NRC·CNRC

Administrative Services and Property Management

DEVIS

NO. DE SOLICITATION:	**18-22005**
Edifice:	**1200 chemin montréal, Ottawa, Ontario**
PROJET:	**La séparation des égouts sanitaires et pluviaux – Phase 3**
NO. DE PROJET :	**5097-3**
Date:	**mai 2018**

National Research Council Canada | Conseil national de recherches Canada

Canada

NRC·CNRC

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By Road, from the OTTAWA International Airport

1. From the airport take the AIRPORT PARKWAY to RIVERSIDE DR EAST
2. Follow RIVERSIDE DR EAST to HIGHWAY 417 EAST
3. Take HIGHWAY 417 EAST, past the ST-LAURENT BLVD exit, where HIGHWAY 417 splits, continue LEFT on HIGHWAY 174 (ROCKLAND)
4. Exit HIGHWAY 174 on BLAIR RD NORTH
5. Proceed on BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.

By Road, from MONTRÉAL

1. Take MÉTROPOLITAIN 40 WEST and follow signs for OTTAWA and HIGHWAY 417 WEST
2. Follow 417 WEST to reach OTTAWA
3. Exit at HIGHWAY 174 EAST (ROCKLAND) when entering OTTAWA
4. Follow 174 EAST and exit at BLAIR RD NORTH (first exit after entering 174 EAST)
5. Follow BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.


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NRC Institute
Major HWY
Airport
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Metro
Trans Canada HWY
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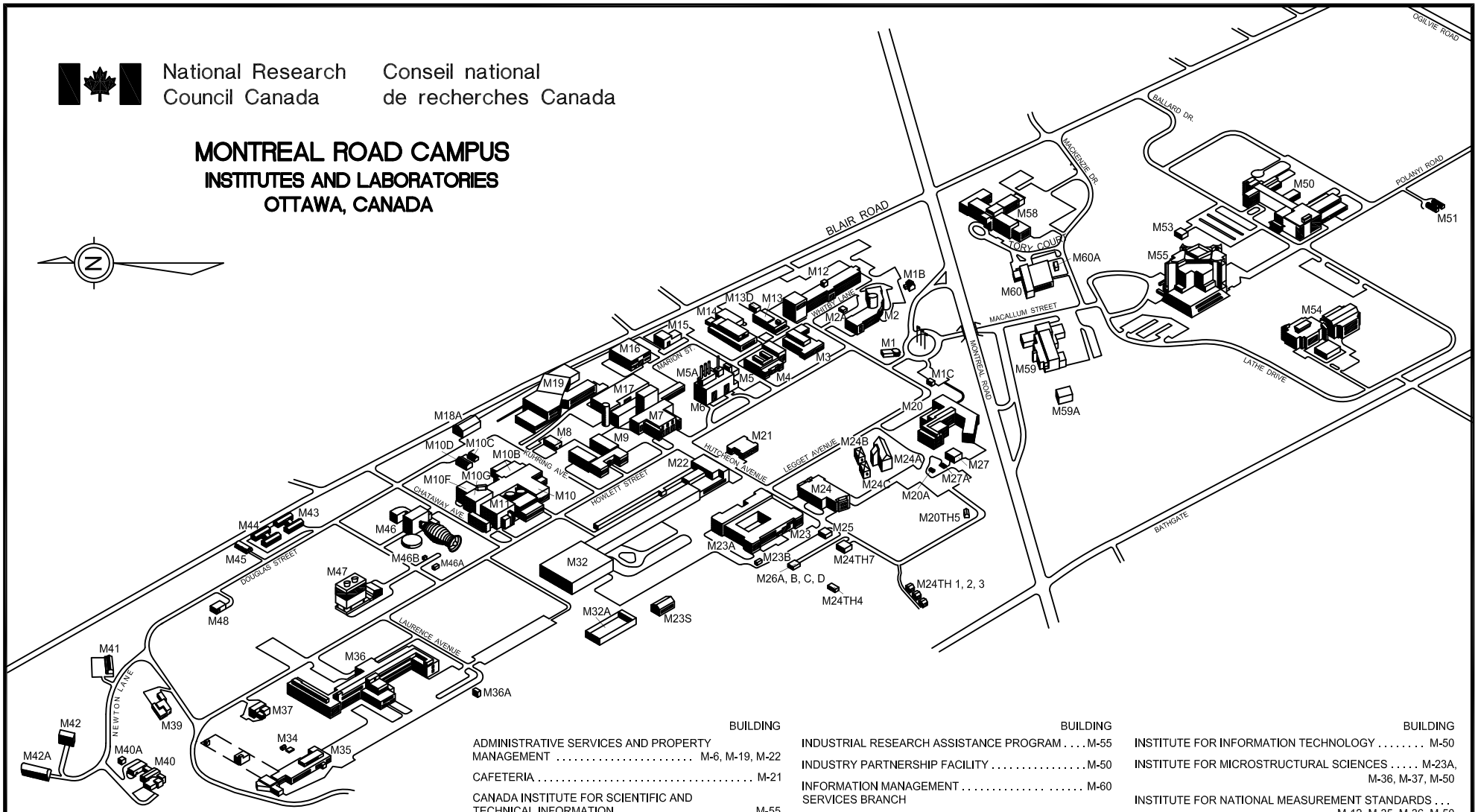
INSTITUTES AND LABORATORIES
OTTAWA, CANADA



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Updated: July 2008

DEVIS

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Formulaire de proposition – Marché de construction

Titre du projet **La séparation des égouts sanitaires et pluviaux – Phase 3**

No. de Proposition: **18-22005**

1.2 **Nom d'entreprise et adresse du soumissionnaire**

Nom _____

Adresse _____

_____

Personne-ressource (nom en lettres moulées) _____

Téléphone (_____) _____ **Téléc.** (_____) _____

1.3 Offre de prix

Le soumissionnaire soussigné offre par les présentes à Sa Majesté du chef du Canada (ci-après appelée « Sa Majesté »), représentée par le Conseil national de recherches du Canada, d'exécuter et d'achever les travaux se rapportant au projet désigné ci-haut, conformément aux plans et devis et aux autres documents d'appel d'offres, à l'endroit et de la manière énoncés aux présentes, pour un montant total de **_____,_____ $** (montant numéraire uniquement) **dans la monnaie ayant cours légal au Canada (TPS/TVH en sus).**

Le montant de l'offre comprend toutes les taxes fédérales, provinciales et municipales applicables(*). Cependant, si l'une des taxes imposées en vertu de la *Loi sur l'accise*, de la *Loi sur la taxe d'accise*, de la *Loi sur la sécurité de la vieillesse*, de la *Loi sur les douanes*, du tarif des douanes ou de toute autre loi provinciale imposant une taxe de vente au détail sur les achats de biens meubles incorporés à un bien immobilier est modifiée et que cette modification survient :

.1 après que la présente proposition ait été mise à la poste ou livrée; ou
.2 si la présente proposition est révisée, après la dernière révision;

le montant de l'offre de prix devra être diminué ou augmenté de la manière prévue à l'article CG22 des Conditions générales du contrat.

1.3.1 <u>Offre de prix</u> (suite)

(*) Dans le cadre de la présente proposition, la taxe sur les produits et services (TPS) n'est pas une taxe applicable.

Dans la province de Québec, la taxe de vente du Québec (TVQ) ne doit pas être ajoutée au montant de l'offre, le gouvernement fédéral étant exempté de la TVQ. Les soumissionnaires doivent s'adresser directement au ministère du Revenu provincial pour récupérer toute taxe qu'ils sont appelés à verser sur des biens et services acquis dans le cadre de l'exécution du présent marché. Les soumissionnaires devraient cependant inclure dans le montant de leur offre de prix tout montant de TVQ pour lequel ils ne peuvent exiger un remboursement de taxe sur les intrants.

1.4 <u>Acceptation et conclusion du marché</u>

Le soumissionnaire soussigné s'engage, dans les quatorze (14) jours suivant l'avis confirmant l'acceptation de la présente proposition, à signer un contrat portant sur l'exécution des travaux, à condition que l'avis d'acceptation du Ministère parvienne au soumissionnaire dans un délai de trente (30) jours suivant la date de clôture de l'appel d'offres.

1.5 <u>Délai d'exécution des travaux</u>

Le soumissionnaire soussigné s'engage à achever les travaux dans le délai stipulé au devis, lequel commence à courir à compter de l'avis d'acceptation de la présente proposition.

1.6 <u>Garantie de soumission</u>

Le soumissionnaire soussigné joint à la présente proposition une garantie de soumission, conformément à l'article 5 des Instructions générales à l'intention des soumissionnaires.

Le soumissionnaire soussigné convient que dans l'éventualité où il refuse de conclure un contrat qu'il est tenu de conclure en vertu des présentes, tout dépôt de garantie fourni à titre de garantie de soumission sera retenu pour débit. Cependant, le Ministre peut, au nom de l'intérêt public, renoncer au droit de Sa Majesté de retenir pour débit le dépôt de garantie.

Le soumissionnaire soussigné convient que si la garantie de soumission n'est pas conforme aux modalités de l'article 5 des Instructions générales à l'intention des soumissionnaires, sa proposition peut être jugée irrecevable.

1.7 Garantie d'exécution

Dans les quatorze (14) jours suivant l'avis d'acceptation de sa proposition, le soumissionnaire soussigné doit fournir une garantie d'exécution contractuelle, conformément à la section F, Conditions contractuelles, du contrat.

Le soumissionnaire soussigné convient que la garantie d'exécution visée par les présentes, si elle est fournie sous forme de lettre de change, sera versée au Trésor public du Canada.

1.8 Annexes

L'annexe n° _____n/a_____ fait partie intégrante de la présente proposition.

1.9 Addenda

Le montant total de l'offre de prix porte sur l'exécution des travaux définis dans les addenda suivants :

N°	DATE	N°	DATE

(Les soumissionnaires doivent indiquer le numéro et la date des addenda.)

1.10 <u>Signature de la proposition</u>

Les soumissionnaires doivent consulter l'article 2 des Instructions générales à l'intention des soumissionnaires.

SIGNÉ, AUTHENTIFIÉ ET REMIS le _____ e jour du mois de _____ au nom de

_____

(Inscrire le nom d'entreprise du soumissionnaire)

SIGNATAIRE(S) AUTORISÉ(S)

_____

(Signature du signataire autorisé)

_____

(Inscrire le nom et le titre du signataire en lettres moulées)

_____

(Signature du signataire autorisé)

_____

(Inscrire le nom et le titre du signataire en lettres moulées)

<u>SCEAU</u>

1. Les promoteurs DOIVENT fournir une allocation en argent de 200 000 $ pour couvrir les coûts associés, sauf indications contraire sur les plans, pour modifier les conduites principales pouvant entrer en conflit avec l'installation des nouveaux égouts ainsi que toute chloration / désinfection des conduites principales de la ville d'Ottawa. Le travail doit être autorisé par écrit par le représentant du Ministère et le paiement de tout travail doit être appuyé par toutes les factures des sous-traitants. L'allocation doit être indiquée séparément dans la ventilation des coûts du promoteur pour le projet et incluse dans le contrat à prix forfaitaire.

ANNONCE ACHATSETVENTES

La séparation des égouts sanitaires et pluviaux – Phase 3

Le Conseil national de recherches du Canada, 1200 chemin montréal, Ottawa, ON, a une demande pour un projet qui comprend :

La séparation des égouts sanitaires et pluviaux.

1. GENERAL :
Adresser à le représentant ministériel (ou à son représentant) ou à l'Agent des contrats toute question portant sur tout aspect du projet. Ils sont les seuls autorisés à fournir des réponses.

On ne tiendra nullement compte des informations obtenues d'une personne autre que le représentant ministériel (ou son représentant) ou l'Agent des contrats et ce, autant à l'octroi du contrat qu'au cours des travaux.

Les entreprises souhaitant présenter des soumissions pour ce projet devraient obtenir les documents relatifs aux appels d'offres en s'adressant au fournisseur de service Achatsetventes.gc.ca AGAO. Si des addenda sont ajoutés, ils seront distribués par Achasetventes.gc.ca AGAO. Les entreprises qui choisissent de préparer leurs soumissions en se fondant sur des documents d'appel d'offres provenant d'autres sources le font à leurs propres risques et seront tenues d'informer le responsable de l'appel d'offres de leur intention de soumissionner. Les trousses d'appel d'offres ne pourront être diffusées le jour même de la clôture des soumissions**.**

2. VISITE DU SITE OBLIGATOIRE
Les soumissionnaires ont l'obligation de participer à une des visites du site à la date et à l'heure prévues. Les soumissionnaires qui ont l'intention de présenter une soumission doivent envoyer au moins un représentant à cette visite.

Les visites de chantier se tiendront le 22 mai et le 24 mai, 2018 à **9 :00**. Rencontrer Doug Sanftenberg à l'édifice M-22, 1200 chemin montreal, Ottawa, ON. Les soumissionnaires qui, pour une raison quelconque, ne peuvent pas participer à la visite à la date et à l'heure prévues ne pourront obtenir un deuxième rendez-vous; leur soumission sera donc considérée comme non conforme. **AUCUNE EXCEPTION NE SERA FAITE**.

Pour prouver qu'ils ont participé à la visite du site, les soumissionnaires ou leurs représentants DOIVENT signer, lors de la visite, le formulaire de participation élaboré par l'autorité contractante. Les soumissionnaires ou leurs représentants ont la responsabilité de vérifier s'ils ont bien signé ce formulaire avant de quitter le site. Les soumissions présentées par des soumissionnaires qui n'ont pas participé à la visite du site ou qui ont oublié de signer le formulaire de participation seront considérées comme non conformes.

3. DATE DE FERMÊTURE :
La date de fermeture est le 12 juin, 2016 14 :00

4. RÉSULTATS DE L'APPEL D'OFFRES :
À la fermeture de l'appel d'offres, les résultats de l'appel d'offre seront envoyés par télécopieur à tous les entrepreneurs qui auront soumis un appel d'offre.

5. CRITÈRES DE SÉCURITÉ OBLIGATOIRES POUR LES ENTREPRENEURS

5.1 EXIGENCES OBLIGATOIRES RELATIVES A LA SECURITE

.1 **L'entrepreneur doit détenir en permanence, pendant l'exécution du contrat à commandes, une attestation de vérification d'organisation désignée (VOD) en vigueur, délivrée par la Direction de la sécurité industrielle canadienne (DSIC) de Travaux publics et Services gouvernementaux Canada (TPSGC).**

.2 **Les membres du personnel de l'entrepreneur devant avoir accès à des établissements de travail dont l'accès est réglementé doivent TOUS détenir une cote de FIABILITÉ en vigueur, délivrée ou approuvée par la DSIC de TPSGC.**

.3 **L'entrepreneur doit respecter les dispositions:**

a) de la Liste de vérification des exigences relatives à la sécurité et directive de sécurité (s'il y a lieu), reproduite à l'Annexe D;

b) du Manuel de la sécurité industrielle (dernière édition)@ http://ssi-iss.tpsgc-pwgsc.gc.ca/msi-ism/msi-ism-fra.html

5.2 VÉRIFICATION DE L'ATTESTATION DE SÉCURITÉ À LA CLÔTURE DES SOUMISSIONS

.1 **Le soumissionnaire doit détenir une attestation de vérification d'organisation désignée (VOD) en vigueur, délivrée par la Direction de la sécurité industrielle canadienne (DSIC) de Travaux publics et Services gouvernementaux Canada (TPSGC) ET DOIT L'INCLURE AVEC LEUR SOUMISSION OU FAIRE SUIVRE DANS LES 48 HEURES SUIVANT LA DATE ET L'HEURE DE CLÔTURE DE L'APPEL D'OFFRE. Des vérifications seront effectuées par l'intermédiaire de la DSIC pour confirmer l'attestation de sécurité du soumissionnaire. L'omission de se conformer à cette exigence rendra la soumission non conforme et celle-ci sera rejetée.**

.2 **L'entrepreneur général doit nommer tous ses sous-traitants dans un délai de 72 heures suivant la clôture des soumissions, et ceux-ci doivent aussi détenir une attestation VOD valide et soumettre les noms, dates de naissance ou numéros de certificats de sécurité de toutes les personnes qui seront affectées au projet.**

.3 **Il faut noter que les sous-traitants qui doivent exécuter des tâches pendant l'exécution du contrat subséquent doivent aussi satisfaire aux exigences obligatoires du contrat en matière de sécurité. De plus, aucune personne ne possédant pas le niveau de sécurité exigé ne sera admise sur le site. Le soumissionnaire retenu devra s'assurer que les exigences liées à la sécurité sont satisfaites pendant toute l'exécution du contrat. La Couronne ne sera tenue responsable d'aucun retard ni d'éventuels coûts supplémentaires liés à l'inobservation par l'entrepreneur des exigences en matière de sécurité. L'omission de satisfaire à ces exigences sera suffisante pour résilier le contrat pour cause d'inexécution.**

.4 **Pour toute question concernant les exigences liées à la sécurité pendant la période de soumission, les soumissionnaires doivent communiquer avec l'agente de sécurité @ 613-993-8956.**

6.0 CSPAAT (COMMISSION DE LA SECURITE PROFESSIONNELLE ET DE L'ASSURANCE CONTRE LES ACCIDENTS DU TRAVAIL

.1 Tous les soumissionnaires doivent fournir une attestation de la CSPAAT valide avec leur offre ou avant l'attribution du contrat.

7.0 L'OMBUDSMAN DE L'APPROVISIONNEMENT

.1 Services de règlement des différends
Les parties reconnaissent que l'ombudsman de l'approvisionnement nommé en vertu du paragraphe 22.1(1) de la *Loi sur le ministère des Travaux publics et des Services gouvernementaux* veillera à proposer aux parties concernées un processus de règlement de leur différend, sur demande ou consentement des parties à participer à un tel processus de règlement extrajudiciaire en vue de résoudre un différend entre elles au sujet de l'interprétation ou de l'application d'une modalité du présent contrat, et obtiendra leur consentement à en assumer les coûts. Le Bureau de l'ombudsman de l'approvisionnement peut être joint par téléphone, au 1-866-734-5169 ou par courriel, à l'adresse boa.opo@boa-opo.gc.ca.

.2 Administration du contrat
Les parties reconnaissent que l'ombudsman de l'approvisionnement nommé en vertu du paragraphe 22.1(1) de la *Loi sur le ministère des Travaux publics et des Services gouvernementaux* examinera une plainte déposée par [*le fournisseur ou l'entrepreneur ou le nom de l'entité à qui ce contrat a été attribué*] concernant l'administration du contrat si les exigences du paragraphe 22.2(1) de la *Loi sur le ministère des Travaux publics et des Services gouvernementaux* et les articles 15 et 16 du *Règlement concernant l'ombudsman de l'approvisionnement* ont été respectées, et si l'interprétation et l'application des modalités ainsi que de la portée du contrat ne sont pas contestées. Le Bureau de l'ombudsman de l'approvisionnement peut être joint par téléphone, au 1-866-734-5169 ou par courriel, à l'adresse boa.opo@boa-opo.gc.ca.

.3 Le Bureau de l'ombudsman de l'approvisionnement (BOA) a été mis sur pied par le gouvernement du Canada de manière à offrir aux fournisseurs un moyen indépendant de déposer des plaintes liées à l'attribution de contrats de moins de 25 000 $ pour des biens et de moins de 100 000 $ pour des services. Vous pouvez soulever des questions ou des préoccupations concernant une demande de soumissions ou l'attribution du contrat subséquent auprès du BOA par téléphone, au 1-866-734-5169 ou par courriel, à l'adresse boa.opo@boa-opo.gc.ca. Vous pouvez également obtenir de plus amples informations sur les services qu'offre le BOA, en consultant son site Web, à l'adresse www.opo-boa.gc.ca.

Le représentant ministériel responsable ou son représentant: Doug Sanftenberg
Téléphone: 613 993-9628

L'autorité contractante : Collin Long collin.long@nrc-cnrc.gc.ca
Téléphone : 613 993-0431

INSTRUCTIONS AUX SOUMISSIONNAIRES

Article 1 - Réception des soumissions

1a) Aucune soumission reçue après le moment fixé pour la clôture des soumissions ne sera acceptée. LES SOUMISSIONS RECUES APRES LE MOMENT FIXÉ NE SONT PAS VALIDES et ne peuvent être prises en considération, peu importe la raison de leur retard.

1b) Une lettre ou une télécommunication imprimée envoyée par un soumissionnaire pour signifier un prix ne peut être considérée comme étant une soumission valide à moins qu'une soumission officielle n'ait été reçue sur la formule prescrite à cette fin.

1c) Il est loisible aux soumissionnaires de modifier leurs soumissions par lettre ou télécommunication imprimée mais à condition que de telles modifications ne soient pas reçues plus tard qu'au moment prévu pour la clôture des soumissions.

1d) Les modifications à la soumission qui sont transmises par télécopieur doivent être signées et doivent permettre d'identifier sans équivoque le soumissionnaire.

Toutes les modifications de ce genre doivent être envoyées à :

Conseil national de recherches Canada
Services d'approvisionnement
Collin Long, agent supérieur de contrats
Édifice M-22
Chemin Montréal, Ottawa (Ontario)
K1A OR6

Télécopieur: (613) 991-3297

Article 2 - Formule de soumission et qualifications

1) Toutes les soumissions doivent être présentées sur la formule de soumission - construction et être signées en conformité avec les exigences suivantes:

a) Société à responsabilité limitée : le nom complet de la société ainsi que le nom et le titre des fondés de signature autorisés doivent être imprimés dans l'espace prévu à cette fin. La signature des fondés de signature et le sceau de la société doivent être apposés.

b) Société de personne : le nom de l'entreprise ainsi que le(s) noms du (des) signataire(s) doivent être imprimés dans l'espace prévu. L'un ou plusieurs des associés doivent signer en présence d'un témoin qui, lui aussi, doit apposer sa signature. Un sceau de couleur adhésif doit être apposé en regard de chaque signature.

c) Entreprise à propriétaire unique : le nom de l'entreprise et le nom du propriétaire unique doivent être imprimés dans l'espace prévu. Le propriétaire est tenu de signer en présence d'un témoin qui doit lui aussi apposer sa signature. Un sceau de couleur adhésif doit être apposé en regard de chaque signature.

2) Toute modification à la partie imprimée de la formule de soumission - construction ou tout défaut de fournir l'information qui y est demandée peut invalider la soumission.

3) Toutes les rubriques de la formule de soumission - construction doivent être remplies et les corrections manuscrites ou dactylographiées apportées aux parties ainsi remplies doivent être paraphées par la ou les personnes qui signe(nt) la soumission au nom du soumissionnaire.

4) Les soumissions doivent être basées sur les plans, devis et documents de soumission fournis.

Article 3 - Contrat

1) L'entrepreneur devra signer un contrat semblable à la formule standard pour contrats de construction à prix fixe dont un exemplaire en blanc est annexé dos à la présente brochure pour information.

Article 4 - Destinataire de la soumission

1a) Les soumissions doivent être envoyées sous enveloppe cachetée adressée à l'Agent de contrats, **Conseil national de recherches**, **Services administratifs et gestion de l'immobilier, édifice M-22, 1200 chemin Montréal, Ottawa, ON. K1A 0R6** Canada, et la mention "Soumission relative à (inscrire le titre de travail apparaissant sur les dessins et le cahier des charges)" ainsi que le nom et l'adresse du soumissionnaire doivent apparaître sur l'enveloppe.

1b) Sauf dispositions contraires, les seuls documents à soumettre pour la soumission sont la formule de soumission et la garantie de soumission.

Article 5 - Garantie

1a) La garantie de soumission est requise. La garantie doit alors être soumise sous l'une ou l'autre des formes suivantes :

i) un chèque certifié payable au Receveur général du Canada et tiré sur un établissement membre de l'Association canadienne des paiements ou un établissement de crédit coopératif local membre d'une société centrale de crédit coopératif elle-même membre de l'Association canadienne des paiements OU

ii) des obligations du gouvernement du Canada, ou des obligations avec garantie inconditionnelle par le gouvernement du Canada quant au capital et aux intérêts, OU

iii) un cautionnement de soumission.

1b) Peu importe la forme de la garantie de soumission, elle ne devrait jamais dépasser la somme de 250 000 $ calculée à 10% de la première tranche de 250 000 $ du prix soumissionné, plus 5% de tout montant dépassant 250 000 $.

2a) Une garantie de soumission doit être fournie avec chaque soumission. Elle peut aussi être envoyée séparément à condition qu'elle ne soit pas reçue plus tard qu'au moment prévu pour la clôture des soumissions. On doit fournir l'ORIGINAL de la garantie de soumission. Des garanties transmises par télécopieur ou des photocopies NE SONT PAS acceptées. DEFAUT DE FOURNIR LA GARANTIE REQUISE RENDRA LA SOUMISSION INVALIDE.

2b) Dans le cas où la soumission n'est pas acceptée, la garantie de soumission fournie en conformité avec l'article 8 sera retournée au soumissionnaire.

3a) L'adjudicataire doit fournir une garantie au plus tard 14 jours après réception d'un avis lui signifiant l'acceptation de sa soumission. Il doit fournir L'UN OU L'AUTRE des documents suivants :

i) Un dépôt de garantie tel que décrit à l'alinéa 1b) ci-dessus ainsi qu'un cautionnement du paiement de la main d'oeuvre et des matériaux s'élevant à 50%, au moins, de la somme payable en vertu du contrat, OU

ii) Une garantie d'exécution et un cautionnement du paiement de la main d' oeuvre et des matériaux, chacun s'élevant à 50% du montant payable en vertu du contrat.

3b) Au cas où il ne serait pas possible d'obtenir un cautionnement du paiement de la main d'oeuvre et des matériaux, tel que requis aux termes de l'alinéa 3a) ci-dessus, en s'adressant par conséquent à au moins deux compagnies de garantie acceptables, un dépôt de garantie supplémentaire s'élevant à 10% exactement du montant payable en vertu du contrat doit être fourni.

