generally a 1-3-1 fertilizer for sodding and seeding. During planting, the addition of fertilizer is unnecessary for trees and shrubs if the planting soil meets the requirements of the tables of this document.

.5 Composted manure: manure composed of a manure compost, straw, sawdust and bark. The composted manure must present the following minimum chemical analysis ($N – P_2O_5 – K_2O$): 1.0-1.0-1.0.

.6 **Required chemical profile**:

Nitrogen:	1.0 – 1.5%
Phosphorus:	0.5 – 1.0%
Potassium:	0.8 – 1.0%
Calcium:	2.0 – 3.0%
Magnesium:	0.3 – 0.5%

Water pH:	6.5 – 7.5
Organic matter:	50 – 60%
C/N ratio:	20 – 25

.7 Vegetable compost: compost composed of leaves, grass and bark. Vegetable compost must present the following minimum chemical analysis ($N – P_2O_5 – K_2O$): 1.0-0.3-0.8.

Required chemical profile:

Nitrogen:	1.0 – 1.5%
Phosphorus:	0.2 – 0.4%
Potassium:	0.5 – 1.0%
Calcium:	1.0 – 3.0%
Magnesium:	0.3 – 0.5%
Water pH:	6.5 – 7.5
Organic matter:	40 – 50%
C/N ratio:	15 – 25

.8 Biostimulant: mycorrhiza; specific quantity for trees, shrubs, conifers, perennials, annuals and bulbs, according to the manufacturer's recommendations.

.9 Peat moss: consists of partially decomposed cellular or fibrous twigs and leaves, sphagnum moss; brown colour with homogeneous elastic consistency; free of wood and harmful materials that could prevent growth; composed of shredded particles measuring at least 5 mm.

.10 Polypropylene fiber: Polypropylene fiber, type Stalok or approved equivalent. Can be incorporated in the soil before delivery on site.

2.2 SOURCE QUALITY CONTROL

.1 Inform the NCC Representative, at least ten (10) days before starting the placement of topsoil or planting soil, of the proposed source of supply and ensure easy access so that the NCC Representative can analyze the materials. Acceptance of the topsoil or planting soil will depend on the soil analysis tests and the inspection. Do not start the work before the topsoil or planting soil is accepted by the NCC Representative.

.2 The analysis and the tests are performed by a laboratory.

.3 The chemical properties of the different types of planting soils (mineral or organic) and the amended topsoil used for the project will be analyzed according to the parameters and requirements of section 0605-100-III of the latest version of the BNQ standard.

.4 The environmental quality of the soil will also be tested to ensure that it meets the most stringent of MOECC Table 1 and MOECC Table 9 standards. Topsoil sourced directly from a commercial supplier is considered to be of acceptable quality provided that it does not contain debris, deleterious materials (e.g. bricks, glass, ashes, cinders, etc), staining or odours.

.5 Submit a 0.5 kg soil sample to the laboratory for testing and clearly indicate its current use, the projected use, the nature of the subsoil and the efficiency of the drainage system. Pack and ship the sample in accordance with the provincial regulations in force and the testing laboratory's requirements.

Minimum chemical composition of the soil:

	(SM) (SC)	(ML) (OL) (CL)
Water pH	Minimum 5	6 to 7.5
Phosphorus (P) (ppm)	22	22
Potassium (K) (ppm)	27	115

.6 Submit copies of the soil analysis report to the NCC Representative, as well as the recommended amendments and fertilization.

2.3 SOIL AMENDMENT AND FERTILIZATION IN SITU

.1 When the surface soil, known as topsoil, is recovered to perform the work, the necessary amendments and fertilizations shall be incorporated according to the results of the analyses specified by the testing laboratory and the requirements of the following tables.

2.4 MIXTURE OF PLANTING SOILS

.1 There are two main classes of planting soils: mineral and organic. Each of these classes is divided into subclasses (Planting Soil A1, Planting Soil A2, etc.). Unless there is notice to the contrary, use Type A mixes (mineral planting soil mixture) for planting of trees and shrubs, sodding and seeding.

2.5 MIXTURE OF MINERAL SOILS

.1 Mineral planting soils must contain less than 30% organic matter measured on a dry basis.