3c) Lorsqu'une soumission a été accompagnée d'un dépôt de garantie tel que décrit à l'alinéa 1b) ci-dessus, le montant du dépôt de garantie requis en vertu de l'alinéa 3a) ci-dessus peut être réduit du montant du dépôt de garantie qui accompagnait la soumission.

3d) Les obligations doivent être de la forme approuvée et doivent être émises par des compagnies dont les obligations sont acceptées par le gouvernement du Canada. Des modèles de la forme approuvée des garanties à déposer par les soumissionnaires, des garanties d'exécution et des cautionnements du paiement de la main-d'oeuvre et des matériaux ainsi qu'une liste des compagnies de garantie acceptables peuvent être obtenus en s'adressant au Services d'approvisionnement, Conseil national de recherches du Canada, édifice M-22, chemin Montréal, Ottawa (Ontario) K1A OR6, Canada.

Article 6 - Intérêt payé sur les dépôts de garantie

1) Les soumissionnaires sont avertis qu'ils doivent se mettre d'accord personnellement avec leurs banquiers relativement à l'intérêt, le cas échéant, payé sur le montant du chèque certifié accompagnant leur soumission. Le Conseil ne paiera pas d'intérêt sur ledit chèque en attendant l'adjudication du contrat et ne sera pas non plus responsable du paiement des intérêts en vertu de toute disposition prise par les soumissionnaires.

Article 7 - Taxe sur les ventes

1) Le montant de la soumission doit comprendre toutes les taxes prélevées en vertu de la Loi sur l'accise, de la Loi sur la taxe d'accise, de la Loi sur la sécurité de la vieillesse, de la Loi sur les douanes ou du Tarif des douanes en vigueur ou applicables à ce moment.

2) Au Québec, la taxe provinciale ne doit pas être incluse au montant soumissionné, car le Gouvernement Fédéral en est exclu. Les soumissionnaires devront faire les démarches nécessaires auprès du Ministère du Revenu provincial pour recouvrir toute taxe payée sur les biens et services dans le cadre de ce contrat.

Cependant , les soumissionnaires devraient inclure dans leur prix, les taxes provinciales pour lesquelles les remboursements ne s'appliquent pas.

Article 8 - Examen de l'emplacement

1) Tous les soumissionnaires examineront l'emplacement des travaux proposés avant d'envoyer leur soumission, étudieront minutieusement ledit emplacement et obtiendront tous les renseignements nécessaires à la bonne exécution du contrat. Aucune réclamation postérieure ne sera permise ou admise relativement à tout travail ou matériaux pouvant être requis et

nécessaires à la bonne exécution du présent contrat à l'exception des dispositions de l'article CG 35 des Conditions générales du cahier des charges général.

Article 9 - Erreurs, omissions, etc.

1a) Les soumissionnaires relevant des erreurs ou des omissions dans les dessins, le cahier des charges ou d'autres documents, ou ayant des doutes quant au sens ou à l'intention de n'importe quelle partie de ces derniers, devront en avertir immédiatement l'ingénieur qui fera parvenir des directives ou des explications écrites à tous les soumissionnaires.

1b) Ni l'ingénieur, ni le Conseil ne seront responsables des directives orales.

1c) Les additions ou les corrections effectuées au cours de la présentation des soumissions seront incluses dans la soumission. Cependant, le contrat remplace toutes les communications, négociations et tous les accords, sous forme verbale ou écrite, se rapportant aux travaux et effectués avant la date du contrat.

Article 10 - Nul paiement supplémentaire pour accroissement des frais

1) Les seules autres modifications pouvant être apportées au prix forfaitaire sont celles précisées dans les Conditions générales du Cahier des charges général. Le prix forfaitaire ne sera pas modifié à la suite de changements dans les tarifs de transport, les cotes des changes, les échelles de salaire, le coût des matériaux, de l'outillage ou des services.

Article 11 - Adjudication

1a) Le Conseil se réserve le pouvoir et le droit de rejeter les soumissions provenant de parties ne possédant pas les connaissances et la préparation requises à la bonne exécution de la catégorie de travaux mentionnés dans les présentes et précisés dans les plans. Les soumissionnaires doivent fournir la preuve de leur compétence lorsque cela est exigée.

1b) Un soumissionnaire peut être tenu de faire parvenir au Services d'approvisionnement, Conseil national de recherches Canada, édifice
M-22, chemin Montréal, Ottawa (Ontario) K1A OR6, Canada, des copies non signées des polices d'assurance auxquelles il envisage de souscrire pour satisfaire aux exigences relatives aux assurances comprises dans les Conditions d'assurance du Cahier des charges général.

1c) Le Conseil ne s'engage pas à accepter la soumission la plus basse ni une soumission quelconque.

Article 12 - Taxe TPS

1) La TPS qui est maintenant en vigueur est applicable à cette proposition; cependant, l'entrepreneur devra proposer un prix NE COMPRENNANT PAS la TPS. La TPS détaillée séparément dans toutes les factures et demandes de paiement partiel présentées pour des produits fournis ou un travail accompli et sera payée par le Canada. Le montant de la TPS sera inclus dans le prix total du contrat. L'Entrepreneur convient de verser à Revenu Canada tout montant payé ou dû au titre de la TPS.

Entrepreneurs non résidents

Guide de la TVD 804F
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Publication archivées

Avis aux lecteurs : Concernant la taxe de vente au détail (TVD) – Le 1er juillet 2010, la taxe de vente harmonisée (TVH) de 13 % est entrée en vigueur en Ontario pour remplacer la TVD provinciale en la combinant avec la taxe fédérale sur les produits et services (TPS). Conséquemment, les dispositions de la TVD décrites dans cette page et dans d'autres publications ont expiré le 30 juin 2010.

A compter du 1er juillet 2010, cette publication fait partie des archives pour la TVD **seulement**. Puisque ce document reflète la loi de la TVD qui était en vigueur au moment où il fut publié et peut ne plus être valide, veuillez l'utiliser avec prudence.

- Les renseignements contenus dans le présent Guide décrivent les responsabilités d'un entrepreneur non résident qui obtient un contrat en vue d'effectuer des travaux de construction en Ontario, ainsi que celles de ses clients ontariens. Veuillez prendre note que le présent Guide remplace la version précédente publiée en mars 2001.

Définition d'un entrepreneur non résident

Un entrepreneur non résident est un entrepreneur en construction dont le siège social est situé à l'extérieur de l'Ontario et qui a obtenu un contrat de construction pour effectuer des travaux en Ontario, mais qui n'a pas tenu de façon continue un établissement stable en Ontario au cours des douze mois qui ont précédé la signature du contrat, ou qui n'est pas une société constituée en Ontario. Un contrat de construction est un contrat pour ériger, remodeler ou réparer un bâtiment ou autre structure situé sur un terrain.

Un entrepreneur est une personne qui se livre à la construction, la modification, la réparation ou la rénovation de biens immobiliers et s'entend, sans s'y limiter,

1. d'un entrepreneur général et d'un sous-traitant,
2. d'un charpentier, d'un maçon, d'un tailleur de pierres, d'un électricien, d'un plâtrier, d'un plombier, d'un peintre, d'un décorateur, d'un paveur et d'un constructeur de ponts,
3. d'un entrepreneur en tôle, en carreaux et en terrazzo, en chauffage, en climatisation, en isolation, en ventilation, en pose de papier peint, en construction de routes, en revêtement de toiture et en ciment,

qui installe ou qui incorpore des articles dans un bien immobilier. (Consultez le Guide de la taxe de vente au détail n° 206F - Biens immobiliers et accessoires fixes).

Inscription et cautionnement

Tout entrepreneur non résident à qui l'on accorde un contrat de construction pour des travaux en Ontario doit s'inscrire auprès du ministère des Finances (ministère), Unité des programmes centralisés, et verser un cautionnement équivalant à 4 p. 100 du total de la valeur de chaque contrat. Ce cautionnement peut être acquitté en espèces, par chèque certifié (libellé à l'ordre du Ministre des Finances), par lettre de crédit ou par certificat de cautionnement.

Afin de s'inscrire auprès du ministère et pour obtenir plus de précisions sur le dépôt d'un cautionnement, les entrepreneurs peuvent communiquer avec l'Unité des programmes centralisés du ministère, 33, rue King Ouest, CP 623, Oshawa, Ontario, L1H 8H7, sans frais 1 866 ONT-TAXS (1 866 668-8297) ou télécopieur 905) 435-3617.

Tout entrepreneur non résident qui vend et qui fournit seulement des biens taxables à des clients de l'Ontario, ou qui fournit des services taxables en Ontario, peut obtenir un permis de vendeur régulier lui permettant de percevoir et remettre la TVD sur ses ventes. Tout entrepreneur non résident à qui un permis de vendeur régulier a été émis doit tout de même s'inscrire séparément auprès du ministère et verser un cautionnement s'il se voit accorder un contrat de construction en Ontario.

Lettre de conformité

Après avoir reçu le cautionnement, le ministère envoie à l'entrepreneur non résident une lettre de conformité en deux exemplaires attestant que les exigences relatives à la TVD ont bien été respectées. L'entrepreneur doit alors remettre un exemplaire de cette lettre à son client.

S'il omet de le faire, le client doit retenir 4 p. 100 de chaque paiement dû à l'entrepreneur non résident et remettre les sommes retenues au Ministre des Finances (le ministre). Les paiements doivent être envoyés à l'Unité des programmes centralisés en prenant soin d'y joindre les détails du contrat visé. Au lieu d'effectuer ces paiements de 4 p. 100, le client peut remettre au ministre un certificat de cautionnement équivalant à 4 p. 100 du prix contractuel total.

Remarque : Tout client qui néglige d'observer ces règles pourrait être tenu de verser une somme égale à 4 % de tous les montants payables à l'entrepreneur non résident ou tout autre montant qui, de l'avis du ministère, devrait être assujetti à la TVD à la suite de l'exécution du contrat.

Calcul de la TVD

Juste valeur

La TVD doit être versée sur la « juste valeur » des matériaux achetés ou importés en Ontario et utilisés pour l'exécution du contrat en Ontario. Par « juste valeur », on entend :

- le prix d'achat en devises canadiennes;
- tous les frais de manutention et de livraison facturés par le fournisseur; et
- tous les droits de douane ainsi que les taxes de vente et d'accise fédérales (mais non la taxe fédérale sur les produits et services [TPS]).

L'entrepreneur est aussi tenu de payer la TVD aux fournisseurs de l'Ontario au moment de l'achat ou de la location (avec ou sans bail) de services, matériaux, machines ou d'équipement taxables.

Machines et équipment - loués à bail

Lorsque des machines ou un équipement loués auprès d'un fournisseur de l'extérieur de l'Ontario sont apportés dans la province, la TVD est exigible sur les paiements de location pendant toute la période de séjour des machines et de l'équipement en Ontario.

Machines et équipment - appartenant à l'entrepreneur

1. Si un entrepreneur apporte des machines et de l'équipement en Ontario pour une durée inférieure à douze mois, la TVD applicable doit être calculée selon la formule suivante :

   1/36 × valeur comptable nette à la date d'importation × nombre de mois en Ontario × taux de taxe.

   Aux fins de cette formule, la TVD est exigible pour chaque mois ou partie de mois pendant lesquels les biens se trouvent en Ontario. En outre, on considère qu'un mois constitue une période de 31 jours consécutifs, et qu'une partie de mois représente plus de 12 jours. La TVD exigible est fondée sur le nombre de jours où les machines et l'équipement se trouvent en Ontario et non sur le nombre de jours d'utilisation effective des machines ou de l'équipement.

Exemple: De l'équipement est apporté en Ontario le 28 mars et sorti de la province le 8 mai. L'équipement a donc séjourné pendant 41 jours dans la province. La TVD est alors payable sur les 31 premiers jours de séjour temporaire en Ontario vs l'usage de l'équipement. Étant donné que la période restante (10 jours) n'est pas considérée comme une partie d'un mois, aucune TVD n'est exigible sur cette période.

1. Si l'on prévoit que les machines ou l'équipement apportés en Ontario resteront dans cette province pendant plus de 12 mois, l'entrepreneur doit payer la TVD selon la formule suivante :

   valeur comptable nette à la date d'importation × taux de taxe

   Si, au moment de l'importation des machines et de l'équipement, la durée du séjour n'est pas connue, le vendeur peut appliquer la formule (a). Si, par la suite, il s'avère nécessaire de garder les machines et l'équipement en Ontario pendant une durée dépassant 12 mois, la TVD versée selon (a) pourra être déduite du montant de la TVD payable selon (b).

À l'aide de la formule (a) ou (b) ci-dessus, les entrepreneurs calculeront et remettront la TVD exigible sur la déclaration à produire une fois le contrat dûment exécuté.

Fabrication de matériel à des fins personnelles

Il arrive qu'un entrepreneur doive fabriquer divers éléments, tels que des portes et fenêtres, pour exécuter son contrat de construction. Par fabrication, il faut entendre tout travail effectué dans une usine à l'extérieur d'un chantier de construction, une unité mobile ou un atelier sur un chantier de construction ou à proximité de ce dernier. La fabrication a lieu lors de la transformation de matières brutes en produits fabriqués qui seront utilisés dans l'exécution de contrats immobiliers.

Un entrepreneur est considéré comme un entrepreneur fabricant si :

1. les produits fabriqués sont destinés à un usage personnel dans l'exécution de contrats immobiliers; et que
2. le coût de fabrication des produits dépasse 50 000 $ par an.

(Consultez le Guide de la taxe de vente au détail no 401F - Entrepreneurs- fabricants).

Contrat avec le gouvernement fédéral

Lorsqu'un entrepreneur non résident conclut un contrat de construction avec le gouvernement fédéral, pour la construction d'un bâtiment et(ou) l'installation d'équipement, c'est la nature de l'équipement qui détermine si le contrat doit être soumissionné sur une base taxe comprise ou taxe non comprise.

Les contrats pour la construction d'un bâtiment et l'installation d'équipement qui dessert directement ce bâtiment (par ex. les ascenseurs, escaliers roulants, luminaires, systèmes de chauffage central, air climatisé, etc.) doivent être soumissionnés sur une base taxe comprise. L'entrepreneur est considéré comme le consommateur des articles utilisés dans l'exécution de ces contrats et doit payer ou rendre compte de la TVD sur les articles utilisés aux fins de ces contrats. Le simple fait qu'un contrat soit conclu avec le gouvernement fédéral ne donne pas droit, en soi, à une exemption.

Les contrats pour l'installation d'équipement qui devient un accessoire fixe et qui ne dessert pas directement un bâtiment (par ex. le matériel de manutention, l'outillage de production, l'équipement de télécommunication et le matériel de formation) peuvent être soumissionnés sur une base taxe non comprise. Les entrepreneurs qui entreprennent des contrats de ce genre sont permis d'acheter un tel équipement en exemption de la TVD en remettant un Certificat d'exemption de taxe valide aux fournisseurs. Seul un entrepreneur non résident inscrit auprès du ministère et ayant versé un cautionnement peut remettre un Certificat d'exemption de taxe.

Exonérations

Il arrive que des entrepreneurs fournissent et installent de l'équipement ou du matériel pour certains clients ayant droit à une exemption de la TVD (par ex. fabricants, conseils de bandes indiennes, agriculteurs et organismes diplomatiques). Une fois installés, l'équipement ou les matériaux deviennent des biens immobiliers s'ils sont fixés en permanence au sol, ou des accessoires fixes s'ils sont fixés de façon permanente à un bâtiment ou une structure immobilière. Étant donné que la responsabilité de la TVD incombe à l'entrepreneur, ce dernier doit communiquer avec le ministère pour déterminer si le client est admissible à l'exonération, avant d'offrir un contrat taxe non comprise.

Indiens inscrits, bandes indiennes et conseils de bandes indiennes

L'entrepreneur non résident peut acheter des matériaux de construction en exemption de la TVD pour certains bâtiments et certaines structures situés dans des réserves. Le coût de ces projets doit être défrayé par un conseil de bande, et les bâtiments doivent servir à des fins communautaires, au bénéfice de la réserve. Dans le cas de contrats pour des projets de construction communautaires exonérés de taxe, le contrat doit être offert sur une base taxe non comprise. L'entrepreneur non résident peut acheter les matériaux sans payer la TVD s'il remet aux fournisseurs un Certificat d'exemption de taxe valide. Comme précisé ci-dessus, seul un entrepreneur non résident inscrit auprès du ministère et ayant versé un cautionnement peut remettre un Certificat d'exemption de taxe. (Consultez le Guide de la taxe de vente au détail nº 204F - Certificats d'exemption de taxe).

Les entrepreneurs non résidents doivent payer eux-mêmes la TVD sur les articles achetés à des fins d'incorporation à un bâtiment ou une structure, érigé à l'intention d'un Indien inscrit particulier dans une réserve. (Consultez le Guide de la taxe de vente au détail nº 808F - Indiens inscrits, bandes indiennes et conseils de bandes indiennes).

Exécution du contrat

Une fois le contrat dûment exécuté, l'entrepreneur qui a dû déposer un cautionnement doit remplir une « Déclaration de la taxe de vente au détail - Entrepreneurs non résidents [PDF - 93 KO] » qui est fournie par le ministère.

Lorsque le cautionnement a été acquitté en espèces ou par chèque certifié, le montant déposé peut être déduit de la TVD que l'entrepreneur doit payer. Si le montant de cette taxe est supérieur au montant déposé, l'entrepreneur doit verser la différence. Dans le cas contraire, si le montant déposé est supérieur au montant de la taxe exigible, la différence lui sera remboursée.

Si, au lieu d'un acquittement en espèces, un certificat de cautionnement a été déposé, ce dernier fera l'objet d'une main-levée une fois que le paiement de la taxe aura été intégralement acquitté. Toutes les déclarations peuvent faire l'objet d'une vérification.

Références législatives

- Loi sur la taxe de vente au détail, parpagraphes 19 (2) et 39 (3) 4 et 5
- Règlement 1012 pris en application de la Loi, paragraphes 15.3 (1) (2) (5) (6) et (7)
- Règlement 1013 pris en application de la Loi, articles 1 et 3

Pour plus de renseignements

Les informations contenues dans cette publication ne sont données qu'à titre d'indication. Pour plus de renseignements, adressez-vous au ministère des Finances de l'Ontario en composant le 1 866 ONT-TAXS (1 866 668-8297) ou visitez notre site Web à ontario.ca/finances.

Compagnies de cautionnement reconnues

Publiée septembre 2010

Voici une liste des compagnies d'assurance dont les cautionnements peuvent être acceptés par le gouvernement à titre de garantie.

1. Compagnie canadiennes

Assurance ACE INA
Allstate du Canada, Compagnie d'assurances
Ascentus Ltée, Les Assurances (cautionnement seulement)
Aviva, Compagnie d'Assurance du Canada
AXA Assurances (Canada)
AXA Pacific Compagnie d'assurance
Le Bouclier du Nord Canadien, Compagnie d'Assurance
Certas direct, compagnie d'assurances (cautionnement seulement)
Chubb, Compagnie d'assurances du Canada
Commonwealth, Compagnie d'assurances du Canada
Compagnie d'assurance Chartis du Canada (anciennement La Cie d'assurance commerciale AIG du Canada)
Co-operators General, Compagnie d'assurance
CUMIS, Compagnie d'assurances générales
La Dominion du Canada, Compagnie d'assurances générales
Échelon, Compagnie D'Assurances Générale (cautionnement seulement)
Economical, Compagnie Mutuelle d'Assurance
Elite, Compagnie d'assurances
La Compagnie d'Assurance Everest du Canada
Federated, Compagnie d'assurances du Canada
Federation, Compagnie d'assurances du Canada
La Compagnie d'assurance et de Garantie Grain
Gore Mutual Insurance Company
The Guarantee, Compagnie d'Amérique du Nord
Industrielle Alliance Pacifique, Compagnie d'Assurances Générales
Intact Compagnie d'assurance
Jevco, Compagnie d'assurances (cautionnement seulement)
Compagnie canadienne d'assurances générales Lombard
Compagnie d'assurance Lombard
Markel, Compagnie d'assurances du Canada
Missisquoi, Compagnie d'assurances
La Nordique compagnie d'assurance du Canada
The North Waterloo Farmers Mutual Insurance Company (fidélité du personnel seulement)
Novex Compagnie d'assurance (fidélité du personnel seulement)
La Personnelle, compagnie d'assurances
La Compagnie d'Assurance Pilot
Compagnie d'Assurance du Québec
Royal & Sun Alliance du Canada, société d'assurances
Saskatchewan Mutual Insurance Company
Compagnie d'Assurance Scottish & York Limitée
La Souveraine, Compagnie d'Assurance Générale
TD, Compagnie d'assurances générales
Temple, La compagnie d'assurance
Traders, Compagnie d'assurances générales
La Compagnie Travelers Garantie du Canada
Compagnie d'Assurance Trisura Garantie

Waterloo, Compagnie d'assurance
La Compagnie Mutuelle d'Assurance Wawanesa
Western, Compagnie d'assurances
Western, Compagnie de garantie

2. Compagnie provinciales

Les cautionnements de garantie des compagnies suivantes peuvent être acceptés à condition que le contrat de garantie soit conclu dans une province où la compagnie est autorisée à faire affaires, comme il est indiquée entre parenthèses.

AXA Boréal Assurances Inc. (I.-P.-É., N.-B., Qué., Ont., Man., C.-B.)
ALPHA, Compagnie d'assurances Inc. (Québec)
Canada West Insurance Company (Ont., Man., Sask., Alb., C.-B., T.-N.-0.) (cautionnement seulement)
La Capitale assurances générales inc. (T.-N.-L., N.-É, I.-P.-É, Qué. (cautionnement seulement), Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
Coachman Insurance Company (Ont.)
La Compagnie d'Assurance Continental Casualty (T.-N.-L., N.-É, I.-P.-É, N.-B., Qué., Ont., Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
GCAN Compagnie d'assurances (T.-N.-L., N.-É, I.-P.-É, N.-B., Qué., Ont., Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
The Insurance Company of Prince Edward Island (N.-É, I.-P.-É, N.-B.)
Kingsway Compagnie d'assurances générales (N.-E., N.-B., Qué., Ont., Man., Sask., Alb., et C.-B.)
La Compagnie d'Assurance Liberté Mutuelle (T.-N.-L., N.-É, I.-P.-É, N.-B., Qué., Ont., Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
Norgroupe Assurances Générales Inc.
Orléans, compagnie d'assurance générale (N.-B., Qué., Ont.)
Saskatchewan Government Insurance Office (Sask.)
SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alb.)
Société d'assurance publique du Manitoba (Man.)
Union Canadienne, Compagnie d'assurances (Québec)
L'Unique assurances générales inc. (T.-N.-L., N.-É, I.-P.-É, N.-B., Qué. (cautionnement seulement), Ont. (cautionnement seulement), Man., Sask., Alb. C.-B. (cautionnement seulement), Nun., T.-N.-O., Yuk.)

3. Compagnie étrangères

Aspen Insurance UK Limited
Compagnie Française d'Assurance pour le Commerce Extérieur (fidélité du personnel seulement)
Eagle Star Insurance Company Limited
Société des Assurances Ecclésiastiques (fidélité du personnel seulement)
Lloyd's, Les Souscripteurs du
Mitsui Sumitomo Insurance Company, Limited
NIPPONKOA Insurance Company, Limited
Assurances Sompo du Japan
Tokio Maritime & Nichido Incendie Compagnie d'Assurances Ltée
XL Insurance Company Limited (cautionnement seulement)
Zurich Compagnie d'Assurances SA

Articles de convention

Contrat de construction – Articles de convention
(23/01/2002)

A1 Contrat

A2 Description des travaux et date d'achèvement

A3 Prix du contrat

A4 Adresse de l'entrepreneur

A5 Tableau des prix unitaires

Articles de convention

Les présents Articles de convention faits en double le **8ième** jour de **janvier, 2015**

Entre

Sa Majesté la Reine, du chef du Canada (ci-àprès appelé " Sa Majesté") représentée par le Conseil National recherches du Canada. (ci-àprès appelé " le Conseil")

Et **Les installations électriques Pichette Inc.**

(ci-àprès appelé "l'Entrepreneur")

Font foi que sa Majesté et l'Entrepreneur ont établi entre eux les conventions suivantes:

A1 Contrats

(23/01/2002)

1.1 Sous réserve des paragraphes A1.4 and A1.5, les documents constituant le contrat passé entre Sa Majesté et l'Entrepreneur (ci-après appelé le Contrat) sont:

1.1.1 les présents Articles de convention;

1.1.2 les documents intitulés "Plans et devis" et annexés aux présentes sous la cote "A";

1.1.3 le document intitulé "Modalités de paiement" et annexé aux présentes sous la cote "B";

1.1.4 le document intitulé, "Conditions générales" et annexé aux présentes sous la cote "C";

1.1.5 le document intitulé, "Conditions de travail" et annexé aux présentes sous la cote "D";

1.1.6 le document intitulé, "Conditions d'assurance" et annexé aux présentes sous la cote "E";

1.1.7 le document intitulé, "Conditions de garantie du contract" et annexé aux présentes sous la cote "F"; et

1.1.8 toute modification au Contract en accord avec le Conditions génerales.

1.1.9 le document intitulé "Échelles de juste salaire pour les contrats fédéraux de construction", désigné dans le présent document par l'appellation "Échelles de justes salaires".

Articles de Convention

1.2 Le Conseil désigne de **SAGI**
du CNRC, du gouvernement du Canada, Ingénieur aux fins du Contrat et à toute fin, y compris aux fins accessoires, l'adresse de l'Ingénieur est réputée être:

1.3 **Dans le Contrat**

1.3.1 " Entente à prix fixe" désigne la partie du Contrat où il est stipulé qu'un paiement global sera fait en contrepartie de l'exécution des travaux auxquels elle se rapporte; et

1.3.2 " Entente à prix unitaire" désigne la partie du Contrat où il est stipulé que le produit d'un prix multiplié par un nombre d'unité de mesurage d'une catégorie sera versé à titre de paiement pour l'exécution des travaux visés par cette entente.

1.4 Toute dispositions du Contrat qui s'applique expressément et seulement à une Entente à prix unitaire ne s'applique à aucune partie des travaux qui relève de l' Entente à prix fixe.

1.5 Toute dispositions du Contrat qui s'applique expressément et seulement à une Entente à prix fixe ne s'applique à aucune partie des travaux qui relève de l' Entente à prix Unitaire.

A2 Description des travaux et date d'achèvement
(23/01/2002)

2.1 Entre la date des présentes Articles de convention et le jour de **,** l'Entrepreneur exécute, avec soin et selon le règles de l'art, à l'endroit et de la manière indiquée, les travaux suivants :

plus particulièrement décrits dans les Plans et devis, incluant les addenda no.

A3 Prix du marché

(23/01/2002)

3.1 Sous réserve de toute addition, soustraction, déduction, réduction ou compensation prévue en vertu du Contrat, Sa Majesté, aux dates et de la manière énoncées ou mentionnées dans les Modalités de paiement, paie à l'Entrepreneur:

3.1.1 la somme de **$** (TPS/TVH en sus), en considération et l'exécution des travaux ou des parties de travaux à laquelle s'applique l'Entente à prix fixe, et

3.1.2 une somme égale à l'ensemble des produits du nombre d'unités de mesurage de chaque catégorie de travail, d'outillage ou de matériaux indiqué dans le Certificat définitif de mesurage mentionné ou paragraphe CG44.8, ce nombre d'unités étant multiplié selon le cas par le prix de chaque unité indiquée dans le Tableau des prix unitaires relativement à l'exécution des travaux ou des parties de travaux qui ont fait l'objet d'une Entente à prix unitaire.

3.2 Pour le gouverne de l' Entrepreneur et des personnes chargées de l'exécution du Contrat au nom de sa Majesté, mais sans toutefois comporter une garantie ou un engagement de quelque nature de la part de l'une ou l'autre partie, il est estimé que la somme totale payable par Sa Majesté à l'Entrepreneur pour la partie des travaux qui a fait l'objet d'une Entente à prix unitaire, sera d'environ **N/A** $

3.3 L'alinéa A3.1.1 ne s'applique qu'à une Entente à prix fixe.

3.4 L'alinéa A3.1.2 et le paragraphe A3.2 ne s'appliquent qu'à une Entente à prix unitaire.

A4 Adresse de L'Entrepreneur

(23/01/2002)

4.1 Aux fins du Contrat, y compris les fins accessoires, l'adresse de l'Entrepreneur est réputé être:

A5 Tableau des prix unitaires

(23/01/2002)

5.1 Il est convenu entre Sa Majesté et l'Entrepreneur que le tableau ci-après est le Tableau des prix unitaires pour le Contrat:

Colonne 1 Postes	**Colonne 2** Catégorie de travail outillage ou de matériaux	**Colonne 3** Unité de mesurage	**Colonne 4** Quantité totale estimative	**Colonne 5** Prix unitaire	**Colonne 6** Prix total estimatif
		N/A			

5.2 Le Tableau des prix unitaires présenté au paragraphe A5.1 décrit la partie des travaux visée par l'Entente à prix unitaire.

5.3 La partie des travaux qui n'est pas décrite dans le Tableau des prix unitaires mentionné au paragraphe A5.2 est la partie des travaux visée par l'Entente à prix fixe.

Signé au nom de Sa Majesté par

_____

en tant que **agent supérieur de contrats**

et_____

en tant que_____

du Conseil national de recherches Canada

le_____

jour de_____

Signé, scellé et signifié par

_____

en tant que_____et
emploi

par_____

en tant que_____
emploi

de _____.
entrepreneur

le_____

jour de_____

Sceau

Drawings

The following is a list of drawings which accompany these specifications and which form part of the Contract Documents for the Work:

CIVIL

5097-C300-1 PHASE 3 – COVERSHEET

5097-C301-1 PHASE 3 – LEGEND

5097-C302-1 PHASE 3 - NOTES
5097-C302-2 PHASE 3 – NOTES

5097-C303-1 MASTER PLAN NORTH – SANITARY SEWER
5097-C303-2 MASTER PLAN SOUTH – SANITARY SEWER

5097-C304-1 MASTER PLAN NORTH – STORM SEWER
5097-C304-2 MASTER PLAN SOUTH – STORM SEWER

5097-C305-1 PHASE 3 - TOPOGRAPHICAL SURVEY ALIGNMENT "B" 80+000 TO 80+150
5097-C305-2 PHASE 3 - TOPOGRAPHICAL SURVEY ALIGNMENT "E" 90+000 TO 90+300
5097-C305-3 PHASE 3 - TOPOGRAPHICAL SURVEY ALIGNMENT "E" 90+300 TO 90+440

5097-C306-1 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "B" 80+000 TO 80+080
5097-C306-2 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "E" 90+000 TO 90+150
5097-C306-3 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "E" 90+150 TO 90+440
5097-C306-4 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "ALIGNMENT M-20"

5097-C307-1A PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "B" 80+000 TO 80+150
5097-C307-1B PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 85+000 TO 85+140
5097-C307-3 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "M20"
5097-C307-4 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 90+000 TO 90+150
5097-C307-5 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 90+150 TO 90+300
5097-C307-6 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 90+300 TO 90+440

5097-C308-1 PHASE 3 - DETAILS
5097-C308-2 PHASE 3 - DETAILS
5097-C308-3 PHASE 3 - DETAILS
5097-C308-4 PHASE 3 - DETAILS
5097-C308-5 PHASE 3 - DETAILS
5097-C308-6 PHASE 3 - DETAILS
5097-C308-7 PHASE 3 - DETAILS
5097-C308-8 PHASE 3 - DETAILS

1. DESCRIPTION DES TRAVAUX

.1 Les travaux prévus dans la phase 3 de ce contrat couvrent la séparation des égouts sanitaires et pluviaux au 1200 chemin Montréal, Ottawa (Ontario), du Conseil national de recherches Canada

2. DESSINS

.1 Se reporter à la Section 00 01 50 - Liste des Dessins pour les dessins qui font partie de ce contrat.

3. ACHÈVEMENT DES TRAVAUX

.1 Tous les travaux de génie civil tel que la chaussée, terrassements, travaux souterrains sanitaires, aqueduc, etc., doivent être achevées avant le 15 Decembre 2018.

4. GÉNÉRALITÉS

.1 Sans objet en français.

.2 Fournir les items mentionnés dans les dessins ou dans les spécifications.

5. MATÉRIEL ET PRODUITS SPÉCIFIÉS, DÉSIGNÉS ACCEPTABLES OU SUBSTITUTS

.1 Les produits et le matériel spécifiés dans les dessins ou les devis ont été sélectionnés dans le but d'établir des normes de rendement et de qualité. Dans la plupart des cas, lorsque l'on précise la marque de commerce et le numéro de modèle de tout produit ou matériel, on indique aussi les noms d'autres fabricants qui seraient acceptables. Les entrepreneurs peuvent calculer le montant de leur soumission en se fondant sur les prix des produits et du matériel fournis par n'importe quel des fabricants désignés comme étant des fournisseurs acceptables de produits ou de matériel particuliers.

.2 En plus des fabricants spécifiés ou désignés comme étant acceptables, vous pouvez demander au représentant ministériel d'approuver d'autres fabricants, produits ou matériel. Pour faire approuver un produit en tant que substitut, vous devez remettre une demande par écrit au représentant ministériel au cours de la période fixée pour soumissionner, au plus tard dix (10) jours ouvrables avant la clôture de l'appel d'offres.

.3 Vous devez attester par écrit que le substitut répond à toutes les exigences relatives aux dimensions, à la capacité, au rendement et à la qualité du matériel ou des produits spécifiés. En outre, il est entendu que l'entrepreneur assume tous les coûts qui sont reliés à l'acceptation des substituts proposés, ou qui en résultent.

.4 L'approbation des substituts sera communiquée sous forme d'un Addendum aux documents de soumission.

.5 Nous n'examinerons pas les demandes d'approbation d'autres fabricants, produits ou matériel qui sont incomplets et impossibles à évaluer ou qui sont soumises moins de dix (10) jours avant la clôture de l'appel d'offres.

6. NORMES MINIMALES

.1 Se conformer aux exigences des normes minimales acceptables des divers codes fédéraux, provinciaux et municipaux pertinents tels le Code national du bâtiment, le Code national de prévention des incendies, le Code canadien de la plomberie, le Code canadien de l'électricité, le Code canadien de la sécurité sur les chantiers de construction et la Loi provinciale sur la sécurité dans la construction, ou les dépasser.

.2 Effectuer les travaux conformément aux normes et codes dont il est fait mention, en vigueur ou révisés à la date de publication du présent devis.

7. SYSTÈME D'INFORMATION SUR LES MATIÈRES DANGEREUSES UTILISÉES AU TRAVAIL (SIMDUT)

.1 L'entrepreneur doit se conformer aux lois fédérales et provinciales portant sur le SIMDUT. Les responsabilités de l'entrepreneur comprennent les tâches suivantes, sans s'y limiter :

.1 S'assurer de l'étiquetage acceptable de tout produit contrôlé introduit sur les lieux des travaux par l'entrepreneur lui-même ou un sous-traitant, ou l'un de leurs fournisseurs;

.2 Mettre à la disposition des travailleurs et du représentant ministériel des fiches techniques « santé - sécurité » (FTSS) portant sur ces produits contrôlés;

.3 Former ses propres ouvriers pour le SIMDUT et les produits contrôlés présents au chantier;

.4 Informer les autres entrepreneurs, les sous-traitants, le représentant ministériel, les visiteurs autorisés, ainsi que les représentants des organismes externes d'inspection, de la présence et de l'utilisation de ces produits sur les lieux des travaux.

.5 Le contremaître ou le surveillant des travaux doit pouvoir démontrer au représentant ministériel qu'il a reçu une formation portant sur le SIMDUT et qu'il est au courant des exigences de ce système. Le représentant ministériel peut exiger le remplacement de cette personne, si celle-ci ne satisfait pas à l'exigence susmentionnée ou si le SIMDUT n'est pas mis en œuvre de façon acceptable.

8. PRESCRIPTIONS DU RÈGLEMENT 208, SECTION 18(A)

.1 Tel que prescrit par le Règlement 208 de la Loi sur la santé et la sécurité au travail du Ministère du Travail de l'Ontario, nous vous avisons de la présence possible sur les lieux de travail visés par le présent contrat des matières désignées suivantes:

.1 Acrylonitrile, Arsenique, Amiante, Benzène, Résidus de cokéfaction, Oxyde d'éthylène, Isocyanotes, Plomb, Mercure, Silice, Chlorure de vinyle.

.1 L'entrepreneur général a la responsabilité de s'assurer que tous les éventuels sous-traitants ont reçu une copie de liste des matières désignées qui peuvent être présentes sur le chantier.

.2 En plus de celles énumérées par la province, il peut également s'y trouver les matières désignées suivantes : mercure

.3 L'entrepreneur général est de prendre les précautions appropriées lorsqu'ils traitent avec les substances ci-dessus.

9. VENTILATION DES COÛTS

.1 Soumettre pour l'approbation du représentant ministériel une ventilation des coûts dans les 72 heures qui suivent l'acceptation de la soumission.

.2 Une fois approuvée, utiliser la ventilation des coûts comme base pour la soumission de toute autre demande.

.3 Avant de rédiger et de soumettre une demande sous sa forme définitive, obtenir le consentement verbal du représentant ministériel quant au montant de cette demande.

10. SOUS-TRAITANTS

.1 Dans les 72 heures qui suivent l'acceptation de la soumission, soumettre à l'étude du représentant ministériel une liste complète des sous-traitants.

11. INSIGNES D'IDENTIFICATION ET ENQUETES DE SÉCURITÉ DU PERSONNEL

.1 Toute personne employée par l'Entrepreneur ou par un de ses sous-traitants et présents sur le chantier doit rencontrer les exigences d'une enquête de sécurité en accord avec la section intitulée Instructions Spéciales aux Soumissionnaires.

.2 Toutes ces personnes doivent porter et garder visible une insigne d'identification émise par le Bureau de la sécurité du CNRC.

12. HEURES DE TRAVAIL ET EXIGENCES D'ESCORTE

.1 Les heures normales de travail au CNRC sont de 8h00 à 16h30, du lundi au vendredi inclusivement, sauf les congés fériés.

.2 En tout autre temps, des laissez-passer spéciaux sont nécessaires pour avoir accès au chantier.

.3 Obtenir la permission du représentant ministériel d'exécuter des tâches particulières avant de planifier tout travail après les heures normales de travail.

.4 Après les heures normales de travail, il se peut qu'une escorte soit nécessaire. Défrayer les coûts de cette escorte si le représentant ministériel le demande.

13. CALENDRIER DES TRAVAUX

.1 L'Entrepreneur doit soumettre un calendrier détaillé des travaux, indiquant les dates du début et de la fin des diverses étapes des travaux et le mettre à jour. Il doit remettre ce calendrier au représentant ministériel au plus tard deux (2) semaines après l'adjudication du contrat et avant d'entreprendre tout travail au chantier.

.2 Informer le représentant ministériel par écrit de toute modification apportée au calendrier.

.3 Cinq (5) jours avant la date d'achèvement prévue, planifier de faire une inspection provisoire avec le représentant ministériel.

14. RÉUNIONS

.1 Tenir régulièrement des réunions aux heures et aux endroits approuvés par le représentant ministériel.

.2 Aviser toutes les parties intéressées des réunions pour assurer une bonne coordination des travaux.

.3 Le représentant ministériel déterminera les heures de réunions et assume la responsabilité d'enregistrer et distribuer le procès-verbal.

15. DESSINS D'ATELIER

.1 Soumettre au représentant ministériel, aux fins de vérification, les dessins d'atelier, la documentation et les échantillons prescrit deux (2) semaines après l'adjudication du contrat.

.2 Soumettre au représentant ministériel aux fins de vérification, une liste complète de tous les dessins d'atelier, la documentation et les échantillons prescrits et une confirmation écrite des dates de livraison correspondantes dans l'intérieur d'une (1) semaine, suite à la date d'approbation des dessins d'atelier, de la documentation et des échantillons. Cette liste devra être mise à jour sur une base de bihebdomadaire et n'importe quels changements à la liste devront être immédiatement notifiés par écrit au représentant ministériel.

.3 Examiner les dessins d'atelier, la documentation et les échantillons avant de les soumettre.

.4 Sauf avis contraire, soumettre des copies électronique de tous les dessins d'atelier, de la documentation, ainsi que des échantillons pour vérification.

.5 Demeurer responsable des erreurs et des omissions apparaissant dans les dessins d'atelier et la documentation et s'assurer qu'ils sont conformes aux documents contractuels même s'ils sont revus par le représentant ministériel.

16. ÉCHANTILLONS ET MAQUETTES

.1 Soumettre des échantillons aux dimensions et quantités prescrites.

.2 Si la couleur, le motif ou la texture sont des facteurs spécifiés, soumettre tout un éventail d'échantillons.

.3 Monter des modèles et des maquettes au chantier, aux endroits qui conviennent le représentant ministériel.

.4 Tout travail terminé est vérifié sur place d'après les modèles ou maquettes approuvés qui servent de normes pour la façon et les matériaux.

17. MATÉRIAUX ET MISE EN ŒUVRE

.1 Pour le présent projet, n'utiliser que des matériaux neufs, sauf si noté autrement.

.2 Seuls les travaux de première classe seront acceptés, non seulement en ce qui a trait à la sécurité, l'efficacité et la durabilité, mais aussi à l'exactitude du détail et au bon rendement.

18. OUVRAGES ET MATÉRIAUX FOURNIS PAR LE PROPRIÉTAIRE

.1 Les ouvrages et matériaux non inclus dans ce contrat sont décrits sur les dessins et dans le devis.

.2 Tous les matériaux retournés au Propriétaire doivent être transportés à un lieu d'entreposage désigné par le représentant ministériel.

.3 Sauf indication contraire, prendre possession des matériaux fournis par le Propriétaire à leur lieu d'entreposage et assurer leur transport.

.4 Responsabilités de l'Entrepreneur :

.1 Les décharger à pied d'œuvre.

.2 En faire aussitôt l'inspection et signaler tout article endommagé ou défectueux.

.3 Par écrit, informer le représentant ministériel des articles qui sont reçus en bon état.

.4 Les manutentionner à pied d'œuvre, ce qui comprend leur déballage et leur entreposage.

.5 Réparer ou remplacer les articles endommagés au chantier.

.6 Installer et raccorder les produits finis conformément aux prescriptions.

19. VOIES D'ACCÈS

.1 Prendre les dispositions nécessaires avec le représentant ministériel avant de commencer les travaux ou avant de transporter des matériaux et du matériel au chantier.

.2 Obtenir l'approbation du représentant ministériel quant aux moyens d'accès normaux au chantier pendant la période de construction.

.3 Obtenir l'approbation du représentant ministériel avant de suspendre temporairement les travaux sur le chantier; avant de retourner au chantier et avant de quitter le chantier à la fin des travaux.

.4 Obtenir l'approbation du représentant ministériel avant de suspendre temporairement les travaux sur le chantier; avant de retourner au chantier et avant de quitter le chantier à la fin des travaux.

.5 Aménager et entretenir des routes provisoires et assurer leur déneigement pendant les travaux.

.6 L'Entrepreneur doit réparer et nettoyer les routes qu'il a dû utiliser au cours des travaux.

20. UTILISATION DU CHANTIER

.1 Limiter les travaux sur le chantier aux secteurs approuvés par le représentant ministériel au moment de la soumission.

.2 Tous matériel, structures, abris, etc. provisoires doivent se trouver dans les secteurs désignés.

.3 Limiter le stationnement aux secteurs désignés.

21. ACCEPTATION DU CHANTIER

.1 Avant d'entreprendre les travaux, l'Entre- preneur doit visiter le chantier et, en compagnie du représentant ministériel, revoir toutes les conditions qui pourraient toucher ses travaux.

.2 Le début des travaux signifiera l'acceptation des conditions existantes.

22. BUREAU ET TÉLÉPHONE AU CHANTIER

.1 L'Entrepreneur devra ériger, à ses frais, un bureau temporaire au chantier.

.2 Au besoin, installer un téléphone et en assurer l'entretien.

.3 Il est interdit d'utiliser les téléphones du CNRC, sauf en cas d'urgence.

23. INSTALLATIONS SANITAIRES

.1 Fournir ses propres installations, et en assumer tous les frais.

24. SERVICES PROVISOIRES

.1 L'Entrepreneur pourra bénéficier d'une source provisoire d'électricité à pied d'œuvre. Il devra fournir, sans frais, tous les raccords et matériaux nécessaires pour assurer ledit service au chantier.

.2 Fournir et installer tous les centres de distributions, disjoncteurs, conduits, câblage, commutateur de déconnexion, transformateurs nécessaires à partir de la source d'électricité.

.3 Il n'est permis d'utiliser le courant que pour les outils électriques, l'éclairage, les commandes, les moteurs, et non pas pour chauffer.

.4 Sur demande, il sera possible de se raccorder provisoirement au réseau de distribution d'eau.

.5 Assumer tous les frais pour amener l'eau aux endroits nécessaires.

.6 Se conformer aux exigences du CNRC lors du raccordement aux réseaux existants, conformément aux articles "Coopération" et "Interruptions des services" de cette section".

25. DEVIS DESCRIPTIF, BULLETINS, DESSINS D'ARCHIVES

.1 L'Entrepreneur doit conserver à pied d'œuvre une (1) copie à jour et en bon état de tous les devis, dessins et bulletins relatifs aux travaux; le représentant ministériel ou ses représentants doivent pouvoir les consulter en tout temps.

.2 L'Entrepreneur doit annoter au moins une (1) copie du devis et des dessins pour y indiquer tous les travaux tels qu'ils ont été exécutés. Il doit la remettre au représentant ministériel avec la Demande de paiement pour le Certificat définitif d'achèvement des travaux.

26. COOPÉRATION

.1 Coopérer avec le personnel du CNRC pour que les travaux de recherche courants soient interrompus le moins possible.

.2 Faire, à l'avance, un calendrier de tous les travaux qui pourraient interrompre le travail normal exécuté dans l'édifice.

.3 Faire approuver le calendrier par le représentant ministériel.

.4 Donner un préavis écrit de 72 heures au représentant ministériel avant toute interruption projetée des installations, des secteurs, des corridors, des services mécaniques ou électriques, et attendre son autorisation.

27. MESURES DE PROTECTION ET ÉCRITEAUX AVERTISSEMENT

.1 Fournir et installer tous les matériaux nécessaires pour protéger le matériel existant.

.2 Ériger des écrans anti-poussière pour éviter que la poussière et les débris ne se répandent en dehors des limites des travaux.

.3 Protéger contre la poussière le matériel et le mobilier avec des bâches et coller ces dernières au plancher, au moyen de ruban adhésif, pour que la poussière ne s'infiltre pas.

.4 Réparer ou remplacer, gratuitement et à la satisfaction du représentant ministériel, tout bien du Propriétaire endommagé pendant les travaux.

.5 Protéger les édifices, les routes, les pelouses, les services, etc. contre tout dommage qui pourrait survenir suite à l'exécution des présents travaux.

.6 Planifier et coordonner les travaux pour que l'eau, la poussière, etc. ne s'infiltre pas dans les édifices.

.7 Fermer toutes les portes, fenêtres, etc. qui pourraient permettre le passage de la poussière, de vapeurs, etc. dans les autres secteurs de l'édifice.

.8 Fermer le secteur des travaux à la fin de chaque journée de travail et être responsable des lieux.

.9 Fournir et installer en permanence des barrières de sécurité appropriées autour du chantier pour éviter que le public et le personnel du CNRC soient blessé pendant l'exécution des travaux.

.10 Poser des écriteaux d'avertissement pour toutes les situations où il pourrait se produire des blessures (ex : Casque protecteurs obligatoires, danger, travaux, etc.) ou lorsque le représentant ministériel le demande.

.11 Fournir et installer des abris provisoires au-dessus des entrées et des sorties de l'édifice pour assurer la protection des piétons. Tous ces abris doivent pouvoir résister aux intempéries et à la chute de débris.

.12 Tous les travaux doit être effectué en conformité avec le Règlement sur le bruit Règlement N° 253 – 2004 de la ville d'Ottawa.

28. BILINGUISME

.1 Tous les écriteaux, avis, etc. doivent être bilingues.

.2 Toute identification de services exigée aux termes du présent contrat.

29. DISPOSITION DES OUVRAGES

.1 Les localisations des équipements, appareils, raccords et ouvertures tel que spécifiées ou indiquées aux dessins doivent être considérées comme approximatives.

.2 Situer les équipements, appareils et systèmes de distributions de façon à minimiser les interférences et maximiser l'espace utilisable et en accord avec les instructions du manufacturier pour un accès et entretien sécuritaire.

.3 Engager une personne compétente pour agencer les travaux selon les documents contractuels.

30. ÉCARTS ET INTERFÉRENCES

.1 Avant de débuter les travaux, examiner les dessins et le devis. Signaler aussitôt au représentant ministériel tout écart, défaut, omission ou interférence qui touchent les travaux.

.2 Si, au cours des travaux, l'Entrepreneur trouve que les plans ne reflètent pas la réalité, il lui incombe de le signaler immédiatement par écrit au représentant ministériel, lequel doit rapidement vérifier les allégations.

.3 Tout travail exécuté après cette découverte, jusqu'à ce qu'il soit autorisé, doit être fait aux risques de l'Entrepreneur.

.4 Si des obstacles ou interférences mineures sont décelés en cours d'exécution et qu'ils n'avaient pas été signalés sur la soumission originale ou sur les plans et le devis, fournir et installer des doubles coudes ou des coudes ou modifier le tracé des services pour qu'il soit appropriés aux conditions du chantier, et ce sans frais supplémentaire.

.5 Prendre les dispositions pour que tous les travaux ne gênent d'aucune façon l'exécution des autres travaux.

31. INSTRUCTIONS DU FABRICANT

.1 Sauf indications contraires, se conformer aux plus récentes instructions écrites du fabricant concernant les matériaux et le matériel à utiliser et les méthodes de mise en place.

.2 Aviser le représentant ministériel par écrit de toute divergence entre le présent devis et les instructions du fabricant; le représentant ministériel déterminera alors quel document a priorité.

32. CHAUFFAGE PROVISOIRE ET VENTILATION

.1 Assumer les frais de la ventilation et du chauffage provisoire utilisés pendant la construction, y compris les frais d'installation, de combustible, d'exploitation, d'entretien et d'enlèvement du matériel.

.2 Sauf si le représentant ministériel l'a autorisé, il est interdit d'utiliser des appareils de chauffage autonomes répandant des émanations dans les zones de travail.

.3 Fournir et installer le matériel provisoire de chauffage et de ventilation requis dans les endroits fermés afin de:

.1 Faciliter l'exécution des travaux.

.2 Protéger les ouvrages et les matériaux contre l'humidité et le froid.

.3 Réduire la condensation de l'humidité sur les surfaces à un niveau acceptable.

.4 Assurer les niveaux de température ambiante et d'humidité indispensables pour l'entreposage, l'installation et la période de séchage requis des matériaux.

.5 Assurer une ventilation adéquate afin de répondre aux exigences de santé publique concernant la sécurité dans les zones de travail.

.4 Maintenir une température d'au moins 10oC (50oF) aux endroits spécifiés, partir du début des travaux de finition jusqu'au moment de l'acceptation du bâtiment par le représentant ministériel.