.2 The mineral composition of the planting soil must comply with the following gradation:

1. 80% to 90% particles with a diameter ranging between 0.002 mm and 2 mm, including 10% to 20% particles with a diameter less than 0.05 mm (silt);
2. 0% to 8% particles with a diameter less than 0.002 mm (clay);
3. 0% to 5% particles with a diameter ranging between 2 mm and 25 mm (gravel);

.3 The chemical properties of mineral planting soils must comply with the requirements of the following table:

	A1	A2	A3	A4
Use of mineral planting soil	**Lawn**	**Trees**	**Shrubs**	**Bioretention**

Organic matter measured on a dry basis, %	⩾3	⩾6	⩾10	2-5
Water pH	6 to 7	5,5 to 7,0	6,0 to 7,0	6,0 to 7,5
Cation exchange capacity (CEC), meq/100g	⩾7	⩾10	⩾10	⩾10
Electrical conductivity, mS/cm*	<3,5	<3,5	<3,5	<3,5
Phosphorus, mg/kg**	n.a.	>27	>41	>27
Potassium, mg/kg**	n.a.	>71	>108	>125
*1 millimho (mmho) = 1 millisiemens (mS). Salinity is determined by measuring electrical conductivity. The method specifies that salinity expressed in milligrams per kilogram (mg/kg) is equal to electrical conductivity expressed in millisiemens (mS) multiplied by 700. ** 1 hectare (ha) = 1 square hectometer (hm^2). Milligrams per kilogram (mg/kg) are converted into kilograms per square hectometer (kg/hm^2) by multiplying the milligrams per kilogram by a factor of 2.24.				

.4 List of Mineral Planting Soil Mixtures

The following soil mixes represent examples of soils to submit for approval to the NCC Representative. This list is suggestive and non-limitative and does not represent a guarantee of acceptance. Any equivalence may be submitted for approval.

Planting Soil A1: Mineral planting soil for lawns

- Planting soil number 01-04 supplied by Les Sols Champlain Inc. or approved equivalent product;
- Planting Soil Mixture No. 1 supplied by Matériaux paysagers Savaria ltée or approved equivalent;

Planting Soil A2: Mineral planting soil for trees

- Planting soil number 01-04 supplied by Les Sols Champlain Inc. or approved equivalent product;

- Planting Soil Mixture No. 1 supplied by Matériaux paysagers Savaria ltée or approved equivalent;

Planting Soil A3: Mineral planting soil for shrubs and perenials

- Planting soil number 01-02 supplied by Les Sols Champlain Inc. or approved equivalent product;
- Planting Soil Mixture No. 2 supplied by Matériaux paysagers Savaria ltée or approved equivalent;

Planting Soil A4: Mineral planting soil for biorentention areas

- Planting soil with a permeable factor of 8cm/hr minimum and 12 cm/hr maximum, such as Natureausol supplied by Matériaux paysagers Savaria ltée or approved equivalent.

2.6 MIXTURE OF ORGANIC PLANTING SOILS

.1 Organic planting soils must contain at least 30% organic matter, measured on a dry basis.

.2 The chemical properties of organic planting soils must comply with the requirements of the following table:

	Planting Soil B1	**Planting Soil B2**	**Planting Soil B3**
Use of organic planting soil	**Trees**	**Shrubs**	**Annual and perennial plants (bulb plants included)**
Apparent density, kg/m^3 (wet basis)	>500	>350	>350
Water pH	5.0 to 6.5	5.0 to 6.5	5.0 to 6.5
Cation exchange capacity (CEC), meq/100 g	>20	>20	>20
Electrical conductivity, mS/cm*	<3.5	<3.5	<3.5
Phosphorus, mg/kg**	>27	>67	>67

Potassium, mg/kg**	>71	>134	>134

*1 millimho (mmho) = 1 millisiemens (mS). Salinity is determined by measuring electrical conductivity. The method specifies that salinity expressed in milligrams per kilogram (mg/kg) is equal to electrical conductivity expressed in millisiemens (mS) multiplied by 700.

** 1 hectare (ha) = 1 square hectometre (hm^2). Milligrams per kilogram (mg/kg) are converted into kilograms per square hectometre (kg/hm^2) by multiplying the milligrams per kilogram by a factor of 2.24.