.1 Maintenir la température ambiante et l'humidité aux niveaux nécessaires pour assurer le bien être du personnel du CNRC.

.5 Prendre les mesures nécessaires pour empêcher les accumulations dangereuses de poussières, fumées, buées, vapeurs et émanations, dans les zones occupées pendant les travaux de construction, y compris aussi les aires d'entreposage et les installations sanitaires.

.1 Évacuer les substances dangereuses de sorte que la santé des occupants ne soit pas mise en danger.

.6 Assurer une surveillance constante et rigoureuse du fonctionnement du matériel de chauffage et de ventilation.

.1 Faire respecter les normes et les codes pertinents.

.2 Se conformer aux instructions de l'Agent de prévention des incendies du CNRC, ce qui comprend la désignation, sur demande, de gardiens de sécurité- incendie à temps complet.

.3 Faire respecter les normes de sécurité.

.4 Doter les appareils de combustion autonomes de mises à l'air libre vers l'extérieur.

.7 Rédiger les soumissions en supposant que les installations et le matériel neufs ou existants ne pourront être utilisés pour le chauffage et la ventilation provisoire.

.8 Une fois le contrat adjugé, le représentant ministériel peut autoriser l'utilisation de l'installation permanente s'il peut y avoir entente sur ce qui suit:

.1 Conditions d'utilisation, matériel spécial, protection et entretien, remplacement des filtres, etc.

.2 Méthodes pour s'assurer que le caloporteur ne sera pas perdu et, dans le cas de la vapeur, entente sur ce qu'il adviendra du condensateur.

.3 Réduction du prix du contrat (s'il doit être débit).

.4 Prescriptions pertinentes aux garanties du matériel.

33. INTERRUPTIONS DES SERVICES

.1 Lorsque les travaux impliquent le raccord a des services existants, exécuter les travaux en temps et manière pré-agrées avec le représentant ministériel et autres autorités ayant juridiction avec le minimum de perturbations au personnel du CNRC, a la circulation véhiculaire et de temps d'interruption du service. L'entrepreneur ne doit en aucun cas opérer les équipements du CNRC.

.2 Avant de commencer les travaux, établir la localisation et l'étendue des lignes de services dans l'espace de travail et ou affectés par les travaux et aviser le représentant ministériel des constatations.

.3 Fournir une cédule et obtenir l'approbation du représentant ministériel pour toute interruption ou fermeture de services actif et allouer un préavis de 72 heures.

.4 Aviser le représentant ministériel immédiatement suivant la rencontre de services inconnus et confirmer la découverte par écrit.

.5 Afin de minimiser les interruptions, prévoir des déviations, des ponts, des sources d'alimentation de rechange, etc., au besoin.

.6 Protéger les services existants comme il se doit et effectuer aussitôt toutes les réparations nécessaires si des dommages surviennent.

.7 Enlever tous les lignes de services abandonnés tel qu'indiqués dans les documents contractuels et tel qu'approuvé par le représentant ministériel, boucher et ou autrement sceller aux points de coupure. Noter et fournir une copie au représentant ministériel de la localisation de toutes les lignes de services maintenues, déroutées et ou abandonnées.

34. DÉCOUPAGE ET RAPIÉÇAGE

.1 Découper les surfaces existantes de façon à ce que les ouvrages s'agencent correctement entre eux.

.2 Supprimer tous les articles indiqués ou prescrits.

.3 Rapiécer et réparer, à la satisfaction du représentant ministériel, les surfaces qui ont été modifiées, découpées ou endommagées, avec des matériaux identiques.

.4 Là où des nouveaux tuyaux passent à travers des travaux existants, percer une ouverture. La dimension de l'ouverture doit laisser un jeu de 12mm (1/2") autour des tuyaux ou de l'isolation de la tuyauterie. Ne pas percer, ni couper aucune surface sans l'approbation de le représentant ministériel.

.5 Obtenir l'approbation écrite du représentant ministériel avant de percer des ouvertures dans les pièces de charpente neuves ou existantes.

.6 Calfeutrer toutes les ouvertes où des câbles, conduits ou tuyaux passent à travers les murs avec un calfeutrant acoustique conforme à CAN/CGSB 19.21-M87.

.7 Là où des câbles, conduits ou tuyaux passent à travers des murs ou des planchers coupe-feu, emplir l'espace avec des fibres de verre comprimées et calfeutrer avec un calfeutrant en accord avec CAN/CGSB-19.13 et NBC 3.1.7.

35. DISPOSITIFS DE FIXATION

.1 Sauf autorisation expresse du représentant ministériel, il est interdit d'utiliser des pistolets à charge explosive.

.2 Se conformer aux exigences de la norme ACNOR A-166, Pistolets d'ancrage à charge explosive.

.3 Obtenir la permission du représentant ministériel avant d'utiliser tout genre d'outils percussion.

36. SURCHARGE

.1 S'assurer qu'aucune partie de l'ouvrage ou de l'édifice ne supporte une charge susceptible de compromettre sa sécurité ou de causer une déformation permanente ou un dommage de structure.

37. DRAINAGE

.1 Assurer le drainage et le pompage temporaires, selon les besoins, afin de garder les excavations et le chantier propres.

38. ENCEINTES ET FERMETURES DE LA CHARPENTE

.1 Ériger et entretenir toutes les enceintes temporaires nécessaires pour protéger les fondations, le sous-sol, le béton, la maçonnerie, etc. contre le gel ou les dommages.

.2 Ne pas les enlever tant que tout danger de dommage n'est pas écarté et tant que la cure n'est pas terminée.

.3 Munir les ouvertures extérieures de fermetures protectrices provisoires à l'épreuve des intempéries, jusqu'à ce que les châssis, les vitres et les portes extérieures soient installés en permanence.

.4 Fournir et installer des fermetures avec verrou, afin d'assurer la sécurité des installations du CNRC, et en être responsable.

.5 Sur demande, remettre des clés au personnel de sécurité du CNRC.

.6 Disposer les ouvrages avec soin et avec précision. Vérifier toutes les dimensions et en être responsable. Situer les points de repère généraux et prendre les mesures nécessaires pour empêcher leur déplacement.

.7 Pendant toute la durée des travaux, voir à toujours être au courant des conditions du chantier et des travaux exécutés par tous les autres gens de métier, engagés dans le présent projet.

.8 Sauf indication contraire, dissimuler tous les services, tuyauterie, câblage, conduits, etc. dans les planchers, les murs ou les plafonds.

39. ENTREPOSAGE

.1 Pour ne pas que les outils, matériaux, etc. soient endommagés ou volés, prévoir un entrepôt et en être responsable.

.2 Il est interdit d'entreposer des produits inflammables ou explosifs sur le chantier à moins que l'Agent de prévention des incendies du CNRC l'autorise.

40. EXAMEN GÉNÉRAL

.1 Même si le représentant ministériel revoit périodiquement les travaux de l'Entrepreneur, ceci ne dégage pas l'Entrepreneur de sa responsabilité d'exécuter les travaux conformément aux documents contractuels. L'Entrepreneur doit effectuer son propre contrôle de la qualité pour vérifier si ses travaux sont conformes aux documents contractuels.

.2 Informer le représentant ministériel de tout obstacles à la bonne conduite des travaux et obtenir son approbation pour la relocalisation.

41. INSPECTION DES SERVICES ENFOUIS OU DISSIMULÉS

.1 Avant de dissimuler tout service installé, s'assurer que tous les organismes d'inspection intéressés, y compris le CNRC, ont inspecté les ouvrages et ont assisté à tous les essais. Dans le cas contraire, l'Entrepreneur peut avoir à les découvrir à ses propres frais.

42. ESSAIS

.1 A l'achèvement des travaux, ou sur demande du représentant ministériel et (ou) des inspecteurs des organismes locaux en cours d'exécution, et avant que tout service soit

couverts et que le rinçage soit terminé, faire l'essai de toutes les installations en présence du représentant ministériel.

.2 Obtenir tous les certificats d'acceptation ou tous les résultats d'essais des organismes compétents et les remettre le représentant ministériel. Dans le cas contraire, le projet ne sera pas complet.

43. OCCUPATION PARTIELLE

.1 Le CNRC peut demander une occupation partielle de l'installation si les travaux se poursuivent au-delà de la date d'achèvement prévue.

.2 Ne pas limiter l'accès à l'édifice, routes et services.

.3 Ne pas encombrer inutilement le chantier de matériaux ou de matériel.

44. ÉVACUATION DES DÉCHETS

.1 Évacuer, en toute sécurité hors des terrains du CNRC, tous les déchets, y compris les produits volatils; voir article "Exigences Générales de Sécurité".

45. NETTOYAGE PENDANT LA CONSTRUCTION

.1 Sur une base quotidienne, garder les lieux et le secteur adjacent au campus, y compris les toits, exempts de débris et de déchets.

.2 Apporter sur les lieux des conteneurs destinés à la cueillette des déchets et des débris.

46. NETTOYAGE FINAL

.1 A la fin des travaux, effectuer le nettoyage final à la satisfaction du représentant ministériel.

.2 Nettoyer toutes les nouvelles surfaces, les luminaires et les surfaces existantes touchés par les présents travaux, remplacer les filtres, etc.

.3 Nettoyer tous les couvre-planchers souples et les préparer à recevoir le fini protecteur qui sera appliqué par le personnel du CNRC.

47. GARANTIE

.1 Voir les conditions générales C, section GC32.

.2 Veiller à ce que toutes les garanties soient adressées au nom de l'entrepreneur et du Conseil national de recherches du Canada.

48. MANUELS D'ENTRETIEN

.1 À la fin des travaux et avant la décharge de garantie, soumettre trois (3) exemplaires bilingues des manuels d'entretien ou deux (2) exemplaires de chacune des versions anglaises et françaises.

.2 Bien relier les données dans des cahiers à couverture rigide pour feuilles volantes.

.3 Les manuels doivent renfermer les instructions d'exploitation et d'entretien, les garanties, les dessins d'atelier, la documentation technique, etc. touchant les matériaux et les appareils fournis aux termes du présent contrat.

FIN DE SECTION

1. EXIGENCES GÉNÉRALES DE SÉCURITÉ EN CONSTRUCTION

1. L'Entrepreneur doit prendre toutes les mesures nécessaires lors de l'exécution du contrat pour protéger le personnel (travailleurs, les visiteurs, le public général, etc.) et la propriété immobilière.

2. L'Entrepreneur est le seul responsable pour la sécurité de ses employés, des employés de ses sous-traitants et pour l'initiation, le maintien et la supervision des précautions, programmes et procédures de sécurité en rapport avec l'exécution des travaux.

3. L'Entrepreneur doit se conformer à la règlementation et les codes de sécurité Fédéraux, Provinciaux et municipaux et ainsi que la Loi sur la santé et la sécurité au travail (Ontario) à la Commission de la sécurité professionnelle et de l'assurance contre les accidents du travail (CSPAAT). Advenant des conflits entre les dispositions de la législation ou des codes, les dispositions les plus sévères s'appliqueront.

4. La révision périodique du travail de l'Entrepreneur par le représentant ministériel en utilisant les critères des documents contractuels ne relève pas l'Entrepreneur de ses responsabilités vis-à-vis la sécurité lors de l'accomplissement des travaux selon les documents contractuels. L'Entrepreneur doit consulter avec le représentant ministériel pour s'assurer que cette responsabilité est acquitte.

5. L'Entrepreneur doit s'assurer que seulement des personnes compétentes puissent avoir accès et travailler sur le chantier. Tout au cours du contrat toute personne qui n'observe pas ou n'applique pas les règlements de sécurité pourra être renvoyée du chantier.

6. Tous les équipements doivent être sécuritaires en bon état de fonctionnement et appropriés pour la tâche.

7. Suivant une évaluation du projet et des risques spécifiques au site des travaux, l'Entrepreneur doit développer un Plan de sécurité spécifique au Site.

    1. Fournir une affiche montée dans un endroit visible du site du projet contenant les informations suivantes :
        1. Avis de Projet.
        2. Politique de Sécurité Spécifique au site.
        3. Une copie de Loi sur la santé et la sécurité au travail (Ontario).
        4. Un schéma du bâtiment indiquant toutes les sorties d'urgence.
        5. Les procédures en cas d'urgence spécifiques au bâtiment.
        6. Une liste de contacts pour le CNRC, l'Entrepreneur et tous les sous-traitants impliqués.
        7. Toutes fiches signalétiques SIMDUT pertinentes.
        8. Les numéros téléphoniques d'urgence du CNRC.

8. L'Entrepreneur doit fournir du personnel compétent pour appliquer son programme de sécurité ainsi que tout article applicable de la Loi sur la santé et la sécurité au travail et pour s'assurer que ces directives sont suivies.

9. L'Entrepreneur doit orienter tous ces employés ainsi que ceux des sous-traitants sous sa juridiction.

10. Le représentant ministériel exercera une surveillance pour s'assurer que les exigences de sécurité sont rencontrées, que les documents pertinents sont bien remplis et conservés. Le contrat pourra être cancellé et l'Entrepreneur ou ses sous-traitants pourront être renvoyés du chantier advenant le non-respect répétitif des standards de sécurités.

11. L'Entrepreneur devra rapporter tout accident ou incident qui résulte de l'exécution des travaux par l'Entrepreneur et impliquant l'Entrepreneur, le personnel du CNRC ou le public au représentant ministériel et aux autorités ayant juridiction.

12. Si pour effectuer ses travaux, l'entrée dans une laboratoire est requise, l'Entrepreneur devra être fournir une session d'orientation concernant la sécurité et les procédures spécifiques a ce laboratoire a ses employés ainsi qu'à ceux de ses sous-traitants suivant les instructions fournies par le responsable du laboratoire ou le représentant ministériel.

2. EXIGENCES DE SÉCURITÉ INCENDIE

1. Autorité

1. Le Commissaire des incendies du Canada (CIC) est l'autorité en matière de sécurité incendie au CNRC.
2. Aux fins du présent document, le représentant ministériel est le représentant de la CNRC en charge du projet.
3. Respectez les normes suivantes publiées par le Bureau du commissaire des incendies du Canada:
   1. Norme 301 'Norme Travaux de construction', juin 1982;
   2. Norme 302 'Norme Travaux de soudage et de coupage au chalumeau', juin 1982.

2. Usage du Tabac

1. Il est interdit de fumer dans les immeubles du CNRC, ainsi que sur les toits.
2. Respectez les écriteaux "DÉFENSE DE FUMER".

3. Travail à chaud

1. Vous devez obtenir un permis de 'Travail à chaud' du représentant ministériel avant d'entreprendre des travaux de soudage, de brasage, de brûlage ou d'utilisation de chalumeaux et de salamandres ou d'une flamme nue.
2. Avant le début du travail à chaud, réexaminez l'aire de travaux avec le représentant ministériel pour déterminer le niveau de sécurité incendie nécessaire.

4. Signalisation des Incendies

1. Soyez au courant de l'emplacement exact du téléphone et de l'alarme manuelle d'incendie les plus près, ainsi que le numéro de téléphone d'urgence.
2. SIGNALER immédiatement tout incident comportant un feu en procédant comme suit :

1. Déclenchez l'alarme manuelle d'incendie le plus près;
2. Téléphonez au numéro de téléphone d'urgence suivant:

D'UN TÉLÉPHONE DU CNRC	**333**
D'UN AUTRE TÉLÉPHONE	**(613) 993-2411**

3. Lorsque vous signalez un incendie par téléphone, indiquez l'endroit exact du feu, le nom et le numéro du bâtiment, et soyez prêts à vérifier le lieu.
4. La personne qui déclenche l'alarme manuelle d'incendie doit demeurer sur la scène d'incendie pour fournir les renseignements et les indications nécessaires au personnel du service d'incendie.

5. Réseaux Détecteurs et Alarmes d'Incendie à l'Intérieur et à l'Extérieur

1. N'obstruez pas et ne fermez pas les réseaux détecteurs et alarmes d'incendie sans l'autorisation du représentant ministériel.
2. Lors d'une interruption d'un réseau avertisseur, des mesures spéciales définies par le représentant ministériel doivent être prises pour s'assurer que la protection incendie soit maintenue.
3. Ne laissez pas les réseaux détecteurs et avertisseurs d'incendie inactifs a la fin d'une journée de travail sans avoir avisé le représentant ministériel et obtenu son autorisation. Le représentant ministériel doit informer l'api des détails à chaque occasion.
4. N'utilisez pas les bornes d'incendie ni les réseaux de colonnes montantes et robinets armés à d'autres fins que la lutte contre l'incendie sans l'autorisation du représentant ministériel.

6. Extincteurs d'Incendies

1. Fournissez au moins un extincteur à poudre ABC (20 lb) pour chaque site de travail à chaud.
2. Fournissez les extincteurs suivants pour les travaux d'asphalte chaud et de toiture:
   1. Près du pot de goudron - 1 extincteur à poudre ABC (20 lb);
   2. Toiture - 2 extincteurs à poudre ABC (20 lb).
3. Prévoir des extincteurs munis:
   1. d'une goupille et d'un sceau;
   2. d'un manomètre;
   3. d'une étiquette portant la signature d'un préposé d'une compagnie d'entretien d'extincteurs d'incendie.
4. Les extincteurs à l'anhydride carbonique (CO) ne sont pas considérés comme des substituts des extincteurs ci-dessus.

7. Travaux de Toiture

1. Chaudières:
   1. Prévoyez l'emplacement des chaudières d'asphalte et le lieu d'entreposage avec le représentant ministériel avant la livraison au chantier. N'installez

pas les chaudières sur une toiture ou sur un échafaudage et placez-les à une distance d'au moins 10 m (30 pi) de tout bâtiment.

2. Les chaudières doivent être équipées de thermomètres ou de jauges en bon état de fonctionnement.
3. N'utilisez pas les chaudières à des températures excédant 232oC (450oF).
4. Assurez une surveillance permanente pendant l'usage des chaudières et fournissez des couvercles de métal pour étouffer les flammes en cas de feu dans les chaudières. Fournissez les extincteurs d'incendie exigés à l'article 2.6.
5. Expliquez les capacités des récipients au représentant ministériel avant le début des travaux.
6. Ranger les bouteilles de gaz comprimé debout à une distance d'au moins 6M (20 pieds) de la chaudière.

2. Balais à franges ('vadrouilles'):
   1. N'utilisez que des balais à franges en fibres de verre pour toitures.
   2. Enlevez les balais à franges usagés du lieu de travail à la fin de chaque journée de travail.
3. Application au chalumeau:
   1. N'utilisez pas de chalumeaux à proximité des murs.
   2. N'utilisez pas de chalumeaux pour appliquer des membranes sur du bois exposés ou dans des cavités.
   3. Assurez une surveillance incendie conformément à l'article 2.9 de la présente section.
4. Rangez tous les matériaux combustibles utilisés pour les toitures à une distance d'au moins 3 m (10 pi) de toute structure.
5. Les bouteilles de gaz doivent être protégées des dommages mécaniques et maintenues en position verticale et a au moins d'au moins 6m (20 pieds) de la chaudière.

8. Operations de soudure et de meulage

1. L'Entrepreneur doit fournir des couvertures ignifuges, des dispositifs d'extraction de fumée, de écrans et autre équipements similaires pour prévenir l'exposition aux éclairs d'arc de soudure ou étincelles de meulage.

9. Surveillance Incendie

1. Assurez une surveillance incendie pendant au moins une (1) heure après la fin d'une journée de travail à chaud.
2. Chauffage provisoire : voir la Section 00 10 00, Instructions générales.
3. Dotez les équipes de repérage des incendies des extincteurs prévus à l'article 2.6.

10. Obstruction des voies d'évacuation des chaussées, des couloirs, des portes et des ascenseurs

1. Avisez le représentant ministériel avant d'entreprendre tout travail qui entraverait le libre passage du personnel du service d'incendie et de son équipement. Cela

englobe toute dérogation à la hauteur libre minimale, à l'édification de barricades et au creusage de tranchées.

2. Les parcours d'issue du bâtiment ne doivent nullement être obstrués sans la permission expresse du représentant ministériel, qui s'assurera que des parcours de remplacement seront maintenus.
3. Le représentant ministériel avisera l'API de tout obstacle pouvant justifier une planification et des dispositifs de communication plus poussés pour assurer la sécurité des occupants et l'efficacité des interventions de lutte contre l'incendie.

11. Débris et Déchets

1. Limitez autant que possible les détritus et les déchets et les ranger à une distance d'au moins 20 pieds des chaudières ou des torches.
2. Il est interdit de faire brûler des détritus sur le chantier.
3. Bennes à déchets :
   1. En consultation avec le représentant ministériel, déterminez un emplacement sûr et acceptable avant de livrer la benne au chantier ou installer des chutes.
   2. Ne pas excéder la capacité de remplissage des bennes et garder le périmètre libre de tous débris.
4. Stockage :
   1. Soyez extrêmement prudents lorsque vous devez stocker des déchets combustibles sur les lieux de travail. Maintenez les lieux le plus propre possible et bien ventilés et respectez les normes de sécurité.
   2. Déposez les torchons et autres matériaux graisseux ou huileux sujets à la combustion spontanée dans des contenants approuvés et évacuez-les comme exigé au paragraphe 3.1.

12. Liquides Inflammables

1. La manutention, le stockage et l'utilisation de liquides inflammables sont régis par le Code national de prévention des incendies du Canada en vigueur.
2. Les liquides inflammables comme l'essence, le kérosène et le naphta, peuvent être gardés sur les lieux pour fins d'usage à brève échéance en quantités ne dépassant pas 45 litres (10 Gal Imp.), à condition d'être stockés dans les bidons de sûreté portant le sceau d'approbation des LAC (ULC). Le stockage de plus grandes quantités de liquides inflammables aux fins de l'exécution des travaux qui nécessite l'autorisation du représentant ministériel.
3. Il est interdit de laisser des liquides inflammable sur les toits après les heures normales de travail.
4. Il est interdit de transvaser des liquides inflammables à l'intérieur des bâtiments.
5. Il est interdit de transvaser des liquides inflammables à proximité de dispositifs à flamme nue ou de tout autre type de dispositif dégageant de la chaleur.
6. Il est interdit d'utiliser des liquides inflammables ayant un point d'éclair inférieur à 38oC (100oF, tels que le naphta ou l'essence, comme solvants ou agents de nettoyage.

7. Stockez les liquides résiduels inflammables dans des récipients approuvés situés dans un endroit sûr bien ventilé. Les déchets constitués de liquides inflammables doivent être régulièrement évacués du chantier.

8. Lorsque des liquides inflammables, tels que des laques ou des uréthanes, sont utilisés, veillez à ce que la ventilation soit adéquate et éliminer toute source d'inflammation. Prévenez le représentant ministériel avant le début de tels travaux et une fois les travaux achevés.

13. Questions et/ou demandes d'explications

1. Adressez vos questions ou demandes d'explications concernant la sécurité incendie au représentant ministériel.

FIN DE SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Ontario Provincial Standard Specifications (OPSS).

.2 Ontario Provincial Standard Drawings (OPSD).

1.2 SECTION INCLUDES

.1 Title and description of Work.

.2 Contract Method.

.3 Work by others.

.4 Future Work.

.5 Work sequence.

.6 Contractor use of premises.

.7 Owner occupancy.

1.3 PRECEDENCE

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

. 2 The Drawings listed in section 00 01 50 take precedence over the Geotechnical Reports included in Appendix A and B of this Project Manual.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises the existing combined sewer to be replace by a sanitary and storm sewer, located at 1200 Montreal Rd, Ottawa, ON. The site is located West of Blair Road and North of Montreal Road. Work include the following:

.1 Asphalt removal
.2 Combine Sewer removal
.3 Sanitary and Storm sewer installation
.4 Maintenance Holes and Catch Basins
.5 Excavation, Grading and Paving
.6 Concrete curb and Sidewalks
.7 Site lighting
.8 Landscaping
.9 Construction Photographic Documentation Service
.11 Other related Work

1.5 CONTRACT METHOD

.1 **Construct Work under lump sum price contract.**

.2 Relations and responsibilities between Contractor and Subcontractors assigned by Owner are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:

.1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations thereunder when Contractor is required to furnish such bonds to Departmental Representative.

.2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide to Departmental Representative.

1.6 COST BREAKDOWN

.1 Within 72 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract amount.

.2 Show separately cost of equipment purchased exempt from Ontario Retail Sales Tax under your Ontario Sales Tax licence number.

.3 Within 72 hours of acceptance of bid submit a list of subcontractors.

1.7 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.8 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's use of premises during construction.

.1 The Contractor will be required to submit a construction staging plan for approval to the Departmental Representative prior to the commencement of work for approval.

.2 Staging plan to accommodate and include the following provisions:

.1 Day time access to loading docks must remain active.

.2 Maintain Fire route access through site.

.3 Maintain a minimum parking spots during all phases of construction during regular business hours.

.4 Contractor to provide all necessary signage and barricades to identify closures and detours.

.2 Co-ordinate Progress Schedule and co-ordinate with Departmental Representative during construction.

.3 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.

.4 Task such as milling entire parking lot, grading, installation of underground services may be completed by closing off site after business hours and on weekends with approval of the Departmental Representative.

1.9 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for Work, storage, and for access to allow:

.1 Owner occupancy.

.2 Work by other contractors.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Contractor and his sub-contractors are limited to a total 6 parking spaces on site for the duration of the construction.

.4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

.8 Contractor will be responsible for snow removal of the entire construction area for the duration of the construction period.

1.10 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.11 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hour notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel and vehicular traffic.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

1.12 DOCUMENTS REQUIRED

.1 Maintain at job site, one (1) copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Geotechnical Investigation Report, Houle Chevrier Engineering, March 11, 2016 (Ref. 62739.10).
.12 Supplemental Geotechnical Investigation, GEMTEC, Februrary 6, 2018 (Ref. 62739.10).
.13 Other documents as specified.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 72 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel, pedestrian and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16.