.3 List of Organic Planting Soil Mixtures

.1 The following soil mixtures represent examples of planting soils to submit for approval by the NCC Representative. This list is suggestive and non-limitative and does not represent a guarantee of acceptance. Any equivalence may be submitted for approval.

.2 Planting Soil B3: Organic planting soil for annual and perennial plants (bulb plants included)

.3 Planting soil number 01-07 distributed by Les Sols Champlain Inc. or approved equivalent product.

2.7 GENERAL REQUIREMENTS

.1 The planting soils must be homogeneous, screened and free of foreign objects, pebbles, lumps and woody debris exceeding 25 mm in diameter. They must also be free of foreign objects that are sharp or could cause injuries.

.2 The planting soils shall not release any odour characteristic of anaerobiosis

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways or the stormwater infrastructure system.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 RECOVERY OF TOPSOIL

.1 When recovering topsoil that meets the planting soil characteristics, this recovery shall be done everywhere the surfaces are disturbed. This work shall be performed only after cleanup of the land.

.2 If the topsoil is not recoverable, dispose of it off site.

.3 The recovered topsoil shall be amended to present the same characteristics as the specified planting soil.

3.3 AMENDMENT MATERIALS

.1 Incorporate the amendment materials according to the prescribed quantities determined from the soil sample analysis results.

.2 Ensure the soil amendment materials penetrate the full depth of the planting soil or topsoil before incorporating fertilizer.

3.4 SPREADING OF FERTILIZER

.1 Spread the fertilizer at least 1 week after application of the lime.

.2 Spread the fertilizer uniformly over the entire surface of the planting soil or the topsoil, in accordance with the quantities determined from the sample analysis results.

.3 Ensure the fertilizer penetrates the entire planting soil or topsoil layer.

3.5 BIOSTIMULANT

.1 Add mycorrhiza during planting to favour better rooting, stress resistance and growth of the seedling.

3.6 SOIL REINFORCING

.1 Where indicated, add polypropylene fiber to topsoil at a ratio of 1 lb per square meter (150 mm soil thickness).

.2 Thoroughly mix the fiber with the soil to obtain an even mixture.

.3 Place the soil according to depths and levels as indicated in the Contract documents.

3.7 FINISHING EARTHWORKS

.1 Grade and disturb the amended planting soil or topsoil to eliminate roughnesses and low points and ensure good surface runoff. Produce a well-tilled amended planting soil or topsoil layer by crumbling and then raking.

.2 Use a roller to consolidate the amended planting soil or topsoil layer of the surfaces intended for sodding and to render them smooth, uniform and firm, with a fine loose texture, to the satisfaction of the NCC Representative.

3.8 RESTORATION OF STOCKPILING AREAS

.1 Restore the condition of the stockpiling areas used for the work, to the satisfaction of the NCC Representative.

3.9 SURPLUS MATERIAL

.1 Remove surplus material to the location designated by the NCC Representative.

3.10 SITE STORAGE

.1 Storage shall be established on clean, well-drained surfaces, previously cleaned so as not to contaminate the planting soil.

.2 For prolonged storage, care must be taken to recover the material so as to avoid contamination by seeds or leaching of minerals.

3.11 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after NCC Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil as indicated to following minimum depths after settlement.

.1 150 mm for seeded areas.

.2 135 mm for sodded areas.

.3 500 mm for flower beds.

.4 500 mm for shrub beds.

.5 500 mm for trees.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.12 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by NCC Representative.

.1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.13 ACCEPTANCE

.1 NCC Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.14 SURPLUS MATERIAL

.1 Dispose of materials not required off site.

3.15 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

32 92 23 - SODDING

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 MEASUREMENT PROCEDURES

.1 Measurement and payment for sodding will be made in square meter in accordance with Summary of paid items as listed in the price table.

1.3 SCHEDULING

.1 Schedule sod laying to coincide with preparation of soil surface.

.2 Schedule sod installation when frost is not present in ground.

1.4 QUALITY CONTROL

.1 The sodding material must be approved by the City's Representative at the source of supply.

.2 Once the sod's source of supply has been approved, no other source may be used without written consent.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials when possible.

.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by NCC Representative.

.3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

1.6 DELIVERY AND STORAGE

.1 Deliver, unload and store sod only on loading pallets.

.2 Deliver sod to the site within 24 hours of being lifted and lay sod within 24 hours of being lifted.

.3 It is forbidden to deliver small, irregular or broken pieces of sod.

.4 In wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.

.5 In dry weather, protect sod from drying and water sod as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod will be rejected.

Part 2 Products

2.1 MATERIALS

.1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.

.1 Turf Grass Nursery Sod types:

.1 100% Kentucky Bluegrass, TWCA certified (Turfgrass Water Conservation Alliance), no dicotyledon seeds, Gold Tag first quality seeds. 0% other varieties or herb species, clover, weeds (broadleaf or other). 0% POA ANNUA (annual meadow grass). 0% Bentgrass (Agrostide). Mixture of four or five Kentucky Meadow Grass cultivars;

.2 Number One Named Cultivars: Nursery Sod grown from certified seed.

.2 Turf Grass Nursery Sod quality:

.1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.

.2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.

.3 Mowing height limit: 35 to 65 mm.

.4 Soil portion of sod: 6 to 15 mm in thickness.

.3 Moving residues must be removed.

.2 Sod establishment support:

.1 Geotextile fabric: biodegradable, square mesh.

.2 Wooden pegs: 17 mm x 8 mm x 200 mm.

.3 Biodegradable starch pegs: 17 mm x 8 mm x 200 mm.

.3 Water:

.1 Supplied by NCC Representative at designated source.

.4 Fertilizer:

.1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

.2 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.

Part 3 Execution

3.1 PREPARATION

.1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13 - Topsoil Placement and Grading. If discrepancies occur, notify NCC Representative and do not commence work until instructed by NCC Representative.

.2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.3 Fine grade surface free of humps and hollows to smooth, even grade, elevations indicated to tolerance of plus or minus 8 mm for Turf Grass Nursery Sod and plus or minus 15 mm for Commercial Grade Turf Grass Nursery, surface to drain naturally.

.4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.2 SOD PLACEMENT

.1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.

.2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.3 Roll sod as directed by NCC Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

.1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.

.2 Start laying sod at bottom of slopes.

.3 Peg sod on slopes to following pattern:

.1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.

.2 Not less than 3-6 pegs per square metre.

.3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by NCC Representative.

.4 Drive pegs to 20 mm above soil surface of sod sections.

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.

.2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.

.3 Cut grass when reaching height of 75 mm. Remove clippings which will smother grassed areas [as directed by NCC Representative.

.4 Maintain sodded areas weed free 95%.

.5 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.5 ACCEPTANCE

.1 Turf Grass Nursery Sod areas will be accepted by NCC Representative provided that:

- .1 Sodded areas are properly established.
- .2 Sod is free of bare and dead spots.
- .3 No surface soil is visible from height of 1 500 mm when grass has been cut to height of 75 mm.
- .4 Sodded areas have been cut minimum 2 times prior to acceptance.

.2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.6 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period of one (1) year:

- .1 Water sodded Turf Grass Nursery Sod areas to obtain optimum soil moisture conditions to depth of 100 mm.

.2 Repair and re-sod dead or bare spots to satisfaction of NCC Representative.

.3 Cut grass and remove clippings that will smother grass to height as follows:

- .1 Turf Grass Nursery Sod:
  - .1 75 mm during normal growing conditions.
- .2 Cut grass but at intervals so that approximately one third of growth is removed in single cut.
- .3 Fertilize areas in accordance with fertilizing program, if required.
- .4 Eliminate weeds by mechanical means to extent acceptable to NCC Representative.
- .5 No chemical process will be accepted for weeding.

3.7 CLEANING

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

32 93 10 - TREES, SHRUBS AND GROUND COVER PLANTING

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for plant material, accessories, mulch, planting, tree support, mulching and maintenance.

.2 Sustainable requirements for construction and verification, including, but not limited to:

- Preparation of ditches and planting beds
- Staking proposed tree locations
- Stakes, supports, guying collars, cables, guys, spirals, membranes, etc.
- Maintenance and replacement during the first warranty year
- Winter protection

.2 Related Sections:

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 31 22 13 - Rough Grading.

.3 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 REFERENCES

.1 Agriculture and Agri-Food Canada (AAFC).

.1 Plant Hardiness Zones in Canada-2000.

.2 Canadian Nursery Landscape Association (CNLA).

.1 Canadian Standards for Nursery Stock-2001.