.2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

.4 Ingress and egress of Contractor vehicles at site is limited to Blair Road and Montreal Road.

1.6 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Smoking is not permitted within a building.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 APPOINTMENT AND PAYMENT

.1 Departmental Representative will appoint and pay for services of testing laboratory except follows:

- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .4 Mill tests and certificates of compliance.
- .5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
- .6 Additional tests specified as follows:
  - .1 Granular Gradation.
  - .2 Granular Compaction – Road Base and Sub-Base.
  - .3 Granular Compaction – Utility Trench.
  - .4 Asphalt Compaction, Voids, Gradation and AC Content.
  - .5 Concrete Strength.
  - .6 Concrete Air and Slump.
  - .7 Topsoil.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:

- .1 Provide access to Work for inspection and testing.
- .2 Facilitate inspections and tests.
- .3 Make good Work disturbed by inspection and test.
- .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Departmental Representative 48 hours (minimum) in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of the Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four (4) days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within five (5) days after meetings and transmit to meeting participants, affected parties not in attendance and Departmental Representative.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Owner, Departmental Representative, Contractor, Major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work in accordance with Section 01 32 16

.3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Site security in accordance with Section 01 56 00

.5 Health and safety in accordance with Section 01 35 29

.5 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.7 Owner provided products.

.8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures and 01 78 00.

.9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.11 Monthly progress claims, administrative procedures, photographs, hold backs.

.12 Appointment of inspection and testing agencies or firms.

.13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work and one (1) week prior to project completion, schedule progress meetings once a week, unless otherwise agreed upon with the Departmental Representative, Owner and Contractor.

.2 Contractor, major Subcontractors involved in Work, Departmental Representative and Owner are to be in attendance.

.3 Notify parties minimum five (5) days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for effect on construction schedule and on completion date.

.12 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.

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1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Submit to Departmental Representative within 30 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.5 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.5 Excavation.
.6 Backfill.
.7 Piping.
.8 Paving.
.9 Testing and Commissioning.
.10 Supplied equipment long delivery items.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings specified in Section 01 31 19, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review 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 to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated 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 Departmental 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 coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one (1) reviewed copy of each submission on site.

.11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with NRC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.

.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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow five (5) days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, in duplicate, 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.

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.9 After Departmental Representative's review, distribute copies.

.10 Submit three (3) hard copies and one electronic copy prints of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit three (3) hard copies and one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit three (3) hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within three (3) years of date of contract award for project.

.13 Submit three (3) hard copies and one electronic copy of certificates for requirements requested in specification sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit three (3) hard copies and one electronic copy of manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit three (3) hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit three (3) hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.17 Delete information not applicable to project.

.18 Supplement standard information to provide details applicable to project.

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.19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by NRC is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that NRC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

.21 Notwithstanding the above, digital versions of all required submissions (i.e. .pdf format) shall be acceptable and is the preferred method of submittals for this project. Digital versions shall contain all the same information as the hard copies described above.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

.1 Erect mock-ups in accordance with Section 01 45 00.

1.5 CONSTRUCTION PHOTOGRAPHIC DOCUMENTATION SERVICE

.1 The Contractor must carry a photographic documentation service. The service must include a pre-construction site survey of the site as well as a record of construction progression at pre-determined intervals. Refer to specific requirements listed in Appendix C.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

1.7 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.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

1.2 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 National Building Code 2010 (NBC):

.1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.4 National Fire Code 2010 (NFC):

.1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.

.5 Province of Ontario

.1 Occupational Health and Safety Act, R.S.O. 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
.2 O. Reg. 490/09, Designated Substances.
.3 Workplace Safety and Insurance Act, 1997.
.4 Municipal statutes and authorities.

1.3 SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Measures and controls to be implemented to address identified safety hazards and risks.

.3 Provide a Fire Safety, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Emergency Procedures and Evacuation Plan. Deliver tow copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.

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.4 Contractor's and Subcontractors' Safety Communication Plan.

.5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.

.6 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.

.7 Submit copies of orders, reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.8 Submit copies of incident and accident reports.

.9 Submit WHMIS MSDS - Material Safety Data Sheets.

.10 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

.11 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.12 Submit names of personnel and alternates responsible for site safety and health.

.13 Submit records of Contractor's health and Safety meetings when requested.

.14 Submit Workplace Safety and Insurance Board (WSIB) – Experience Rating Report.

.15 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

1.4 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.5 WORK PERMIT

.1 Obtain work permits related to project prior to commencement of Work.

1.6 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.7 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.8 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.8 PROJECT/SITE CONDITIONS

.1 Confined spaces in maintenance holes.

.2 Working on live sewers

.3 Working near live watermain.

.4 Working near live gas lines.

.5 Wording near live electrical lines (underground and aerial).

.6 Working in deep trenches.

.7 Excavation near existing buildings.

.8 Pedestrian and Vehicular traffic near work area.

1.9 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site specific health and Safety Plan shall be submitted to Departmental Representative in writing.

1.10 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and regulations for Construction Projects for the Province of Ontario.

1.11 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Health and Safety Act, R.S.O.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.12 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.13 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 working knowledge of occupational safety and health regulations.

.2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.4 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.14 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 having jurisdiction, and in consultation with Departmental Representative.

.1 Contractor's Safety Policy.

.2 Constructor's Name.

.3 Notice of Project.

.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).

.5 Ministry of Labour Orders and reports.

.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.

.7 Address and phone number of nearest Ministry of Labour office.

.8 Material Safety Data Sheets.

.9 Written Emergency Response Plan.

.10 Site Specific Safety Plan.

.11 Valid certificate of first aider on duty.

.12 WSIB "In Case of Injury At Work" poster.

.13 Location of toilet and cleanup facilities

1.15 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.16 BLASTING

.1 **Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative. It is expected that rock excavation will be performed using hoe ramming techniques.**

1.17 POWDER ACTUATED DEVICES

1.17 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.18 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. Departmental Representative may also stop Work for health and safety considerations.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

.

Part 1 General

1.1 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section01 33 00.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS, MSDS.

.3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

.4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.5 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.6 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.

.6 Drawings indicating 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.
.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.9 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.10 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.11 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.

.12 Waste Water 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.

.13 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.14 Pesticide treatment plan to be included and updated, as required.

1.3 REFERENCES

.1 Canadian Environmental Protection Act (CEPA).

.2 Provincial Water Quality Objectives (PWQOs).

.3 Canadian Water Quality Guidelines (CWQGs).

.4 Ambient Air Quality Criteria (AAQC).

.5 Canadian Fisheries Act.

1.4 FIRES

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

1.5 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 assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sedimentations control plan.

.3 Provide temporary drainage and pumping required to keep excavations and site free from water.

.4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Departmental Representative.

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 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

.1 Provide temporary enclosures where indicated or directed by Departmental Representative.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and temporary granular parking lots.

1.8 REFUELING PROCEDURES / REQUIREMENTS

.1 The Contractor must ensure the following mitigation measures are implemented in order to reduce the risk of ground contamination from petroleum products:

.1 The list of persons and agencies to contact in the event of an emergency shall be posted in plain sight on the work site for the duration of the construction.

.2 Machinery will be clean and kept clean to limit any grease or oil deposits inside the work area.

.3 Frequent inspections will be performed to detect any oil, fuel, grease or other leaks. If a leak is detected, the necessary corrective action will be taken immediately.

.4 An emergency kit for the recovery of petroleum products will be kept on site at all times. The kit will include at least 30 meters of absorbent booms, a box of absorbent pads and solid absorbent material (powder or granules). The kit will be stored near the location of work and machinery, and kept within easy reach at all times to ensure a rapid response.

.5 In the event of a spill, the contractor will immediately report to the Spills Action Centre of the Ministry of the Environment Ontario at 1-800-268-6060. Hydrocarbons and contaminated soils will be recovered by a specialized firm at the Contractor's expense.

1.9 HISTORICAL/ARCHAEOLOGICAL CONTROL

.1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

.2 Plan: include methods to assure protection of known or discovered resources and identity lines of communication between Contractor personnel and Departmental Representative.

1.10 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 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 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 CLEANING

.1 Clean in accordance with Section 01 74 11 – Cleaning.

.2 Waste Management: separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

.4 Washwater to be tested and treated in accordance with authorities having jurisdiction prior to disposal.

.5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with the Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD), National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.

.2 Meet or exceed requirements of:
- .1 Contract documents.
- .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's are discovered in course of work.

1.3 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

1.4 ACCESSIBLE DESIGN

.1 Comply with CSA B651-12, Accessible Design for the Built Environment, unless specified otherwise. In any case of conflict or discrepancy between the building codes and CSA B651, the requirements of CSA B651 shall apply.

1.5 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.6 EXAMINATION

.1 Examine existing conditions and determine conditions affecting work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ABBREVIATIONS AND ACRONYMS

.1 The abbreviations and acronyms are commonly found in the Project Manual and represent the associated organizations or terms.

1.2 MATERIALS, EQUIPMENT AND METHODS

.1 A:
- .1 AB: anchor bolt.
- .2 AC: acoustic.
- .3 AC PAN: acoustic panel.
- .4 ACU: acoustic unit ceiling.
- .5 AFF: above finished floor.
- .6 AC PLAS: acoustic plaster.
- .7 ACT: acoustic tile.
- .8 ACR CU LVR: acrylic cube louvre.
- .9 ADH: adhesive.
- .10 ADJ: adjustable.
- .11 A/C: air conditioner.
- .12 AHU: air handling unit.
- .13 AL: aluminum.
- .14 ANOD: anodized.
- .15 APPROX: approximate.
- .16 ARCH: architecture.
- .17 ARCH BLK: architectural block.
- .18 AVB: air vapour barrier.

.2 B:
- .1 B: base.
- .2 BEAST: benthic assessment of sediment.
- .3 BH: bore hole.
- .4 BHP: brake horse power.
- .5 BL: bottom layer.
- .6 BLK: block.
- .7 BLKD: bulkhead.
- .8 BM: beam.
- .9 BOT: bottom.
- .10 BMP: best management practice.
- .11 B PL: base plate.
- .12 BRG: bearing.
- .13 BRK: brick.
- .14 BSMT: basement.
- .15 BTEX: benzene, toluene, ethylbenzene and xylenes.
- .16 BUR: built-up roof.

.3 C:

.1 CAL: caliper.
.2 CANTIL: cantilever.
.3 CB: catch basin.
.4 CC: centre to centre.
.5 CCN: contemplated change notice.
.6 CDF: controlled density fill.
.7 CEC: Canadian Electical Code.
.8 CF: chair fabric.
.9 CHAN: channel.
.10 CHS: Canadian hydrographic service.
.11 CJ: construction joint.
.12 CL: centreline.
.13 CK: cork.
.14 CLG: ceiling.
.15 CLR: clear.
.16 COL: column.
.17 CONC: concrete.
.18 CONC BLK: concrete block.
.19 CONC BRK: concrete brick.
.20 CONT: continuous.
.21 CONT J: control joint.
.22 COMPL: complete.
.23 CM: centimetre. (Nursery stock).
.24 CP: circulating pump.
.25 CPL: cement plaster.
.26 CPM: critical path method.
.27 CPT: carpet.
.28 CPTT: carpet tile.
.29 CT: ceramic tile.
.30 CTE: connect to existing.
.31 CV: control valve.
.32 CVT: conductive vinyl tile.
.33 C/W: complete with.

.4 D:

.1 D: deep.
.2 dB: decibels.
.3 DB: dry-bulb.
.4 DD: dutch door.
.5 DEG: degree.
.6 DF: drinking fountain.
.7 DIA: diameter.
.8 DIM: dimension.
.9 DL: dead load.
.10 DMNT: demountable.
.11 DP: dampproofing.
.12 DR: door.
.13 DRP: drapery.
.14 DWL: dowel.

.5 E:

- .1 EA: each.
- .2 EC: epoxy coating.
- .3 ECF: engineered containment facility.
- .4 EE: each end.
- .5 EF: each face (architectural/structural).
- .6 EF: exhaust fan (mechanical/electrical).
- .7 EL: elevation.
- .8 ELEC: electric.
- .9 ELEV: elevator.
- .10 EM: expanded metal.
- .11 ENCL: enclosure.
- .12 EQ: equal.
- .13 ET: expansion tank.
- .14 EXH: exhaust.
- .15 EXIST: existing.
- .16 EXPJ: expansion joint.
- .17 EXP STRUCT: exposed structure.
- .18 EXT: exterior.
- .19 EW: each way.
- .20 EWT: entering water temperature.

.6 F:

- .1 FC: fuel contributed.
- .2 FD: floor drain.
- .3 FDN: foundation.
- .4 FEAT W: feature wall.
- .5 FEXT: fire extinguisher.
- .6 FH: fire hose.
- .7 FHC: fire hose cabinet.
- .8 FHR: fire hose rack.
- .9 FIN: finish.
- .10 FIP: federal identity program.
- .11 FL: floor.
- .12 FLD: field.
- .13 FLUOR: fluorescent.
- .14 FR: frame.
- .15 FRR: fire resistance rating.
- .16 FTG: footing.

.7 G:

.1 GALV: galvanized steel.
.2 GB: grab bar.
.3 GBD: gypsum board.
.4 GC: General Conditions.
.5 GF: ground floor.
.6 GFCI: ground fault circuit interrupter.
.7 GL: glass or glazing.
.8 GL BLK: glass block.
.9 GPC: gypsum plaster ceiling.
.10 GPW: gypsum plaster wall.
.11 GT: glass tile.

.8 H:

.1 HB: hose bib.
.2 HC: hollow core.
.3 HCWD: hollow core wood door.
.4 HD: hand dryer.
.5 HDW: hardware.
.6 HDWD: hardwood.
.7 HEX: heat exchanger.
.8 HM: hollow metal.
.9 HOR: horizontal.
.10 HOR EF: horizontal each face.
.11 HP: hydro pole.
.12 HPA: Hamilton Port Authority.
.13 HR: hour.
.14 HRV: heat recovery ventilator.
.15 HT: height.
.16 HTR: heater.
.17 HUM: humidifier.
.18 HWT: hot water tank.
.19 HYD: hydrant.
.20 HZ: Hertz frequency, cycles per second.

.9 I:

.1 ICF: insulated concrete formwork.
.2 ID: inside diameter.
.3 INS: insulation.
.4 INTLK: interlock.

.10 J:

.1 JT: joint.

.11 K:

.1 KPL: kick plate.

.12 L:

.1 LAT: leaving air temperature.
.2 LAV: lavatory.
.3 LDG: landing.
.4 LG: long.
.5 LINO: linoleum.
.6 LL: live load.
.7 LT: light.
.8 LWT: leaving water temperature.

.13 M:

.1 MAS: masonry.
.2 MAS FL: masonry flashing.
.3 MAX: maximum.
.4 MBG: metal bar grating.
.5 MCL: metal cube louvre.
.6 MECH: mechanical.
.7 MET: metal.
.8 MET DK: metal deck.
.9 MET FL: metal flashing.
.10 MET GRID CLG: metal grid ceiling.
.11 MET GRTG: metal grating.
.12 MET LIN CLG: metal linear ceiling.
.13 MET T PTN: metal toilet partition.
.14 MH: maintenance hole.
.15 MIN: minimum.
.16 MLP: metal lath and plaster.
.17 MO: masonry opening.
.18 MR: marble.
.19 MT: metal threshold.
.20 MWP: membrane waterproofing.

.14 N:

.1 NBC: national building code.
.2 NC: normally closed.
.3 NF: near face.
.4 NFC: national fire code.
.5 NIC: not in contract.
.6 NO: number.
.7 NRC: noise reduction coefficient.
.8 NRP: non removable pin.
.9 NTS: not to scale.

.15 O:

- .1 OA: outside air.
- .2 OBC: Ontario building code.
- .3 OC: on centre.
- .4 OD: outside diameter.
- .5 OPNG: opening.
- .6 OPR: operator.
- .7 OVHD: overhead.
- .8 OWSJ: open web steel joist.

.16 P:

- .1 P: prefinished.
- .2 PAH: polynuclear aromatic hydrocarbons.
- .3 PARG: parging.
- .4 PCC: precast concrete.
- .5 PCT: porcelain ceramic tile.
- .6 PED ACS FLG: pedestal access flooring.
- .7 PF: panel fabric.
- .8 PH: phase.
- .9 PL: plate.
- .10 PLAM: plastic laminate.
- .11 PLAS: plaster.
- .12 PLYWD: plywood.
- .13 PR: pair.
- .14 PREFAB: prefabricated.
- .15 PREFIN: prefinished.
- .16 PRESS: pressure.
- .17 PRFL: profile.
- .18 PRV: pressure regulating valve.
- .19 PT: paint.
- .20 PTD: paper towel dispenser.
- .21 PTN: partition.
- .22 PVC: polyvinyl cholide.

.17 Q:

- .1 QTB: quarry tile base.
- .2 QTF: quarry tile floor.
- .3 QTR: quarry tile roof.

.18 R:

- .1 R: radius.
- .2 RA: return air.
- .3 RAD: return air damper.
- .4 RB: resilient base.
- .5 RC: reinforced concrete.
- .6 RCPT: receptacle.
- .7 RD: roof drain.
- .8 REINF: reinforced/reinforcing.
- .9 REQD: required.
- .10 REQT: requirement.
- .11 RFT: rubber floor tile.
- .12 RM: room.
- .13 RO: rough opening.
- .14 RP: radiant panel.
- .15 RRS: recycled rubber sheet.
- .16 RRT: recycled rubber tile.
- .17 RSD: rolling steel door.
- .18 RSF: rubber sheet flooring.
- .19 RT: rubber tile.
- .20 RTU: roof top unit.
- .21 RWL: rain water leader.

.19 S:

- .1 SA: supply air.
- .2 SAN SEW: sanitary sewer.
- .3 SCHED: schedule.
- .4 SC: solid core.
- .5 SCRN: screen.
- .6 SCWD: solid core wood door.
- .7 SD: smoke developed.
- .8 SDT: static dissipative tile.
- .9 SECT: section.
- .10 SH: sill height.
- .11 SIM: similar.
- .12 SL: sliding.
- .13 SLR: sealer.
- .14 SPEC: specification.
- .15 SS: stainless steel.
- .16 STD: standard.
- .17 STL: steel.
- .18 STL BM: steel beam.
- .19 STC: sound tranmission class.
- .20 STL FL DK: steel floor deck.
- .21 STL PL: steel plate.
- .22 STN: stone.
- .23 STR: structure or structural.
- .24 ST SEW: storm sewer.
- .25 S&U: stain and urethane.
- .26 S&V: stain and varnish.
- .27 SVT: solid vinyl tile.

.20 T:

- .1 T: top.
- .2 T&B: top and bottom.
- .3 TCB: turbidity control plan.
- .4 TEL: telephone.
- .5 TER: terrazzo.
- .6 TERT: terrazzo tile.
- .7 THKNS: thickness.
- .8 THR: threshold.
- .9 TMPD: tempered.
- .10 TOPG: topping.
- .11 TRANSV: transverse.
- .12 TYP: typical.

.21 U:

- .1 U: urethane.
- .2 U/C: undercut.
- .3 UGRD: underground.
- .4 UNO: unless noted otherwise.
- .5 UOS: unless otherwise specified.
- .6 U/S: underside.
- .7 UR: urinal.

.22 V:

- .1 V: volt.
- .2 VCF: vinyl coated fabric.
- .3 VCT: vinyl compositition tile.
- .4 VEL: velocity.
- .5 VERT: vertical.
- .6 VERT B: vertical blinds.
- .7 VERT EF: vertical each face.
- .8 VSF: vinyl sheet flooring.
- .9 VPT: vinyl plank flooring.
- .10 VT: vinyl tile.
- .11 VWC: vinyl wall covering.

.23 W:

- .1 WB: wet-bulb.
- .2 WC: water closet.
- .3 W-C: wall connectors.
- .4 WD: wood.
- .5 WDV: wood veneer.
- .6 WG: water gauge.
- .7 WH: wall hydrant.
- .8 WHMIS: workplace hazardous materials information system.
- .9 WP: waterproofing.
- .10 WR: washroom.
- .11 WSIB: workplace safety and insurnace board.
- .12 WT: weight.
- .13 WTP: water treatment plant.

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1.3 STANDARDS ORGANIZATIONS

.1 Standards writing organizations:

.1 AA - Aluminum Association.
.2 ACPA - American Concrete Pipe Association.
.3 ANSI - American National Standards Institute.
.4 ASHRAE - American Society of Heating and Refrigerating and Air-Conditioning Engineers.
.5 ASTM - American Society for Testing and Materials.
.6 AWI/AWMAC - Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada.
.7 AWPA - American Wood Preservers' Association.
.8 AWWA - American Water Works Association.
.9 BHMA - Builders Hardware Manufacturers Association.
.10 CCDC - Canadian Construction Documents Committee.
.11 CCMPA - Canadian Concrete Masonry Producers Association.
.12 CGSB - Canadian General Standards Board.
.13 CNTA - Canadian Nursery Trades Association.
.14 CPCA - Canadian Painting Contractors Association.
.15 CRCA - Canadian Roofing Contractors Association.
.16 CSA - Canadian Standards Association.
.17 CSC - Construction Specifications Canada.
.18 CSDMA - Canadian Steel Door Manufacturers Association.
.19 CSI - Construction Specifications Institute.
.20 CSSBI - Canadian Sheet Steel Building Institute.
.21 CRCA - Canadian Roofing Contractors Association.
.22 DHI - Door and Hardware Insitute.
.23 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.
.24 ESA - Electrical Safety Authority.
.25 FCC - Fire Commissioner of Canada.
.26 FSC - Forest Stewardship Council.
.27 GANA - Glass Association of North America.
.28 HMMA - Hollow Metal Manufacturers Association.
.29 IEEE - Institute of Electrical and Electronics Engineers Inc.
.30 ISO - International Organization for Standardization.
.31 IWFA - International Window Film Association.
.32 LEED - LEED Canada, Leadership in Energy and Environmental Design.
.33 MPI - Master Painters Insitute.
.34 NAAMM - National Association of Architectural Metal Manufacturers.
.35 NCPI - National Clay Pipe Institute.
.36 NEMA - National Electrical Manufacturers Association.
.37 NFPA - National Fire Protection Association.
.38 OPSD - Ontario Provincial Standard Drawings.
.39 OPSS - Ontario Provincial Standard Specifications.
.40 PPI - Plasctics Pipe Institute.
.41 SDI - Steel Door Intitute.
.42 SCAQMD - South Coast Air Quality Management District.
.43 TIA - Telecommunications Industry Association.
.44 TIAC - Thermal Insulation Association of Canada.
.45 TTMAC - Terrazzo Tile and Marble Association of Canada.
.46 UL - Underwriters Laboratories.

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.47 ULC - Underwriters Laboratories of Canada.
.48 US EPA - United States Environmental Protection Agency.
.49 WH - Warnock Hersey.

1.4 FEDERAL GOVERNMENT DEPARTMENTS AND AGENGIES

.1 Departments, agencies and crown corporations.
.1 CEAA - Canadian Environmental Assessment Agency.
.2 CSC - Correctional Service Canada.
.3 CRA - Canada Revenue Agency.
.4 DND - Department of National Defence.
.5 EC - Environment Canada.
.6 FHBRO - Federal Heritage Buildings Review Office.
.7 HC - Health Canada.
.8 HCD - Heritage Conservation Directorate.
.9 LC - Labour Canada.
.10 PC - Parks Canada.
.11 PWGSC - Public Works and Government Services Canada.
.12 RCMP - Royal Canadian Mounted Police.
.13 TBS - Treasury Board Secretariat.
.14 TC - Transport Canada.

1.5 PROVINCIAL GOVERNMENT DEPARTMENTS AND AGENGIES

.1 MOEE - Ontario Ministry of Environment and Energy.

.2 MOL - Ontario Ministry of Labour.

.3 MTO and MOT - Ontario Ministry of Transportation.

.4 TSSA - Technical Standards and Safety Authority.

1.6 INTERNATIONAL GOVERNMENT DEPARTMENTS AND AGENCIES

.1 DOHMH - New York City Department of Health and Mental Hygiene, USA.

.2 GSA - Government Services Administration, USA.

1.7 UNITS OF MEASURE METRIC

.1 The following abbreviations of units of measure are commonly found in the Project Manual:
.1 C: Celsius.
.2 cm: centimetre.
.3 kg: kilogram.
.4 kg/m3: kilogram per cubic metre.
.5 kN: kilonewton.
.6 kPa: kilopascals.
.7 kw: kilowatts.
.8 l/s: litre per second.
.9 m: metre.

.

.10 m3: cubic metre.
.11 mg/kg: milligrams per kilogram.
.12 mg/L: milligrams per litre.
.13 mm: millimetres.
.14 MPa: megapascal.
.15 NTU: nephelometric turbidity unit.
.16 ppm: parts per million.
.17 ug/L: micrograms per litre.
.18 ug/m3: micrograms per cubic metre.

1.8 UNITS OF MEASURE IMPERIAL

.1 The following abbreviations of units of measure are commonly found in the Project Manual:
.1 BTU: British thermal units.
.2 CFM: cubic feet per minute.
.3 F: Fahrenheit.
.4 ft: foot/feet.
.5 FPI: fins per inch.
.6 FPM: feet per minute.
.7 ga: gauge.
.8 gpm: gallons per minute.
.9 in: inches.
.10 lbs: pounds.
.11 NTU: nephelometric turbidity unit.
.12 psi: pounds-force per square inch.
.13 PSIG: PSI gauge.
.14 ppm: parts per million.
.15 RPM: revolutions per minute.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

1.2 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, Contractor is to correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents there will be no compensation to the Contractor.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative or Owner. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

.1 Notify appropriate agency Departmental Representative 48 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.

1.6 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.7 REPORTS

.1 Submit three (3) copies of inspection and test reports to Departmental Representative.

.2 Provide copies to subcontractor of work being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

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

1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to Departmental Representative as specified in specific Section.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Departmental Representative will assist in preparing a schedule fixing dates for preparation.

.6 Mock-ups may remain as part of Work.

1.10 MILL TESTS

.1 Submit mill test certificates as requested and required of specification Sections.

1.11 EQUIPMENT AND SYSTEMS

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Temporary utilities.

1.2 RELATED SECTIONS

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.4 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made for this section.

1.5 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.6 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.7 WATER SUPPLY

.1 Provide continuous supply of potable water for construction use.

.2 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.

.3 Pay for utility charges at prevailing rates.

1.8 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10°C in areas where construction is in progress.

.5 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.9 TEMPORARY POWER AND LIGHT

.1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.

.2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance, and removal.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

.4 Provide and maintain temporary lighting throughout project.

1.8 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone, fax, data hook up, equipment necessary for own use and use of Departmental Representative.

1.9 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

Part 2 Products

2.1 NOT USED

.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 sediment and erosion control plan, specific to site, that complies with 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.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

.4 Project identification.

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978 (R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987 (R2003), Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be graveled 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 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 provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Clean taxi areas where used by Contractor's equipment.

.4 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.

.5 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.6 SECURITY

.1 Pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.7 OFFICES

.1 Provide office heated to 22 ^{o}C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

.4 Maintain in clean condition.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.9 SANITARY FACILITIES

.1 Provide sanitary facilities 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.

1.10 CONSTRUCTION SIGNAGE

.1 No signs or advertisements, other than warning signs, are permitted on site.

.2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.3 Maintain approved signs and notices in good condition for duration of project, and dispose of offsite on completion of project or earlier if directed by Departmental Representative.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and 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 Departmental 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.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary at the approval of the Departmental Representative.

.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.

.10 Provide dust control as required to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.

.12 Ensure full and clear visibility for full width of haul road and work areas during night work operations (if required).

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 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 on a regular basis as directed by the Departmental Representative.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Barriers.

.2 Environmental Controls.

.3 Traffic Controls.

.4 Fire Routes.

1.2 RELATED SECTIONS

.1 Section 01 51 00 - Temporary Utilities.

.2 Section 01 52 00 - Construction Facilities.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB):
- .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
- .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA):
- .1 CSA O121-08(R2013), Douglas Fir Plywood.

1.4 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.5 HOARDING

.1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

.2 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Maintain fence in good repair.

1.6 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.7 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.8 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.9 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.11 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Product quality, availability, storage, handling, protection, and transportation.

.2 Manufacturer's instructions.

.3 Quality of Work, coordination and fastenings.

.4 Existing facilities.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.

.2 Section 01 73 00 – Execution of works.

1.3 REFERENCES

.1 Within text of specifications, reference may be made to reference standards.

.2 Conform to these standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 The cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

.6 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage.

1.4 QUALITY

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.5 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 METRIC SIZED MATERIALS

.1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.

.2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

.3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.

.4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.

.5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

1.7 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.8 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.9 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.10 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.11 COORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.12 REMEDIAL WORK

.1 Refer to Section 01 73 00.

.2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.14 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.15 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No.304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.16 PROTECTION OF WORK IN PROGRESS

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

1.17 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Field engineering survey services to measure and stake site.

.2 Survey services to establish and confirm inverts for Work.

.3 Recording of subsurface conditions found via Daylighting.

1.2 REFERENCES

.1 Owner's identification of existing survey control points and property limits.

1.3 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.4 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor (or approved equivalent), licensed to practice in Place of Work, acceptable to Departmental Representative.

1.5 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Departmental Representative.

.4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.6 SURVEY REQUIREMENTS

.1 Establish two (2) permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data, in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement.

.4 Stake slopes.

.5 Establish pipe invert elevations.

.6 Establish lines and levels for mechanical and electrical work.

1.7 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

.2 Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.8 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.9 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 Record locations of maintained, re-routed and abandoned service lines.

.3 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

1.10 SUBMITTALS

.1 Submit name and address of Surveyor to Departmental Representative.

.2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform and do not conform to Contract Documents.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00.

.2 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00.

1.3 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

.1 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Remove samples of installed Work for testing.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Submit proposed materials, finishes and installation method for patching to Departmental Representative for approval, prior to patching.

.11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Progressive cleaning.

.2 Final cleaning.

1.2 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only.

.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 clearly marked separate bins for recycling. Refer to Section01 74 20.

.7 Remove waste material and debris from site and deposit in waste container at end of each working day.

.8 Dispose of waste materials and debris off site.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Prior to final review remove surplus products, tools, construction machinery and equipment.

.3 Remove waste products and debris including that caused by Owner or other Contractors.

.4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.

.5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.6 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.7 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.8 Remove dirt and other disfiguration from exterior surfaces.

.9 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.10 Clean roofs, downspouts, and drainage systems.

.11 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.12 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures.

.13 Clean lighting reflectors, lenses, and other lighting surfaces.

.14 Sweep and wash clean paved areas.

.15 Remove snow and ice from access to building.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 WASTE MANAGEMENT GOALS

.1 Accomplish maximum control of solid construction waste.

.2 Preserve environment and prevent pollution and environment damage.

1.3 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.3 Demolition Waste Audit (DWA): relates to actual waste generated from project.

.4 Inert Fill: inert waste - exclusively asphalt and concrete.

.5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.11 Separate Condition: refers to waste sorted into individual types.

.12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.

.14 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Unless specified otherwise, materials for removal do not become Contractor's property unless approved by the Departmental Representative.

.3 Protect, stockpile and store salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect surface drainage, mechanical and electrical from damage and blockage.

.6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

1.5 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

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

.3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.6 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

1.7 WASTE AND RECYCLING PROCESSING SITES

.1 When required, the Contractor must contact the following agencies to confirm where to dispose waste and recycling materials:

.1 Waste - Ministry of Environment and Energy (MEE)
- .1 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
- .2 Telephone: 800-565-4923 or 416-323-4321.
- .3 Fax: 416-323-4682.

.2 Recycling - Recycling Council of Ontario (RCO)
- .1 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
- .2 Telephone: 416-657-2797.
- .3 Fax: 416-960-8053.
- .4 Email: rco@rco.on.ca.
- .5 Internet: http://www.rco.on.ca/.

1.8 SCHEDULING

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Environmental Protection Act (CEPA):

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 ACCEPTANCE OF WORK PROCEDURES

.1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and submit verification that corrections have been made.

.2 Request Departmental Representative's Inspection.

.2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify defects and deficiencies. Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested and fully operational.

.4 Certificates required by Electrical Safety Authority: submitted.

.5 Operation of systems have been demonstrated to Owner’s personnel.

.6 Work is complete and ready for final inspection.

.4 Final Inspection: when Completion tasks are done, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: when Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 As-built, samples, and specifications.

.2 Product data, materials and finishes, and related information.

.3 Operation and maintenance data.

.4 Warranties and bonds.

.5 Final site survey.

1.2 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Warranty Meeting:

.1 Convene meeting one (1) week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative four (4) final copies of operating and maintenance manuals in English and French.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

.5 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.6 Copies will be returned after final inspection, with Departmental Representative's comments.

.7 Revise content of documents as required prior to final submittal.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.9 Pay costs of transportation.

1.5 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in .dwg format. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with NRC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.6 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.7 AS-BUILTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Owner one (1) record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

.

.6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit files on USB compatible with NRC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

.7 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.8 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of red lined drawings, provided by Departmental Representative.

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

.7 Provide digital photographs, if requested, for site records.

1.9 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.10 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports.

1.11 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.12 MAINTENANCE MATERIALS

.1 Spare Parts:

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

.2 Extra Stock Materials:

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

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification sections.
.2 Provide items with tags identifying their associated function and equipment.
.3 Deliver to location as directed; place and store.
.4 Receive and catalogue items.
.1 Submit inventory listing to Departmental Representative.
.2 Include approved listings in Maintenance Manual.

1.13 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.14 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.

.3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

.9 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include transformers and commissioned systems.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in a timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification will follow oral instructions. Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.15 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Drawings

The following is a list of drawings which accompany these specifications and which form part of the Contract Documents for the Work:

CIVIL

5097-C300-1 PHASE 3 – COVERSHEET

5097-C301-1 PHASE 3 – LEGEND

5097-C302-1 PHASE 3 - NOTES
5097-C302-2 PHASE 3 – NOTES

5097-C303-1 MASTER PLAN NORTH – SANITARY SEWER
5097-C303-2 MASTER PLAN SOUTH – SANITARY SEWER

5097-C304-1 MASTER PLAN NORTH – STORM SEWER
5097-C304-2 MASTER PLAN SOUTH – STORM SEWER

5097-C305-1 PHASE 3 - TOPOGRAPHICAL SURVEY ALIGNMENT "B" 80+000 TO 80+150
5097-C305-2 PHASE 3 - TOPOGRAPHICAL SURVEY ALIGNMENT "E" 90+000 TO 90+300
5097-C305-3 PHASE 3 - TOPOGRAPHICAL SURVEY ALIGNMENT "E" 90+300 TO 90+440

5097-C306-1 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "B" 80+000 TO 80+080
5097-C306-2 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "E" 90+000 TO 90+150
5097-C306-3 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "E" 90+150 TO 90+440
5097-C306-4 PHASE 3– GEOMETRY, GRADING, PAVEMENT MARKINGS "ALIGNMENT M-20"

5097-C307-1A PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "B" 80+000 TO 80+150
5097-C307-1B PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 85+000 TO 85+140
5097-C307-3 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "M20"
5097-C307-4 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 90+000 TO 90+150
5097-C307-5 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 90+150 TO 90+300
5097-C307-6 PHASE 3 - PLAN VIEW AND PROFILE ALIGNMENT "E" 90+300 TO 90+440

5097-C308-1 PHASE 3 - DETAILS
5097-C308-2 PHASE 3 - DETAILS
5097-C308-3 PHASE 3 - DETAILS
5097-C308-4 PHASE 3 - DETAILS
5097-C308-5 PHASE 3 - DETAILS
5097-C308-6 PHASE 3 - DETAILS
5097-C308-7 PHASE 3 - DETAILS
5097-C308-8 PHASE 3 - DETAILS

1. SCOPE OF WORK

.1 Work under this contract covers the Sanitary and Storm Sewer Separation – Phase 3 at 1200 Montreal Road, Ottawa, Ontario of the National Research Council.

2. DRAWINGS

.1 Refer to Section 00 01 50 – List of Drawings for the drawings forming part of this contract.

3. COMPLETION

.1 All Final Civil Works, regarding storm & sanitary underground works, paving, grounds re-instatement etc. shall be completed prior to December 15, 2018.

4. GENERAL

.1 The word "provide" in this Specification means to supply and install.

.2 Provide items mentioned in either the drawings or the specification.

5. SPECIFIED ACCEPTABLE & ALTERNATIVE EQUIPMENT & MATERIALS

.1 Materials and equipment scheduled and/or specified on the drawings or in the specifications have been selected to establish a performance and quality standard. In most cases, acceptable manufacturers are stated for any material or equipment specified by manufacturer's name and model number. Contractors may base their tender price on materials and equipment supplied by any of the manufacturers' names as acceptable for the particular material or equipment.

.2 In addition to the manufacturers specified or named as acceptable, you may propose alternative manufacturers of materials or equipment to the Departmental Representative for acceptance. For a product to be considered as an alternative product substitute, make a written application to the Departmental Representative during the tender period, not later than ten (10) working days before tender closing.

.3 Certify in writing that the alternative meets all requirements of the specified material or equipment. In addition, it shall be understood that all costs required by or as a result of acceptance or proposed alternatives, will be borne by the contractor.

.4 Approval of alternatives will be signified by issue of an Addendum to the Tender Documents.

.5 Any alternative manufacturers or materials submitted which are incomplete and cannot be evaluated, or are later than ten (10) working days before tender closing date or after the tender period, will not be considered.

6. MINIMUM STANDARDS

.1 Conform to or exceed minimum acceptable standards of the various applicable federal, provincial and municipal codes such as The National Building Code, The National Fire Code, Canadian Plumbing Code, Canadian Electrical Code, Canadian Code for Construction Safety and the Provincial Construction Safety Act.

.2 Work to conform to referenced standards and codes as reaffirmed or revised to date of specification.

7. WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS)

.1 The general contractor shall comply with Federal and Provincial legislation regarding the WHMIS. The contractor's responsibilities include, but are not limited to the following:

.1 To ensure that any controlled product brought on site by the contractor or sub-contractor is labeled;

.2 To make available to the workers and the Departmental Representative, Material Safety Data Sheets (MSDS) for these controlled products;

.3 To train own workers about WHMIS, and about the controlled products that they use on site; and

.4 To inform other contractors, sub-contractors, the Departmental Representative, authorized visitors and outside inspection agency personnel about the presence and use of such products on the site.

.5 The site foreman or superintendent must be able to demonstrate, to the satisfaction of the Departmental Representative, that he/she has had WHMIS training and is knowledgeable in its requirements. The Departmental Representative can require replacement of this person if this condition or implementation of WHMIS is not satisfactory.

8. REQUIREMENTS OF BILL 208, SECTION 18(a)

.1 Under the requirements of Bill 208 of the Ontario Ministry of Labour Occupational Health & Safety Act, the following designated substances may be encountered while performing the work described in these contract documents:

.1 Acrylonitrile, Isocyanates, Arsenic, Lead, Asbestos, Mercury, Benzene, Silica, Coke Oven Emissions, Vinyl Chloride, and Ethylene Oxide.

.1 It is the responsibility of the general contractor to ensure that each prospective subcontractor for this project has received a copy of the above list.

.2 In addition to the above designated substances, the following may also be present: mercury.

.3 The general contractor is to take the appropriate precautions when dealing with the above substances.

9. COST BREAKDOWN

.1 Submit, for approval by the Departmental Representative, a cost breakdown of tender 72 hours after the contract is awarded.

.2 Use the approved cost breakdown as the basis for submitting all claims.

.3 Request Departmental Representative's verbal approval to amount of claim prior to preparing and submitting the claim in its final form.

10. SUB-TRADES

.1 Submit no later than 72 hours after tender closing, a complete list of sub trades for the Departmental Representative's review.

11. PERSONNEL SECURITY AND IDENTIFICATION

.1 All persons employed by the contractor, or by any subcontractor and present on the site must be security cleared in accordance with the requirements of the Section entitled Special Instructions to Tenderers.

.2 All such persons must wear and keep visible identification badges as issued by the Security Office of NRC.

12. WORKING HOURS AND SECURITY

.1 Normal working hours on the NRC property are from 8:00 a.m. until 4:30 p.m., Monday to Friday inclusive, except statutory holidays.

.2 At all other times, special written passes are required for access to the building site.

.3 Before scheduling any work outside normal working hours, obtain permission from the Departmental Representative to perform the specific tasks.

.4 An escort may be required whenever working outside normal hours. Contractor to bear the associated costs.

13. SCHEDULE

.1 The contractor shall prepare a detailed schedule, fixing the date for commencement and completion of the various parts of the work and update the said schedule. Such schedule shall be made available to the Departmental Representative not later than two (2) weeks after the award of the contract and prior to commencement of any work on site.

.2 Notify Departmental Representative in writing of any changes in the schedule.

.3 Five (5) days before the scheduled completion date, arrange to do an interim inspection with the Departmental Representative.

14. PROJECT MEETINGS

.1 Hold regular project meetings at times and locations approved by the Departmental Representative.

.2 Notify all parties concerned of meetings to ensure proper coordination of work.

.3 Departmental Representative will set times for project meetings and assume responsibility for recording and distributing minutes.

15. SHOP DRAWINGS

.1 Submit to Departmental Representative for review, shop drawings, product data and samples specified within two (2) weeks after contract award.

.2 Submit to Departmental Representative for review a complete list of all shop drawings, product data and samples specified and written confirmation of corresponding delivery dates within one (1) week after shop drawings, product data and samples approval date. This list shall be updated on a bi-weekly basis and any changes to the list shall be immediately notified in writing to the Departmental Representative.

.3 Review shop drawings, data sheets and samples prior to submission.

.4 Submit electronic copy of all shop drawings and product data and sample~~s~~ for review, unless otherwise specified.

.5 Review of shop drawings and product data by the Departmental Representative does not relieve the contractor of the responsibility for errors and omissions and for the conformity with contract documents.

16. SAMPLES AND MOCK-UPS

.1 Submit samples in sizes and quantities as specified.

.2 Where colour, pattern or texture is criterion, submit full range of samples.

.3 Construct field samples and mock-ups at locations acceptable to Departmental Representative.

.4 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on the project.

17. MATERIALS AND WORKMANSHIP

.1 Install only new materials on this project unless specifically noted otherwise.

.2 Only first class workmanship will be accepted, not only with regard to safety, efficiency, durability, but also with regard to neatness of detail and performance.

18. WORK & MATERIALS SUPPLIED BY OWNER

.1 Work and materials not included in this contract are described on drawings and in this specification.

.2 Deliver to a storage place, as directed by the Departmental Representative, all materials returned to the Owner.

.3 Unless otherwise specified, accept owner-supplied materials at their storage location and provide all transportation as required.

.4 General Contractor's duties:

.1 Unload at site.
.2 Promptly inspect products and report damaged or defective items.
.3 Give written notification to the Departmental Representative for items accepted in good order.
.4 Handle at site, including uncrating and storage.
.5 Repair or replace items damaged on site.
.6 Install, connect finished products as specified.

19. SITE ACCESS

.1 Make prior arrangements with the Departmental Representative before starting work or moving materials and equipment on site.

.2 Obtain approval of Departmental Representative for regular means of access during the construction period.

.3 Obtain approval of Departmental Representative before temporarily suspending operations on site; before returning to the site and before leaving the site at the end of the job.

.4 Provide and maintain access to site.

.5 Build and maintain temporary roads and provide snow removal during period of work.

.6 Make good any damage and clean up dirt, debris, etc., resulting from contractor's use of existing roads.

20. USE OF SITE

.1 Restrict operations on the site to the areas approved by the Departmental Representative.

.2 Locate all temporary structures, equipment, storage, etc., to the designated areas.

.3 Restrict parking to the designated areas.

21. ACCEPTANCE OF SITE

.1 Inspect the site before commencing work, review any unexpected conditions with the Departmental Representative.

.2 Commencement of work will imply acceptance of existing conditions.

22. SITE OFFICE & TELEPHONE

.1 Contractor to erect a temporary site office at his own expense.

.2 Install and maintain a telephone, if necessary.

.3 Use of NRC phones is not permitted unless in the case of an emergency.

23. SANITARY FACILITIES

.1 Provide sanitary facilities, and bear all associated costs.

24. TEMPORARY SERVICES

.1 A source of temporary power will be made available in the area. Bear all costs to make connections to the power source and perform distribution on site.

.2 Provide all load centres, breakers, conduit, wiring, disconnects, extension cords, transformers, as required from the source of power.

.3 Power is to be used only for power tools, lighting, controls, motors, and not for space heating.

.4 A source of temporary water will be made available if required.

.5 Bear all costs associated with distributing the water to the required locations.

.6 Comply with NRC requirements when connecting to existing systems in accordance with the articles entitled "Co-operation" and "Service Interruptions" of this section.

25. DOCUMENTS REQUIRED AT WORK SITE

.1 The contractor shall keep on the site, one (1) up-to-date copy of all contract documents, including specifications, drawings, addenda, shop drawings, change notices, schedule and any reports or bulletins pertaining to the work, in good order, available to the Departmental Representative and to his / her representatives at all times.

.2 At least one (1) copy of specifications and drawings shall be marked by the contractor to show all work "As Built" and shall be provided to the Departmental Representative with the Application for Payment and for the Final Certificate of Completion.

26. CO-OPERATION

.1 Co-operate with NRC staff in order to keep disruption of normal research work to an absolute minimum.

.2 Work out in advance, a schedule for all work which might disrupt normal work in the building.

.3 Have schedule approved by the Departmental Representative.

.4 Notify the Departmental Representative in writing, 72 hours prior to any intended interruption of facilities, areas, corridors, mechanical or electrical services and obtain requisite permission.

27. PROTECTION AND WARNING NOTICES

.1 Provide all materials required to protect existing equipment.

.2 Erect dust barriers to prevent dust and debris from spreading through the building.

.3 Place dust protection in the form of cover sheets over equipment and furniture and tape these sheets to floors, to ensure no dust infiltration.

.4 Repair or replace any and all damage to Owner's property caused during construction, at no cost to the Owner and to the satisfaction of the Departmental Representative.

.5 Protect the buildings, roads, lawns, services, etc. from damage which might occur as a result of this work.

.6 Plan and co-ordinate the work to protect the buildings from the leakage of water, dust, etc.

.7 Ensure that all doors, windows, etc., that could allow transfer of dust, noise, fumes, etc., to other areas of the building are kept closed.

.8 Be responsible for security of all areas affected by the work under the Contract until acceptance by NRC. Take all necessary precautions to prevent entry to the work area by unauthorized persons and guard against theft, fire and damage by any cause. Secure working area at the end of each day’s work and be responsible for same.

.9 Provide and maintain adequate safety barricades around the work sites to protect NRC personnel and the public from injury during the construction.

.10 Post warnings, in all instances where possible injury could occur such as Work Overhead, Hard Hat Areas, etc. or as required by the Departmental Representative.

.11 Provide temporary protective enclosures over building entrances and exits to protect pedestrians. All enclosures to be structurally sound against weather and falling debris.

.12 All work to be completed in an accordance with City of Ottawa Noise By-Law 2004-253.

28. BILINGUALISM

.1 Ensure that all signs, notices, etc. are posted in both official languages.

.2 Ensure that all identification of services called for by under this contract are bilingual.

29. LAYOUT OF WORK

.1 Location of equipment, fixtures, outlets and openings indicated on drawings or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with the manufacturer's recommendations for safety, access and maintenance.

.3 Employ competent person to lay out work in accordance with the contract documents.

30. DISCREPANCIES & INTERFERENCES

.1 Prior to the start of the work, examine drawings and specifications. Report at once to the Departmental Representative, any defects, discrepancies, omissions or interferences affecting the work.

.2 Contractor to immediately inform the Departmental Representative in writing, of any discrepancies between the plans and the physical conditions so the Departmental Representative may promptly verify same.

.3 Any work done after such a discovery, until authorized, is at the contractor's risk.

.4 Where minor interferences as determined by the Departmental Representative are encountered on the job and they have not been pointed out on the original tender or on the plans and specifications, provide offsets, bends or reroute the services to suit job conditions at no extra cost.

.5 Arrange all work so as not to interfere in any way with other work being carried out.

31. MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify the Departmental Representative in writing of any conflict between these specifications and manufacturer's instruction. Departmental Representative will designate which document is to be followed.

32. TEMPORARY HEATING AND VENTILATING

.1 Bear the costs of temporary heat and ventilation during construction including costs of installation, fuel, operation, maintenance, and removal of equipment.

.2 Use of direct-fired heaters discharging waste products into the work areas will not be permitted unless prior approval is given by the Departmental Representative.

.3 Furnish and install temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of work.

.2 Protect work and products against dampness and cold.

.3 Reduce moisture condensation on surfaces to an acceptable level.

.4 Provide ambient temperature and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for a safe working environment.

.4 Maintain minimum temperature of 10 °C (50 °F) or higher where specified as soon as finishing work is commenced and maintain until acceptance by the Departmental Representative.

.1 Maintain ambient temperature and humidity levels as required for comfort of NRC personnel.

.5 Prevent hazardous or unhealthy accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction including also, storage areas and sanitary facilities.

.1 Dispose of exhaust materials in a manner that will not result in a harmful or unhealthy exposure to persons.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment.

.1 Enforce conformance with applicable codes and standards.

.2 Comply with instructions of the Departmental Representative including provision of full-time watchman services when directed.

.3 Enforce safe practices.

.4 Vent direct-fired combustion units to outside.

.7 Submit tenders assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

.8 After award of contract, Departmental Representative may permit use of the permanent system providing agreement can be reached on:

.1 Conditions of use, special equipment, protection, maintenance, and replacement of filters.

.2 Methods of ensuring that heating medium will not be wasted and in the case of steam, agreement on what is to be done with the condensate.

.3 Saving on contract price.

.4 Provisions relating to guarantees on equipment.

33. CONNECTIONS TO AND INTERRUPTIONS TO EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times and in the manner agreed to by the Departmental Representative and by authorities

having jurisdiction, with minimum disruption to NRC Personnel and vehicular traffic and minimum service interruption. Do not operate any NRC equipment or plant.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.3 Submit a schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility; allow minimum 72 hours notice. Adhere to approved schedule and provide notice to the Departmental Representative.

.4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.5 Provide detours, bridges, alternate feeds, etc., as required to minimize disruptions.

.6 Protect existing services as required and immediately make repairs if damage occurs.

.7 Remove any abandoned service lines as indicated on the contract documents and as approved by the Departmental Representative; cap or otherwise seal lines at cut-off points. Record and provide a copy to the Departmental Representative of locations of maintained, re-routed and abandoned service lines.

34. CUTTING AND PATCHING

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove all items as shown or specified.

.3 Patch and make good with identical materials, the surfaces that have been disturbed, cut or damaged, to the satisfaction of the Departmental Representative.

.4 Where new pipes pass through existing construction, core drill an opening. Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Do not drill or cut any surface without the approval of the Departmental Representative.

.5 Obtain written approval of the Departmental Representative before cutting openings through existing or new structural members.

.6 Seal all openings where cables, conduits or pipes pass through walls with an acoustic sealant conforming to CAN/CGSB-19.21-M87.

.7 Where cables, conduits and pipes pass through fire rated walls and floors, pack space between with compressed glass fibres and seal with fire stop caulking in accordance with CAN/CGSB-19.13-M87 AND NBC 3.1.7.