.3 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.2 Transportation of Dangerous Goods Act (TDGA), 1992, c.34.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

1.3 QUALIFICATIONS

.1 The work shall be performed by a qualified contractor, with at least the team leader having a certificate in landscaping/ornamental horticulture training.

1.4 TERMS OF PAYMENT

.1 Measure planting of trees, shrubs and perennials per unit, including all the material necessary for planting and maintenance, in accordance with the plans, specifications and details.

1.5 DEFINITIONS

.1 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

1.6 SUBMITTALS

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

.2 Submit product data for:

- .1 Fertilizer.
- .2 Mycorrhiza.
- .3 Anti-desiccant.
- .4 Guying assembly including clamps, collar, guying wire, anchors and wire tightener.
- .5 Mulch.

1.7 STORAGE AND PROTECTION

.1 Protect plant material from frost, excessive heat, wind and sun during delivery.

.2 Immediately store and protect plant material which will not be installed within 1 hour after arrival at site in storage location approved by the NCC Representative.

.3 Protect plant material from damage during transportation:

- .1 When delivery distance is less than 30 km and vehicle travels at speeds under 80 km/h, tie tarpaulins around plants or over vehicle box.
- .2 When delivery distance exceeds 30 km or vehicle travels at speeds over 80 km/h, use enclosed vehicle where practical.
- .3 Protect foliage and root balls using anti-desiccants and tarpaulins, where use of enclosed vehicle is impractical due to size and weight of plant material.

.4 Protect stored plant material from frost, wind and sun and as follows:

- .1 For bare root plant material, preserve moisture around roots by heeling-in or burying roots in sand or topsoil and watering to full depth of root zone.
- .2 For pots and containers, maintain moisture level in containers. Heel-in fibre pots.
- .3 For balled and burlapped and wire basket root balls, place to protect branches from damage. Maintain moisture level in root zones.

.5 Waste Management and Disposal:

- .1 Separate waste materials for recycling.

1.8 SCHEDULING

.1 Obtain approval from NCC Representative of schedule 7 days in advance of shipment of plant material.

.2 Schedule to include:

- .1 Quantity and type of plant material.
- .2 Shipping dates.
- .3 Arrival dates on site.
- .4 Planting Dates.

1.9 WARRANTY

.1 The Contractor hereby warrants that the plants appearing on the list of plants will remain free of defects for two (2) full years after provisional acceptance, provided that adequate maintenance has been assured. The horticultural maintenance work of the first warranty year shall be included in the planting item concerned. The horticultural maintenance work of the second warranty year will be paid for via the item of the Price Table provided specifically for this purpose, once all the work is completed, compliant and received.

.2 End-of-warranty inspection will be conducted by NCC Representative.

.3 NCC Representative reserves the right to extend Contractor's warranty responsibilities for an additional one year if, at end of initial warranty period, leaf development and growth is not sufficient to ensure future survival.

.4 The NCC Representative shall perform random regular inspections of the maintenance of the vegetation and will evaluate whether it meets the requirements of these specifications. In the event that maintenance is considered satisfactory, the NCC Representative will give the Contractor written notice of default to perform the maintenance within 24 hours. The NCC Representative reserves the right to apply the penalties prescribed in the “Penalties” clause of these specifications.

.5 The Contractor remains completely responsible for the work techniques it uses. The work methods shall be approved by the NCC Representative.

.6 The NCC Representative reserves the right to verify the progress of the work.

.7 In the event that the Contractor refuses or neglects to make the required repairs within forty-eight (48) hours of the NCC Representative’s written notice, the NCC Representative may have said repairs performed and the resulting expense will be deducted from the performance guarantee amount or from any sums due to the Contractor and, in case these sums are insufficient, it will be recovered by means of suits brought against the Contractor.

1.10 SUBSTITUTION

.1 Substitution of the seedlings specified in the planting plans will not be permitted without having obtained the NCC Representative’s written approval of the type, variety and size of the seedling. Seedlings larger than those specified may be used if they are approved by the NCC Representative; however, this will be done without increasing the price of the contract. If larger seedlings are used, the root ball will be increased in proportion to the size of the seedling.

1.11 REPLACEMENT SEEDLINGS

.1 During the warranty period, remove from the site any dead seedlings or seedlings that have not developed to the satisfaction of the NCC Representative.