35. FASTENING DEVICES

.1 Do not use explosive actuated tools, without first obtaining permission from the Departmental Representative.

.2 Comply with the requirements of CSA A-166 (Safety Code for Explosive Actuated Tools).

.3 Do not use any kind of impact or percussion tool without first obtaining permission from the Departmental Representative.

36. OVERLOADING

.1 Ensure that no part of the building or work is subjected to a load which will endanger safety or cause permanent deformation or structural damage.

37. DRAINAGE

.1 Provide temporary drainage and pumping as required to keep excavations and site free of water.

38. ENCLOSURE OF STRUCTURES

.1 Construct and maintain all temporary enclosures as required to protect foundations, sub-soil, concrete, masonry, etc., from frost penetration or damage.

.2 Maintain in place until all chances of damage are over and proper curing has taken place.

.3 Provide temporary weathertight enclosures for exterior openings until permanent sash and glazing and exterior doors are installed.

.4 Provide lockable enclosures as required to maintain the security of NRC facilities and be responsible for the same.

.5 Provide keys to NRC security personnel when required.

.6 Lay out the work carefully and accurately and verify all dimensions and be responsible for them. Locate and preserve general reference points.

.7 Throughout the course of construction, keep continuously acquainted with field conditions, and the work being developed by all trades involved in the project. Maintain an awareness of responsibility to avoid space conflict with other trades.

.8 Conceal all services, piping, wiring, ductwork, etc., in floors, walls or ceilings except where indicated otherwise.

39. STORAGE

.1 Provide storage as required to protect all tools, materials, etc., from damage or theft and be responsible for the same.

.2 Do not store flammable or explosive materials on site without the authorization of the Departmental Representative.

40. GENERAL REVIEW

.1 Periodic review of the contractor's work by the Departmental Representative does not relieve the contractor of the responsibility of making the work in accordance with contract documents. Contractor shall carry out his own quality control to ensure that the construction work is in accordance with contract documents.

.2 Inform the Departmental Representative of any impediments to the installation and obtain his / her approval for actual location.

41. INSPECTION OF BURIED OR CONCEALED SERVICES

.1 Prior to concealing any services that are installed, ensure that all inspection bodies concerned, including NRC, have inspected the work and have witnessed all tests. Failure to do so may result in exposing the services again at the contractor's expense.

42. TESTING

.1 On completion, or as required by local authority inspectors and/or Departmental Representative during progress of work and before any services are covered up and flushing is complete, test all installations in the presence of the Departmental Representative.

.2 Obtain and hand to the Departmental Representative all acceptance certificates or test reports from authority having jurisdiction. The project will be considered incomplete without the same.

43. PARTIAL OCCUPANCY

.1 NRC may request partial occupancy of the facility if the contract extends beyond the expected completion date.

.2 Do not restrict access to the building, routes, and services.

.3 Do not encumber the site with materials or equipment.

44. DISPOSAL OF WASTES

.1 Dispose of waste materials including volatiles, safely off NRC property. Refer to the section entitled "General and Fire Safety Requirements" included as part of this specification.

45. CLEAN-UP DURING CONSTRUCTION

.1 On a daily basis, maintain project site and adjacent area of campus including roofs, free from debris and waste materials.

.2 Provide on-site dump containers for collection of waste materials and rubbish.

46. FINAL CLEAN-UP

.1 Upon completion do a final clean-up to the satisfaction of the Departmental Representative.

.2 Clean all new surfaces, lights, existing surfaces affected by this work, replace filters, etc.

.3 Clean all resilient flooring and prepare to receive protective finish. Protective finish applied by NRC.

47. WARRANTY AND RECTIFICATION OF DEFECTS IN WORK

.1 Refer to General Conditions "C", section GC32.

.2 Ensure that all manufacturers' guarantees and warranties are issued in the name of the **General** Contractor and the National Research Council.

48. MAINTENANCE MANUALS

.1 Provide three (3) bilingual copies of maintenance manuals or two (2) English and two (2) French maintenance manuals immediately upon completion of the work and prior to release of holdbacks.

.2 Manuals to be neatly bound in hard cover loose leaf binders.

.3 Manuals to include operating and maintenance instructions, all guarantees and warranties, shop drawings, technical data, etc., for the material and apparatus supplied under this contract.

END OF SECTION

1. GENERAL CONSTRUCTION SAFETY REQUIREMENTS

.1 The Contractor shall take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.

.2 The Contractor shall be solely responsible for the construction safety of both its employees and those of its sub-contractors at the work site, and for initiating, maintaining and supervising safety precautions, programs and procedures in connection with the performance of the work.

.3 The Contractor shall comply with all Federal, Provincial and Municipal safety codes and regulations and the Occupational Health and Safety Act and the Workplace Safety and Insurance Board. In the event of any conflict between any provisions in legislation or codes, the most stringent provisions shall apply.

.4 Periodic review of the contractor's work by the Departmental Representative, using the criteria of the contract documents, does not relieve the contractor of his safety responsibilities in carrying out the work in accordance with the contract documents. The contractor shall consult with the Departmental Representative to ensure that this responsibility is carried out.

.5 The Contractor shall ensure that only competent personnel are permitted to work on site. Throughout the term of the contract, any person will be removed from the site who is not observing or complying with the safety requirements.

.6 All equipment shall be in safe operating condition and appropriate to the task.

.7 Following a project and site hazard assessment, the Contractor shall develop a Site Specific Safety Plan based on the following minimum requirements:

.1 Provide a safety board mounted in a visible location on the project site, with the following information included thereon:

.1 Notice of Project.

.2 Site specific Safety Policy.

.3 Copy of Ontario Health and Safety Act.

.4 Building Schematic showing emergency exits.

.5 Building emergency procedures.

.6 Contact list for NRC, Contractor and all involved sub-contractors.

.7 Any related MSDS sheets.

.8 NRC Emergency phone number.

.8 The Contractor shall provide competent personnel to implement its safety program and those of any Health and Safety Act legislation applicable at this project location, and to ensure they are being complied with.

.9 The Contractor shall provide safety orientation to all its employees as well as those of any subcontractors under its jurisdiction.

.10 The Departmental Representative will monitor to ensure that safety requirements are met and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the contract to be cancelled and the Contractor or sub-contractors removed from the site.

.11 The Contractor will report to the Departmental Representative and jurisdictional authorities, any accident or incident involving Contractor or NRC personnel or the public and/or property arising from the Contractor's execution of the work.

.12 If entry to a laboratory is required as part of the work of the Contractor, a safety orientation shall be provided to all his employees as well as those of any subcontractors regarding lab safety requirements and procedures, as provided by the Researcher or the Departmental Representative.

2. FIRE SAFETY REQUIREMENTS

.1 Authorities

1. The Fire Commissioner of Canada (FC) is the authority for fire safety at NRC.
2. For the purpose of this document, "Departmental Representative" will be deemed as the NRC person in charge of the project and who will enforce these Fire Safety Requirements.
3. Comply with the following standards as published by the Office of the Fire Commissioner of Canada:
   - .1 Standard No. 301 - June 1982 "Standard for Construction Operations"; and
   - .2 Standard No. 302 - June 1982 "Standard for Welding and Cutting".

.2 Smoking

1. Smoking is prohibited inside all NRC buildings, as well as roof areas.
2. Obey all "NO SMOKING" signs on NRC premises.

.3 Hot Work

1. Prior to commencement of any "Hot Work" involving welding, soldering, burning, heating, use of torches or salamanders or any open flame, obtain a Hot Work Permit from the Departmental Representative.
2. Prior to commencement of "Hot Work", review the area of hot work with the Departmental Representative to determine the level of fire safety precautions to be taken.

.4 Reporting Fires

1. Know the exact location of the nearest Fire Alarm Pull Station and telephone, including the emergency phone number.
2. REPORT immediately, all fire incidents as follows:
   - .1 Activate nearest fire alarm pull station; and

.2 Telephone the following emergency phone number as appropriate:

FROM AN NRC PHONE 333
FROM ANY OTHER PHONE (613) 993-2411

3. When reporting a fire by phone, give the location of fire, building number and be prepared to verify location.
4. The person activating fire alarm pull station must remain at a safe distance from the scene of the fire but readily available to provide information and direction to the Fire Department personnel.

.5 Interior and Exterior Fire protection & Alarm Systems

1. Do not obstruct or shut off fire protection equipment or systems, including but not limited to fire alarm systems, smoke/heat detectors, sprinkler system, pull stations, emergency call buttons and PA systems, without authorization from the Departmental Representative.

2. When any fire protection equipment is temporarily shut down, alternative measures as prescribed by the Departmental Representative shall be taken to ensure that fire protection is maintained.

3. Do not leave fire protection or alarm systems inactive at the end of a working day without notification and authorisation from the Departmental Representative. The Departmental Representative will advise the (FPO) of the details of any such event.

4. Do not use fire hydrants, standpipes and hose systems for other than firefighting purposes unless authorised by Departmental Representative.

.6 Fire Extinguishers

1. Provide a minimum of 1-20 lb. ABC Dry Chemical Fire Extinguisher at each hot work or open flame location.
2. Provide fire extinguishers for hot asphalt and roofing operations as follows:
   .1 Kettle area - 1-20 lb. ABC Dry Chemical; and
   .2 Roof - 1-20 lb. ABC Dry Chemical at each open flame location.
3. Provide fire extinguishers equipped as below:
   .1 Pinned and sealed;
   .2 With a pressure gauge; and
   .3 With an extinguisher tag signed by a fire extinguisher servicing company.
4. Carbon Dioxide (C02) extinguishers will not be considered as substitutes for the above.

.7 Roofing Operations

1. Kettles:

.1 Arrange for the location of asphalt kettles and material storage with the Departmental Representative before moving on site. Do not locate kettles on any roof or structure and keep them at least 10m (30 feet) away from a building.

.2 Equip kettles with 2 thermometers or gauges in good working order; a hand held and a kettle-mounted model.

.3 Do not operate kettles at temperatures in excess of 232°C (450 °F).

.4 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire. Provide fire extinguishers as required in article 2.6.

.5 Demonstrate container capacities to Departmental Representative prior to start of work.

.6 Store materials a minimum of 6m (20 feet) from the kettle.

2. Mops:

.1 Use only glass fibre roofing mops.

.2 Remove used mops from the roof site at the end of each working day.

3. Torch Applied Systems:

.1 Do not use torches next to walls.

.2 Do not torch membranes to exposed wood or cavity.

.3 Provide a Fire Watch as required by article 2.9 of this section.

4. Store all combustible roofing materials at least 3m (10 feet) away from any structure.

5. Keep compressed gas cylinders a minimum of 6m (20 feet) away from the kettle, protected from mechanical damage, and secured in an upright position.

.8 Welding / Grinding Operations

1. Contractor to provide fire blankets, portable fume extraction devices, screens or similar equipment to prevent exposure to welding flash, or sparks from grinding.

.9 Fire Watch

1. Provide a fire watch for a minimum of one (1) hour after the termination of any hot work operation.
2. For temporary heating, refer to General Instructions Section 00 10 00.
3. Equip fire watch personnel with fire extinguishers as required by article 2.6.

.10 Obstruction of access/egress routes-roadways, halls, doors, or elevators

1. Advise the Departmental Representative in advance of any work that would impede the response of Fire Department personnel and their apparatus. This includes violation of minimum overhead clearance, erection of barricades and the digging of trenches.
2. Building exit routes must not be obstructed in any way without special permission from the Departmental Representative, who will ensure that adequate alternative routes are maintained.

3. The Departmental Representative will advise the FPO of any obstruction that may warrant advanced planning and communication to ensure the safety of building occupants and the effectiveness of the Fire Department.

.11 Rubbish and Waste Materials

1. Keep rubbish and waste materials to a minimum and a minimum distance of 6m (20 feet) from any kettle or torches.
2. Do not burn rubbish on site.
3. Rubbish Containers:
   - .1 Consult with the Departmental Representative to determine an acceptable safe location for any containers and the arrangement of chutes, etc. prior to bringing the containers on site.
   - .2 Do not overfill the containers and keep area around the perimeter free and clear of any debris.
4. Storage:
   - .1 Exercise extreme care when storing combustible waste materials in work areas. Ensure maximum possible cleanliness, ventilation and that all safety standards are adhered to when storing any combustible materials.
   - .2 Deposit greasy or oily rags or materials subject to spontaneous combustion in CSA or ULC approved receptacles and remove at the end of the work day or shift, or as directed.

.12 Flammable Liquids

1. The handling, storage and use of flammable liquids is governed by the current National Fire Code of Canada.
2. Flammable Liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres (10 imp gal), provided they are stored in approved safety cans bearing the ULC seal of approval and kept away from buildings, stockpiled combustible materials, etc. Storage of quantities of flammable liquids exceeding 45 litres (10 imp gal) for work purposes, require the permission of the Departmental Representative.
3. Flammable liquids are not to be left on any roof areas after normal working hours.
4. Transfer of flammable liquids is prohibited within buildings.
5. Do not transfer flammable liquids in the vicinity of open flames or any type of heat producing device.
6. Do not use flammable liquids having a flash point below 38 ^{o}C (100 ^{o}F) such as naphtha or gasoline as solvents or cleaning agents.
7. Store flammable waste liquids for disposal in approved container located in a safe, ventilated area. Waste flammable liquids are to be removed from the site on a regular basis.
8. Where flammable liquids, such as lacquers or urethane are used, ensure proper ventilation and eliminate all sources of ignition. Inform the Departmental Representative prior to, and at the cessation of such work.

.13 Questions and/or clarifications

1. Direct any questions or clarification on Fire or General Safety, in addition to the above requirements, to the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Ontario Provincial Standard Specifications (OPSS).

.2 Ontario Provincial Standard Drawings (OPSD).

1.2 SECTION INCLUDES

.1 Title and description of Work.

.2 Contract Method.

.3 Work by others.

.4 Future Work.

.5 Work sequence.

.6 Contractor use of premises.

.7 Owner occupancy.

1.3 PRECEDENCE

.1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

. 2 The Drawings listed in section 00 01 50 take precedence over the Geotechnical Reports included in Appendix A and B of this Project Manual.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises the existing combined sewer to be replace by a sanitary and storm sewer, located at 1200 Montreal Rd, Ottawa, ON. The site is located West of Blair Road and North of Montreal Road. Work include the following:

.1 Asphalt removal
.2 Combine Sewer removal
.3 Sanitary and Storm sewer installation
.4 Maintenance Holes and Catch Basins
.5 Excavation, Grading and Paving
.6 Concrete curb and Sidewalks
.7 Site lighting
.8 Landscaping
.9 Construction Photographic Documentation Service
.11 Other related Work

1.5 CONTRACT METHOD

.1 **Construct Work under lump sum price contract.**

.2 Relations and responsibilities between Contractor and Subcontractors assigned by Owner are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:

.1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations thereunder when Contractor is required to furnish such bonds to Departmental Representative.

.2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide to Departmental Representative.

1.6 COST BREAKDOWN

.1 Within 72 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract amount.

.2 Show separately cost of equipment purchased exempt from Ontario Retail Sales Tax under your Ontario Sales Tax licence number.

.3 Within 72 hours of acceptance of bid submit a list of subcontractors.

1.7 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.8 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's use of premises during construction.

.1 The Contractor will be required to submit a construction staging plan for approval to the Departmental Representative prior to the commencement of work for approval.

.2 Staging plan to accommodate and include the following provisions:

.1 Day time access to loading docks must remain active.

.2 Maintain Fire route access through site.

.3 Maintain a minimum parking spots during all phases of construction during regular business hours.

.4 Contractor to provide all necessary signage and barricades to identify closures and detours.

.2 Co-ordinate Progress Schedule and co-ordinate with Departmental Representative during construction.

.3 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.

.4 Task such as milling entire parking lot, grading, installation of underground services may be completed by closing off site after business hours and on weekends with approval of the Departmental Representative.

1.9 CONTRACTOR USE OF PREMISES

.1 Limit use of premises for Work, storage, and for access to allow:

.1 Owner occupancy.

.2 Work by other contractors.

.2 Co-ordinate use of premises under direction of Departmental Representative.

.3 Contractor and his sub-contractors are limited to a total 6 parking spaces on site for the duration of the construction.

.4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

.8 Contractor will be responsible for snow removal of the entire construction area for the duration of the construction period.

1.10 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.11 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hour notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic and tenant operations.

.3 Provide alternative routes for personnel and vehicular traffic.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

1.12 DOCUMENTS REQUIRED

.1 Maintain at job site, one (1) copy each document as follows:

.1 Contract Drawings.
.2 Specifications.
.3 Addenda.
.4 Reviewed Shop Drawings.
.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Geotechnical Investigation Report, Houle Chevrier Engineering, March 11, 2016 (Ref. 62739.10).
.12 Supplemental Geotechnical Investigation, GEMTEC, Februrary 6, 2018 (Ref. 62739.10).
.13 Other documents as specified.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

1.2 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for personnel and vehicle access.

.3 Where security is reduced by work provide temporary means to maintain security.

.4 Closures: protect work temporarily until permanent enclosures are completed.

1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.4 EXISTING SERVICES

.1 Notify, Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 72 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.

.3 Provide for personnel, pedestrian and vehicular traffic.

.4 Construct barriers in accordance with Section 01 56 00.

1.5 SPECIAL REQUIREMENTS

.1 Submit schedule in accordance with Section 01 32 16.

.2 Ensure Contractor's personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.

.3 Keep within limits of work and avenues of ingress and egress.

.4 Ingress and egress of Contractor vehicles at site is limited to Blair Road and Montreal Road.

1.6 SECURITY

.1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.

1.7 BUILDING SMOKING ENVIRONMENT

.1 Smoking is not permitted within a building.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 APPOINTMENT AND PAYMENT

.1 Departmental Representative will appoint and pay for services of testing laboratory except follows:

- .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
- .2 Inspection and testing performed exclusively for Contractor's convenience.
- .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
- .4 Mill tests and certificates of compliance.
- .5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
- .6 Additional tests specified as follows:
  - .1 Granular Gradation.
  - .2 Granular Compaction – Road Base and Sub-Base.
  - .3 Granular Compaction – Utility Trench.
  - .4 Asphalt Compaction, Voids, Gradation and AC Content.
  - .5 Concrete Strength.
  - .6 Concrete Air and Slump.
  - .7 Topsoil.

.2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

.1 Provide labour, equipment and facilities to:

- .1 Provide access to Work for inspection and testing.
- .2 Facilitate inspections and tests.
- .3 Make good Work disturbed by inspection and test.
- .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.

.2 Notify Departmental Representative 48 hours (minimum) in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

.3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.

.4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of the Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four (4) days in advance of meeting date to Departmental Representative.

.4 Provide physical space and make arrangements for meetings.

.5 Preside at meetings.

.6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.7 Reproduce and distribute copies of minutes within five (5) days after meetings and transmit to meeting participants, affected parties not in attendance and Departmental Representative.

.8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

.1 Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Owner, Departmental Representative, Contractor, Major Subcontractors, field inspectors and supervisors will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

.5 Agenda to include:

.1 Appointment of official representative of participants in the Work.

.2 Schedule of Work in accordance with Section 01 32 16

.3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.4 Site security in accordance with Section 01 56 00

.5 Health and safety in accordance with Section 01 35 29

.5 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

.6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.

.7 Owner provided products.

.8 Record drawings in accordance with Section 01 33 00 - Submittal Procedures and 01 78 00.

.9 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.

.10 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.

.11 Monthly progress claims, administrative procedures, photographs, hold backs.

.12 Appointment of inspection and testing agencies or firms.

.13 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

.1 During course of Work and one (1) week prior to project completion, schedule progress meetings once a week, unless otherwise agreed upon with the Departmental Representative, Owner and Contractor.

.2 Contractor, major Subcontractors involved in Work, Departmental Representative and Owner are to be in attendance.

.3 Notify parties minimum five (5) days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for effect on construction schedule and on completion date.

.12 Other business.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

.1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.

.2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.

.3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.

.4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.

.5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.

.6 Master Plan: summary-level schedule that identifies major activities and key milestones.

.7 Milestone: significant event in project, usually completion of major deliverable.

.8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.

.9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

.1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.

.2 Plan to complete Work in accordance with prescribed milestones and time frame.

.3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.

.4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.

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1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Submit to Departmental Representative within 30 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.

.3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 MASTER PLAN

.1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

.2 Departmental Representative will review and return revised schedules within 5 working days.

.3 Revise impractical schedule and resubmit within 5 working days.

.4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.5 PROJECT SCHEDULE

.1 Develop detailed Project Schedule derived from Master Plan.

.2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:

.1 Award.
.2 Shop Drawings, Samples.
.3 Permits.
.4 Mobilization.
.5 Excavation.
.6 Backfill.
.7 Piping.
.8 Paving.
.9 Testing and Commissioning.
.10 Supplied equipment long delivery items.

1.6 PROJECT SCHEDULE REPORTING

.1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.

.2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.7 PROJECT MEETINGS

.1 Discuss Project Schedule at regular site meetings specified in Section 01 31 19, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

.2 Weather related delays with their remedial measures will be discussed and negotiated.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review 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 to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated 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 Departmental 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 coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one (1) reviewed copy of each submission on site.

.11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with NRC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.

.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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow five (5) days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, in duplicate, 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.

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.9 After Departmental Representative's review, distribute copies.

.10 Submit three (3) hard copies and one electronic copy prints of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit three (3) hard copies and one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit three (3) hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within three (3) years of date of contract award for project.

.13 Submit three (3) hard copies and one electronic copy of certificates for requirements requested in specification sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit three (3) hard copies and one electronic copy of manufacturer’s instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit three (3) hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit three (3) hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.17 Delete information not applicable to project.

.18 Supplement standard information to provide details applicable to project.

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.19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by NRC is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that NRC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

.21 Notwithstanding the above, digital versions of all required submissions (i.e. .pdf format) shall be acceptable and is the preferred method of submittals for this project. Digital versions shall contain all the same information as the hard copies described above.

1.3 SAMPLES

.1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's business address.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 MOCK-UPS

.1 Erect mock-ups in accordance with Section 01 45 00.

1.5 CONSTRUCTION PHOTOGRAPHIC DOCUMENTATION SERVICE

.1 The Contractor must carry a photographic documentation service. The service must include a pre-construction site survey of the site as well as a record of construction progression at pre-determined intervals. Refer to specific requirements listed in Appendix C.

1.6 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

1.7 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.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 – Submittal Procedures.

1.2 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 National Building Code 2010 (NBC):

.1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.4 National Fire Code 2010 (NFC):

.1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.

.5 Province of Ontario

.1 Occupational Health and Safety Act, R.S.O. 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
.2 O. Reg. 490/09, Designated Substances.
.3 Workplace Safety and Insurance Act, 1997.
.4 Municipal statutes and authorities.

1.3 SUBMITTALS

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

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.

.3 Measures and controls to be implemented to address identified safety hazards and risks.

.3 Provide a Fire Safety, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Emergency Procedures and Evacuation Plan in place at the site. Departmental Representative will provide Emergency Procedures and Evacuation Plan. Deliver tow copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.

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.4 Contractor's and Subcontractors' Safety Communication Plan.

.5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.

.6 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative weekly.

.7 Submit copies of orders, reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.8 Submit copies of incident and accident reports.

.9 Submit WHMIS MSDS - Material Safety Data Sheets.

.10 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

.11 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.12 Submit names of personnel and alternates responsible for site safety and health.

.13 Submit records of Contractor's health and Safety meetings when requested.

.14 Submit Workplace Safety and Insurance Board (WSIB) – Experience Rating Report.

.15 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

1.4 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.5 WORK PERMIT

.1 Obtain work permits related to project prior to commencement of Work.

1.6 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.7 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.8 REGULATORY REQUIREMENTS

.1 Comply with the Acts and regulations of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

1.8 PROJECT/SITE CONDITIONS

.1 Confined spaces in maintenance holes.

.2 Working on live sewers

.3 Working near live watermain.

.4 Working near live gas lines.

.5 Wording near live electrical lines (underground and aerial).

.6 Working in deep trenches.

.7 Excavation near existing buildings.

.8 Pedestrian and Vehicular traffic near work area.

1.9 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

.3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site specific health and Safety Plan shall be submitted to Departmental Representative in writing.

1.10 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

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.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and regulations for Construction Projects for the Province of Ontario.

1.11 COMPLIANCE REQUIREMENTS

.1 Comply with Ontario Health and Safety Act, R.S.O.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.12 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.13 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 working knowledge of occupational safety and health regulations.

.2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.4 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.14 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 having jurisdiction, and in consultation with Departmental Representative.

.1 Contractor's Safety Policy.

.2 Constructor's Name.

.3 Notice of Project.

.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).

.5 Ministry of Labour Orders and reports.

.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.

.7 Address and phone number of nearest Ministry of Labour office.

.8 Material Safety Data Sheets.

.9 Written Emergency Response Plan.

.10 Site Specific Safety Plan.

.11 Valid certificate of first aider on duty.

.12 WSIB "In Case of Injury At Work" poster.

.13 Location of toilet and cleanup facilities

1.15 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.16 BLASTING

.1 **Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative. It is expected that rock excavation will be performed using hoe ramming techniques.**

1.17 POWDER ACTUATED DEVICES

1.17 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.18 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. Departmental Representative may also stop Work for health and safety considerations.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

.

Part 1 General

1.1 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section01 33 00.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS, MSDS.

.3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

.4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.5 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.6 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.

.6 Drawings indicating 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.

.1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.

.8 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.9 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.10 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.11 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.

.12 Waste Water 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.

.13 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

.14 Pesticide treatment plan to be included and updated, as required.

1.3 REFERENCES

.1 Canadian Environmental Protection Act (CEPA).

.2 Provincial Water Quality Objectives (PWQOs).