.2 Replace the plants that will not have been accepted, during the next planting season.

.3 The warranty period for the replacement seedlings shall be equal to the warranty period granted in the case of the original seedlings.

.4 Replace the seedlings as long as they are not accepted.

1.12 QUALITY CONTROL

.1 Ensure plant material is acceptable to the NCC Representative.

.2 Cut the damaged roots and branches.

.3 Apply an anti-desiccant on the conifers and on the foliage of the deciduous trees in accordance with the manufacturer's instructions.

Part 2 Products

2.1 PLANT MATERIAL

.1 Type of root preparation, sizing, grading and quality: comply to Canadian Standards for Nursery Stock.

.1 Source of plant material: grown in Zone 4 to 5 in accordance with Plant Hardiness Zones in Canada.

.2 Plant material must be planted in zone indicated as appropriate for its species.

.3 Plant material in location appropriate for its species.

.2 Plant material: free of disease, insects, defects or injuries and structurally sound with strong fibrous root system.

.3 Trees: with straight trunks, well and characteristically branched for species except where specified otherwise.

.4 Trees larger than 50 mm in caliper: half root pruned during each of two successive growing seasons, the latter at least one growing season prior to arrival on site.

.5 Bare root stock: nursery grown, in dormant stage, not balled and burlapped or container grown.

.6 Collected stock: maximum 50 mm in caliper, with well-developed crowns and characteristically branched; no more than 40% of overall height may be free of branches.

2.2 WATER

.1 Free of impurities that would inhibit plant growth.

.2 Supply at the location indicated by the NCC Representative. No direct connection to a hydrant.

2.3 STAKES

.1 T-bar, steel, 40 mm x 40 mm x 5 mm x 2 440 mm.

2.4 ANCHORS

.1 Wood:

.1 Type 1: 38 mm x 38 mm x 460 mm.

.2 Type 2: 38 mm x 67 mm x 600 mm.

.2 Drive-in type.

.1 Type 1: 13 mm diameter x 75 mm long, aluminum.

.2 Type 2: 18 mm diameter x 120 mm long, aluminum.

2.5 GUYING COLLAR

.1 Grooved belt: plastic reinforced with a steel cable, Pro-Tie type or approved equivalent product.

2.6 TRUNK PROTECTION

.1 Wire mesh: galvanized, electrical wire with 25 mm x 25 mm mesh and fastener.

.2 Plastic: perforated spiralled strip.

2.7 MULCH

.1 Use Ramial Chipped Wood (RCW) mulch (3316) from Matériaux paysagers Savaria ltée or approved equivalent product, unless otherwise specified.

.2 It shall come from chipping of live woody parts of trees and shrubs with a diameter before chipping equal to or less than 70 mm.

.3 The mass of chipped wood material shall not contain more than 10% coniferous wood. The pH shall range between 6.5 and 7.5 (water pH “1:1 ratio” and buffer pH “SMP method”.

.4 The organic material rate shall range between 25 and 40% (modified Walkley-Black method or loss on ignition method).

.5 Gradation analysis requirements for Ramial Chipped Wood mulch:

Sieve (mm)	Total mass passing through the sieve (%)
31.5	100
20.0	90 to 100
14.0	80 to 93
10.0	65 to 85
5.0	44 to 65
2.5	35 to 48
1.25	25 to 35
0.630 (630 microns)	15 to 30
0.315 (315 microns)	8 to 25
0.160 (160 microns)	3 to 10
0.080 (80 microns)	0.5 to 3

2.8 EROSION BLANKET

.1 Use Erosion Blanket instead of mulch for plantings where indicated, notably in the floodplain.

.2 Erosion blanket must consists of naturally seed free curled wood such as Culex III by American Excelsior Company or approved equivalent product.

.3 Suitable for slopes 1H : 1V and rated for channel flows up to 3.1 m/s and 120 Pa shear stress.

.4 Top and bottom of each blanket covered with black net. Net openings 25.4 x 50.8 mm.

.5 Mass per unit area: 0.53 kg/m^2

.6 Thickness: 11.68mm

2.9 FERTILIZER

.1 Synthetic commercial type as recommended by soil test report.

2.10 ANTI-DESICCANT

.1 Wax-like emulsion.

2.11 MYCORHIZES

.1 Myke ProPaysagistes G de Premier Tech Biotechnologies or approved equivalent.

2.12 FLAGGING TAPE

.1 Fluorescent, colour pink.

2.13 SOURCE QUALITY CONTROL

.1 Before starting planting, submit the plants to the NCC Representative for examination.

.2 The plants must be of local origin.

Part 3 Execution

3.1 PLANTING SEASON

.1 Plant the deciduous trees and shrubs during the dormant period, before budburst (opening of the buds).

.2 The seedlings that come from regions enjoying a warmer climate may be planted only in early spring.

.3 If special permission has been granted to proceed with planting after budburst, spray an anti-desiccant on the trees and shrubs to slow transpiration before planting.

.4 Conifers shall be planted in the spring, before budburst. Planting of this type of balled and burlapped tree may begin after mid-August. Spray an anti-desiccant on the conifers before unearthing them.

.5 With permission, trees, shrubs, perennials and ground cover cultivated in pots may be planted during the growing season.

.6 Only proceed with planting when the conditions are favourable to good seedling growth.

.7 Provide a planting schedule. No extension of the work will be authorized due to insufficient labour.

3.2 EXCAVATION AND PREPARATION OF PLANTING BEDS

.1 Establishment of sub-grade for planting beds is specified in Section 31 22 13 - Rough Grading.

.2 Preparation of planting beds is specified in Section 32 91 19.13 - Topsoil Placement and Grading.

.3 Tree positioning:

.1 Stake out location and obtain approval from NCC Representative prior to excavating.

.2 Excavate to depth and width indicated.

.3 Remove subsoil, rocks, roots, debris and toxic material from excavated material that will be used as planting soil for trees and individual shrubs. Dispose of excess material.

.4 Scarify sides of planting hole.

.5 Remove water which enters excavations prior to planting. Notify NCC Representative if water source is ground water.

3.3 PLANTING

.1 For bare root stock, place 50 mm backfill soil in bottom of hole. Plant trees and shrubs with roots placed straight out in hole.

.2 For jute burlapped root balls, cut away top one third of wrapping and wire basket without damaging root ball. Do not pull burlap or rope from under root ball.

.3 For container stock or root balls in non-degradable wrapping, remove entire container or wrapping without damaging root ball.

.4 Plant vertically in locations as indicated. Orient plant material to give best appearance in relation to structure, roads and walks.

.5 For trees and shrubs:

.1 Backfill soil in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.

.2 Form watering saucer as indicated.

.6 For ground covers, backfill soil evenly to finish grade and tamp to eliminate air pockets.

.7 Water plant material thoroughly.

.8 After soil settlement has occurred, fill with soil to finish grade.

.9 Dispose of burlap, wire and container material off site.

3.4 TRUNK PROTECTION

.1 Install trunk protection on deciduous trees as indicated.

.2 Install trunk protection prior to installation of tree supports when used.

3.5 TREE SUPPORTS

.1 Install tree supports as indicated.

.2 Use single stake tree support for deciduous trees less than 3 m and evergreens less than 2 m.

.1 Place stake on prevailing wind side and 150 mm from trunk.

.2 Drive stake minimum 150 mm into undisturbed soil beneath roots. Ensure stake is secure, vertical and unsplit.

.3 Install 150 mm long guying collar 1500 mm above grade.

.4 Thread Type 1 guying wire through guying collar tube. Twist wire to form collar and secure firmly to stake. Cut off excess wire.

.3 Use 3 guy wires and anchors for deciduous trees greater than 3 m and evergreens greater than 2 m.

.1 Use Type 2 guying wire with clamps for trees less than 75 mm in diameter and Type 3 guying wire with clamps for trees greater than 75 mm in diameter.

.2 Use Type 1 anchors for trees less than 75 mm in diameter and Type 2 anchors for trees greater than 75 mm in diameter.

.3 Install guying collars above branch to prevent slipping at approximately 2/3 height for evergreens and 1/2 height for deciduous trees. Collar mounting height not to exceed 2.5 m above grade.

.4 Guying collars to be of sufficient length to encircle tree plus 50 mm space for trunk clearance. Thread guy wire through collar encircling tree trunk and secure to lead wire by clamp or multi-wraps; cut wire ends close to wrap. Spread lead wires equally proportioned about trunk at 120 degrees.

.5 Install anchors at equal intervals about tree and away from trunk so that guy wire will form 45 degree angle with ground. Install anchor at angle to achieve maximum resistance for guy wire.

.6 Attach guy wire to anchors. Tension wire and secure by installing clamps.

.7 Install wire tightener ensuring that guys are secure and leave room for slight movement of tree.

.8 Saw tops off wooden anchors which extend in excess of 100 mm above grade or as directed by NCC Representative.

.9 Install flagging tape to guys as indicated.

.4 After tree supports have been installed, remove broken branches with clean, sharp tools.

3.6 MULCHING OR INSTALLATION OF EROSION BLANKET

.1 Ensure soil settlement has been corrected prior to mulching.

.2 Spread mulch as indicated.

.3 If using erosion blanket, place before planting shrubs and perennials. Run rolls perpendicular to the slope and overlap at least 30 cm. Fix in place with anchors as specified by distributor.

3.7 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following maintenance operations from time of planting to acceptance by NCC Representative.

.1 Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.

.1 For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.

.2 Remove weeds once a month.

.3 Replace or respread damaged, missing or disturbed mulch.

.4 For non-mulched areas, cultivate as required to keep top layer of soil friable.

.5 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from NCC Representative prior to application.

.6 Remove dead or broken branches from plant material.

.7 Keep trunk protection and guy wires in proper repair and adjustment.

.8 Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

3.8 MAINTENANCE DURING WARRANTY PERIOD

.1 From time of acceptance by NCC Representative to end of warranty period (2 years), perform following maintenance operations.

.1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.

.2 Reform damaged watering saucers.

.3 Remove weeds once a month.

.4 Replace or respread damaged, missing or disturbed mulch.

.5 For non-mulched areas, cultivate once a month to keep top layer of soil friable.

.6 If required to control insects, fungus and disease, use appropriate control methods in accordance with Federal, Provincial and Municipal regulations. Obtain product approval from NCC Representative prior to application.

.7 Apply fertilizer in early spring as indicated by soil test.

.8 Remove dead, broken or hazardous branches from plant material.

.9 Remove and replace dead plants and plants not in healthy growing condition by the same soil types and sizes. Make replacements in same manner as specified for original plantings.

.10 Submit monthly written reports to NCC Representative identifying:

.1 Maintenance work carried out.

.2 Development and condition of plant material.

Maintenance work schedule

Interventions	**Date**
Remove snow fences, stakes, geotextile	From April 1st to April 10
Detach bushes and shrubs	From April 1st to April 10
Clean up the site or sites	From April 17 to May 15
Cut dead or damaged wood	From April 17 to May 15
1st weeding and cleaning	From May 23 to May 27
2nd weeding and cleaning	From June 19 to June 23
3rd weeding and cleaning	From July 17 to July 21
4th weeding and cleaning	From August 14 to August 18
5th weeding and cleaning	From Sept. 11 to Sept. 15
Install winter protection	From Oct. 5 to Nov. 13

3.9 WINTER PROTECTION

.1 Deciduous trees of all sizes: The tree trunks must be wrapped in jute or waxed cardboard as winter protection.

.2 The jute or tar paper is spiral wrapped, from the bottom up to the second branch and must be removed in early spring.

.3 Trees along fast traffic corridors: They must have their crown covered with a Texel Arbotex membrane or another approved product to protect them against salt spray.

.4 Conifers less than 1.2 m high: They must be protected with light windbreak screens consisting of a snow fence covered with 213-gram jute. The fence is wrapped around the conifers and fastened to the stakes.

.5 Confers over 1.2 m high: High-strength windbreak screens must be used. They are solidly anchored to the ground and strongly guyed to withstand strong winter gusts. They may consist of wood frames 1.2 m wide and up to five (5) m high, always 30 cm higher than the height of the tree. They are mounted in chevrons 50 mm x 50 mm partitioned every 60 cm and covered with stapled jute.

.6 Shrubs with long branches: Shrubs with long and frail branches and shrubs that could be damaged by snow removal or snow piling must be fastened together with jute cords.

.7 Hedges: The hedges are protected by light wood structures for the duration of the winter.

.8 Perennial plants and grasses: The planting beds shall be covered with pine branches or any other material accepted by the NCC Representative fulfilling the same conditions.

END OF SECTION