.3 Canadian Water Quality Guidelines (CWQGs).

.4 Ambient Air Quality Criteria (AAQC).

.5 Canadian Fisheries Act.

1.4 FIRES

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

1.5 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 assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sedimentations control plan.

.3 Provide temporary drainage and pumping required to keep excavations and site free from water.

.4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.6 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Departmental Representative.

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 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.

.1 Provide temporary enclosures where indicated or directed by Departmental Representative.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and temporary granular parking lots.

1.8 REFUELING PROCEDURES / REQUIREMENTS

.1 The Contractor must ensure the following mitigation measures are implemented in order to reduce the risk of ground contamination from petroleum products:

.1 The list of persons and agencies to contact in the event of an emergency shall be posted in plain sight on the work site for the duration of the construction.

.2 Machinery will be clean and kept clean to limit any grease or oil deposits inside the work area.

.3 Frequent inspections will be performed to detect any oil, fuel, grease or other leaks. If a leak is detected, the necessary corrective action will be taken immediately.

.4 An emergency kit for the recovery of petroleum products will be kept on site at all times. The kit will include at least 30 meters of absorbent booms, a box of absorbent pads and solid absorbent material (powder or granules). The kit will be stored near the location of work and machinery, and kept within easy reach at all times to ensure a rapid response.

.5 In the event of a spill, the contractor will immediately report to the Spills Action Centre of the Ministry of the Environment Ontario at 1-800-268-6060. Hydrocarbons and contaminated soils will be recovered by a specialized firm at the Contractor's expense.

1.9 HISTORICAL/ARCHAEOLOGICAL CONTROL

.1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.

.2 Plan: include methods to assure protection of known or discovered resources and identity lines of communication between Contractor personnel and Departmental Representative.

1.10 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 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 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 CLEANING

.1 Clean in accordance with Section 01 74 11 – Cleaning.

.2 Waste Management: separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

.3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

.4 Washwater to be tested and treated in accordance with authorities having jurisdiction prior to disposal.

.5 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.

END OF SECTION

Part 1 General

1.1 REFERENCES AND CODES

.1 Perform Work in accordance with the Ontario Provincial Standard Specifications (OPSS) and Drawings (OPSD), National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply as directed by the Departmental Representative.

.2 Meet or exceed requirements of:
- .1 Contract documents.
- .2 Specified standards, codes and referenced documents.

1.2 HAZARDOUS MATERIAL DISCOVERY

.1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's are discovered in course of work.

1.3 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions and municipal by-laws.

1.4 ACCESSIBLE DESIGN

.1 Comply with CSA B651-12, Accessible Design for the Built Environment, unless specified otherwise. In any case of conflict or discrepancy between the building codes and CSA B651, the requirements of CSA B651 shall apply.

1.5 TAXES

.1 Pay applicable Federal, Provincial and Municipal taxes.

1.6 EXAMINATION

.1 Examine existing conditions and determine conditions affecting work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 ABBREVIATIONS AND ACRONYMS

.1 The abbreviations and acronyms are commonly found in the Project Manual and represent the associated organizations or terms.

1.2 MATERIALS, EQUIPMENT AND METHODS

.1 A:

- .1 AB: anchor bolt.
- .2 AC: acoustic.
- .3 AC PAN: acoustic panel.
- .4 ACU: acoustic unit ceiling.
- .5 AFF: above finished floor.
- .6 AC PLAS: acoustic plaster.
- .7 ACT: acoustic tile.
- .8 ACR CU LVR: acrylic cube louvre.
- .9 ADH: adhesive.
- .10 ADJ: adjustable.
- .11 A/C: air conditioner.
- .12 AHU: air handling unit.
- .13 AL: aluminum.
- .14 ANOD: anodized.
- .15 APPROX: approximate.
- .16 ARCH: architecture.
- .17 ARCH BLK: architectural block.
- .18 AVB: air vapour barrier.

.2 B:

- .1 B: base.
- .2 BEAST: benthic assessment of sediment.
- .3 BH: bore hole.
- .4 BHP: brake horse power.
- .5 BL: bottom layer.
- .6 BLK: block.
- .7 BLKD: bulkhead.
- .8 BM: beam.
- .9 BOT: bottom.
- .10 BMP: best management practice.
- .11 B PL: base plate.
- .12 BRG: bearing.
- .13 BRK: brick.
- .14 BSMT: basement.
- .15 BTEX: benzene, toluene, ethylbenzene and xylenes.
- .16 BUR: built-up roof.

.3 C:

.1 CAL: caliper.
.2 CANTIL: cantilever.
.3 CB: catch basin.
.4 CC: centre to centre.
.5 CCN: contemplated change notice.
.6 CDF: controlled density fill.
.7 CEC: Canadian Electical Code.
.8 CF: chair fabric.
.9 CHAN: channel.
.10 CHS: Canadian hydrographic service.
.11 CJ: construction joint.
.12 CL: centreline.
.13 CK: cork.
.14 CLG: ceiling.
.15 CLR: clear.
.16 COL: column.
.17 CONC: concrete.
.18 CONC BLK: concrete block.
.19 CONC BRK: concrete brick.
.20 CONT: continuous.
.21 CONT J: control joint.
.22 COMPL: complete.
.23 CM: centimetre. (Nursery stock).
.24 CP: circulating pump.
.25 CPL: cement plaster.
.26 CPM: critical path method.
.27 CPT: carpet.
.28 CPTT: carpet tile.
.29 CT: ceramic tile.
.30 CTE: connect to existing.
.31 CV: control valve.
.32 CVT: conductive vinyl tile.
.33 C/W: complete with.

.4 D:

.1 D: deep.
.2 dB: decibels.
.3 DB: dry-bulb.
.4 DD: dutch door.
.5 DEG: degree.
.6 DF: drinking fountain.
.7 DIA: diameter.
.8 DIM: dimension.
.9 DL: dead load.
.10 DMNT: demountable.
.11 DP: dampproofing.
.12 DR: door.
.13 DRP: drapery.
.14 DWL: dowel.

.5 E:

- .1 EA: each.
- .2 EC: epoxy coating.
- .3 ECF: engineered containment facility.
- .4 EE: each end.
- .5 EF: each face (architectural/structural).
- .6 EF: exhaust fan (mechanical/electrical).
- .7 EL: elevation.
- .8 ELEC: electric.
- .9 ELEV: elevator.
- .10 EM: expanded metal.
- .11 ENCL: enclosure.
- .12 EQ: equal.
- .13 ET: expansion tank.
- .14 EXH: exhaust.
- .15 EXIST: existing.
- .16 EXPJ: expansion joint.
- .17 EXP STRUCT: exposed structure.
- .18 EXT: exterior.
- .19 EW: each way.
- .20 EWT: entering water temperature.

.6 F:

- .1 FC: fuel contributed.
- .2 FD: floor drain.
- .3 FDN: foundation.
- .4 FEAT W: feature wall.
- .5 FEXT: fire extinguisher.
- .6 FH: fire hose.
- .7 FHC: fire hose cabinet.
- .8 FHR: fire hose rack.
- .9 FIN: finish.
- .10 FIP: federal identity program.
- .11 FL: floor.
- .12 FLD: field.
- .13 FLUOR: fluorescent.
- .14 FR: frame.
- .15 FRR: fire resistance rating.
- .16 FTG: footing.

.7 G:

.1 GALV: galvanized steel.
.2 GB: grab bar.
.3 GBD: gypsum board.
.4 GC: General Conditions.
.5 GF: ground floor.
.6 GFCI: ground fault circuit interrupter.
.7 GL: glass or glazing.
.8 GL BLK: glass block.
.9 GPC: gypsum plaster ceiling.
.10 GPW: gypsum plaster wall.
.11 GT: glass tile.

.8 H:

.1 HB: hose bib.
.2 HC: hollow core.
.3 HCWD: hollow core wood door.
.4 HD: hand dryer.
.5 HDW: hardware.
.6 HDWD: hardwood.
.7 HEX: heat exchanger.
.8 HM: hollow metal.
.9 HOR: horizontal.
.10 HOR EF: horizontal each face.
.11 HP: hydro pole.
.12 HPA: Hamilton Port Authority.
.13 HR: hour.
.14 HRV: heat recovery ventilator.
.15 HT: height.
.16 HTR: heater.
.17 HUM: humidifier.
.18 HWT: hot water tank.
.19 HYD: hydrant.
.20 HZ: Hertz frequency, cycles per second.

.9 I:

.1 ICF: insulated concrete formwork.
.2 ID: inside diameter.
.3 INS: insulation.
.4 INTLK: interlock.

.10 J:

.1 JT: joint.

.11 K:

.1 KPL: kick plate.

.12 L:

.1 LAT: leaving air temperature.
.2 LAV: lavatory.
.3 LDG: landing.
.4 LG: long.
.5 LINO: linoleum.
.6 LL: live load.
.7 LT: light.
.8 LWT: leaving water temperature.

.13 M:

.1 MAS: masonry.
.2 MAS FL: masonry flashing.
.3 MAX: maximum.
.4 MBG: metal bar grating.
.5 MCL: metal cube louvre.
.6 MECH: mechanical.
.7 MET: metal.
.8 MET DK: metal deck.
.9 MET FL: metal flashing.
.10 MET GRID CLG: metal grid ceiling.
.11 MET GRTG: metal grating.
.12 MET LIN CLG: metal linear ceiling.
.13 MET T PTN: metal toilet partition.
.14 MH: maintenance hole.
.15 MIN: minimum.
.16 MLP: metal lath and plaster.
.17 MO: masonry opening.
.18 MR: marble.
.19 MT: metal threshold.
.20 MWP: membrane waterproofing.

.14 N:

.1 NBC: national building code.
.2 NC: normally closed.
.3 NF: near face.
.4 NFC: national fire code.
.5 NIC: not in contract.
.6 NO: number.
.7 NRC: noise reduction coefficient.
.8 NRP: non removable pin.
.9 NTS: not to scale.

.15 O:

- .1 OA: outside air.
- .2 OBC: Ontario building code.
- .3 OC: on centre.
- .4 OD: outside diameter.
- .5 OPNG: opening.
- .6 OPR: operator.
- .7 OVHD: overhead.
- .8 OWSJ: open web steel joist.

.16 P:

- .1 P: prefinished.
- .2 PAH: polynuclear aromatic hydrocarbons.
- .3 PARG: parging.
- .4 PCC: precast concrete.
- .5 PCT: porcelain ceramic tile.
- .6 PED ACS FLG: pedestal access flooring.
- .7 PF: panel fabric.
- .8 PH: phase.
- .9 PL: plate.
- .10 PLAM: plastic laminate.
- .11 PLAS: plaster.
- .12 PLYWD: plywood.
- .13 PR: pair.
- .14 PREFAB: prefabricated.
- .15 PREFIN: prefinished.
- .16 PRESS: pressure.
- .17 PRFL: profile.
- .18 PRV: pressure regulating valve.
- .19 PT: paint.
- .20 PTD: paper towel dispenser.
- .21 PTN: partition.
- .22 PVC: polyvinyl cholide.

.17 Q:

- .1 QTB: quarry tile base.
- .2 QTF: quarry tile floor.
- .3 QTR: quarry tile roof.

.18 R:

.1 R: radius.
.2 RA: return air.
.3 RAD: return air damper.
.4 RB: resilient base.
.5 RC: reinforced concrete.
.6 RCPT: receptacle.
.7 RD: roof drain.
.8 REINF: reinforced/reinforcing.
.9 REQD: required.
.10 REQT: requirement.
.11 RFT: rubber floor tile.
.12 RM: room.
.13 RO: rough opening.
.14 RP: radiant panel.
.15 RRS: recycled rubber sheet.
.16 RRT: recycled rubber tile.
.17 RSD: rolling steel door.
.18 RSF: rubber sheet flooring.
.19 RT: rubber tile.
.20 RTU: roof top unit.
.21 RWL: rain water leader.

.19 S:

.1 SA: supply air.
.2 SAN SEW: sanitary sewer.
.3 SCHED: schedule.
.4 SC: solid core.
.5 SCRN: screen.
.6 SCWD: solid core wood door.
.7 SD: smoke developed.
.8 SDT: static dissipative tile.
.9 SECT: section.
.10 SH: sill height.
.11 SIM: similar.
.12 SL: sliding.
.13 SLR: sealer.
.14 SPEC: specification.
.15 SS: stainless steel.
.16 STD: standard.
.17 STL: steel.
.18 STL BM: steel beam.
.19 STC: sound tranmission class.
.20 STL FL DK: steel floor deck.
.21 STL PL: steel plate.
.22 STN: stone.
.23 STR: structure or structural.
.24 ST SEW: storm sewer.
.25 S&U: stain and urethane.
.26 S&V: stain and varnish.
.27 SVT: solid vinyl tile.

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.20 T:

- .1 T: top.
- .2 T&B: top and bottom.
- .3 TCB: turbidity control plan.
- .4 TEL: telephone.
- .5 TER: terrazzo.
- .6 TERT: terrazzo tile.
- .7 THKNS: thickness.
- .8 THR: threshold.
- .9 TMPD: tempered.
- .10 TOPG: topping.
- .11 TRANSV: transverse.
- .12 TYP: typical.

.21 U:

- .1 U: urethane.
- .2 U/C: undercut.
- .3 UGRD: underground.
- .4 UNO: unless noted otherwise.
- .5 UOS: unless otherwise specified.
- .6 U/S: underside.
- .7 UR: urinal.

.22 V:

- .1 V: volt.
- .2 VCF: vinyl coated fabric.
- .3 VCT: vinyl compositition tile.
- .4 VEL: velocity.
- .5 VERT: vertical.
- .6 VERT B: vertical blinds.
- .7 VERT EF: vertical each face.
- .8 VSF: vinyl sheet flooring.
- .9 VPT: vinyl plank flooring.
- .10 VT: vinyl tile.
- .11 VWC: vinyl wall covering.

.23 W:

- .1 WB: wet-bulb.
- .2 WC: water closet.
- .3 W-C: wall connectors.
- .4 WD: wood.
- .5 WDV: wood veneer.
- .6 WG: water gauge.
- .7 WH: wall hydrant.
- .8 WHMIS: workplace hazardous materials information system.
- .9 WP: waterproofing.
- .10 WR: washroom.
- .11 WSIB: workplace safety and insurnace board.
- .12 WT: weight.
- .13 WTP: water treatment plant.

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1.3 STANDARDS ORGANIZATIONS

.1 Standards writing organizations:

.1 AA - Aluminum Association.
.2 ACPA - American Concrete Pipe Association.
.3 ANSI - American National Standards Institute.
.4 ASHRAE - American Society of Heating and Refrigerating and Air-Conditioning Engineers.
.5 ASTM - American Society for Testing and Materials.
.6 AWI/AWMAC - Architectural Woodwork Institute/Architectural Woodwork Manufacturers Association of Canada.
.7 AWPA - American Wood Preservers' Association.
.8 AWWA - American Water Works Association.
.9 BHMA - Builders Hardware Manufacturers Association.
.10 CCDC - Canadian Construction Documents Committee.
.11 CCMPA - Canadian Concrete Masonry Producers Association.
.12 CGSB - Canadian General Standards Board.
.13 CNTA - Canadian Nursery Trades Association.
.14 CPCA - Canadian Painting Contractors Association.
.15 CRCA - Canadian Roofing Contractors Association.
.16 CSA - Canadian Standards Association.
.17 CSC - Construction Specifications Canada.
.18 CSDMA - Canadian Steel Door Manufacturers Association.
.19 CSI - Construction Specifications Institute.
.20 CSSBI - Canadian Sheet Steel Building Institute.
.21 CRCA - Canadian Roofing Contractors Association.
.22 DHI - Door and Hardware Insitute.
.23 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.
.24 ESA - Electrical Safety Authority.
.25 FCC - Fire Commissioner of Canada.
.26 FSC - Forest Stewardship Council.
.27 GANA - Glass Association of North America.
.28 HMMA - Hollow Metal Manufacturers Association.
.29 IEEE - Institute of Electrical and Electronics Engineers Inc.
.30 ISO - International Organization for Standardization.
.31 IWFA - International Window Film Association.
.32 LEED - LEED Canada, Leadership in Energy and Environmental Design.
.33 MPI - Master Painters Insitute.
.34 NAAMM - National Association of Architectural Metal Manufacturers.
.35 NCPI - National Clay Pipe Institute.
.36 NEMA - National Electrical Manufacturers Association.
.37 NFPA - National Fire Protection Association.
.38 OPSD - Ontario Provincial Standard Drawings.
.39 OPSS - Ontario Provincial Standard Specifications.
.40 PPI - Plasctics Pipe Institute.
.41 SDI - Steel Door Intitute.
.42 SCAQMD - South Coast Air Quality Management District.
.43 TIA - Telecommunications Industry Association.
.44 TIAC - Thermal Insulation Association of Canada.
.45 TTMAC - Terrazzo Tile and Marble Association of Canada.
.46 UL - Underwriters Laboratories.

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.47 ULC - Underwriters Laboratories of Canada.
.48 US EPA - United States Environmental Protection Agency.
.49 WH - Warnock Hersey.

1.4 FEDERAL GOVERNMENT DEPARTMENTS AND AGENGIES

.1 Departments, agencies and crown corporations.
.1 CEAA - Canadian Environmental Assessment Agency.
.2 CSC - Correctional Service Canada.
.3 CRA - Canada Revenue Agency.
.4 DND - Department of National Defence.
.5 EC - Environment Canada.
.6 FHBRO - Federal Heritage Buildings Review Office.
.7 HC - Health Canada.
.8 HCD - Heritage Conservation Directorate.
.9 LC - Labour Canada.
.10 PC - Parks Canada.
.11 PWGSC - Public Works and Government Services Canada.
.12 RCMP - Royal Canadian Mounted Police.
.13 TBS - Treasury Board Secretariat.
.14 TC - Transport Canada.

1.5 PROVINCIAL GOVERNMENT DEPARTMENTS AND AGENGIES

.1 MOEE - Ontario Ministry of Environment and Energy.

.2 MOL - Ontario Ministry of Labour.

.3 MTO and MOT - Ontario Ministry of Transportation.

.4 TSSA - Technical Standards and Safety Authority.

1.6 INTERNATIONAL GOVERNMENT DEPARTMENTS AND AGENCIES

.1 DOHMH - New York City Department of Health and Mental Hygiene, USA.

.2 GSA - Government Services Administration, USA.

1.7 UNITS OF MEASURE METRIC

.1 The following abbreviations of units of measure are commonly found in the Project Manual:
.1 C: Celsius.
.2 cm: centimetre.
.3 kg: kilogram.
.4 kg/m3: kilogram per cubic metre.
.5 kN: kilonewton.
.6 kPa: kilopascals.
.7 kw: kilowatts.
.8 l/s: litre per second.
.9 m: metre.

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.10 m3: cubic metre.
.11 mg/kg: milligrams per kilogram.
.12 mg/L: milligrams per litre.
.13 mm: millimetres.
.14 MPa: megapascal.
.15 NTU: nephelometric turbidity unit.
.16 ppm: parts per million.
.17 ug/L: micrograms per litre.
.18 ug/m3: micrograms per cubic metre.

1.8 UNITS OF MEASURE IMPERIAL

.1 The following abbreviations of units of measure are commonly found in the Project Manual:
.1 BTU: British thermal units.
.2 CFM: cubic feet per minute.
.3 F: Fahrenheit.
.4 ft: foot/feet.
.5 FPI: fins per inch.
.6 FPM: feet per minute.
.7 ga: gauge.
.8 gpm: gallons per minute.
.9 in: inches.
.10 lbs: pounds.
.11 NTU: nephelometric turbidity unit.
.12 psi: pounds-force per square inch.
.13 PSIG: PSI gauge.
.14 ppm: parts per million.
.15 RPM: revolutions per minute.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Inspection and testing, administrative and enforcement requirements.

.2 Tests and mix designs.

.3 Mock-ups.

.4 Mill tests.

1.2 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, Contractor is to correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents there will be no compensation to the Contractor.

1.3 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative or Owner. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

.1 Notify appropriate agency Departmental Representative 48 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.

1.6 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.7 REPORTS

.1 Submit three (3) copies of inspection and test reports to Departmental Representative.

.2 Provide copies to subcontractor of work being inspected or tested.

1.8 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as requested.

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

1.9 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to Departmental Representative as specified in specific Section.

.3 Prepare mock-ups for Departmental Representative's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Departmental Representative will assist in preparing a schedule fixing dates for preparation.

.6 Mock-ups may remain as part of Work.

1.10 MILL TESTS

.1 Submit mill test certificates as requested and required of specification Sections.

1.11 EQUIPMENT AND SYSTEMS

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Temporary utilities.

1.2 RELATED SECTIONS

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.4 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made for this section.

1.5 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.6 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.7 WATER SUPPLY

.1 Provide continuous supply of potable water for construction use.

.2 Arrange for connection with appropriate utility company and pay all costs for installation, maintenance and removal.

.3 Pay for utility charges at prevailing rates.

1.8 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside building must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Protect Work and products against dampness and cold.

.3 Prevent moisture condensation on surfaces.

.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Maintain temperatures of minimum 10°C in areas where construction is in progress.

.5 Ventilating:

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:

.1 Conform with applicable codes and standards.

.2 Enforce safe practices.

.3 Prevent abuse of services.

.4 Prevent damage to finishes.

.7 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.9 TEMPORARY POWER AND LIGHT

.1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.

.2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance, and removal.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

.4 Provide and maintain temporary lighting throughout project.

1.8 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary telephone, fax, data hook up, equipment necessary for own use and use of Departmental Representative.

1.9 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

Part 2 Products

2.1 NOT USED

.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 sediment and erosion control plan, specific to site, that complies with 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.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

.4 Project identification.

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.

.2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA International)

.1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-0121-M1978 (R2003), Douglas Fir Plywood.

.3 CAN/CSA-S269.2-M1987 (R2003), Access Scaffolding for Construction Purposes.

.4 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.

.2 Identify areas which have to be graveled 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 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 provided it does not disrupt performance of Work.

.2 Provide and maintain adequate access to project site.

.3 Clean taxi areas where used by Contractor's equipment.

.4 Build and maintain temporary roads where indicated or directed by Departmental Representative and provide snow removal during period of Work.

.5 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.6 SECURITY

.1 Pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

1.7 OFFICES

.1 Provide office heated to 22 ^{o}C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.

.2 Provide marked and fully stocked first-aid case in a readily available location.

.3 Subcontractors to provide their own offices as necessary. Direct location of these offices.

.4 Maintain in clean condition.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.9 SANITARY FACILITIES

.1 Provide sanitary facilities 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.

1.10 CONSTRUCTION SIGNAGE

.1 No signs or advertisements, other than warning signs, are permitted on site.

.2 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.3 Maintain approved signs and notices in good condition for duration of project, and dispose of offsite on completion of project or earlier if directed by Departmental Representative.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and 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 Departmental 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.

.6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.7 Construct access and haul roads necessary at the approval of the Departmental Representative.

.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.

.10 Provide dust control as required to ensure safe operation at all times.

.11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.

.12 Ensure full and clear visibility for full width of haul road and work areas during night work operations (if required).

.13 Provide snow removal during period of Work.

.14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.12 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 on a regular basis as directed by the Departmental Representative.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material not in construction facilities.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Barriers.

.2 Environmental Controls.

.3 Traffic Controls.

.4 Fire Routes.

1.2 RELATED SECTIONS

.1 Section 01 51 00 - Temporary Utilities.

.2 Section 01 52 00 - Construction Facilities.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB):
- .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
- .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.

.2 Canadian Standards Association (CSA):
- .1 CSA O121-08(R2013), Douglas Fir Plywood.

1.4 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.5 HOARDING

.1 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

.2 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Maintain fence in good repair.

1.6 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.

.2 Provide as required by governing authorities.

1.7 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.8 PUBLIC TRAFFIC FLOW

.1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

1.9 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.10 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.11 PROTECTION OF BUILDING FINISHES

.1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.

.2 Provide necessary screens, covers, and hoardings.

.3 Confirm with Departmental Representative locations and installation schedule 3 days prior to installation.

.4 Be responsible for damage incurred due to lack of or improper protection.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Product quality, availability, storage, handling, protection, and transportation.

.2 Manufacturer's instructions.

.3 Quality of Work, coordination and fastenings.

.4 Existing facilities.

1.2 RELATED SECTIONS

.1 Section 01 45 00 - Quality Control.

.2 Section 01 73 00 – Execution of works.

1.3 REFERENCES

.1 Within text of specifications, reference may be made to reference standards.

.2 Conform to these standards, in whole or in part as specifically requested in specifications.

.3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.

.4 The cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.

.5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

.6 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage.

1.4 QUALITY

.1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.

.2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should any dispute arise as to quality or fitness of products, decision rests strictly with Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.

.5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.5 AVAILABILITY

.1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

.2 In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.6 METRIC SIZED MATERIALS

.1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.

.2 The Contractor is required to provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.

.3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.

.4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.

.5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

1.7 STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.

.2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.

.3 Store products subject to damage from weather in weatherproof enclosures.

.4 Store cementitious products clear of earth or concrete floors, and away from walls.

.5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.

.6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

.7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.

.8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

.9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.8 TRANSPORTATION

.1 Pay costs of transportation of products required in performance of Work.

.2 Transportation cost of products supplied by Owner will be paid for by Departmental Representative. Unload, handle and store such products.

1.9 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

.2 Notify Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that Departmental Representative may establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

1.10 QUALITY OF WORK

.1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

.2 Do not employ anyone unskilled in their required duties. Departmental Representative reserves right to require dismissal from site, workers deemed incompetent or careless.

.3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Departmental Representative, whose decision is final.

1.11 COORDINATION

.1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.

.2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.12 REMEDIAL WORK

.1 Refer to Section 01 73 00.

.2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.

.3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.13 LOCATION OF FIXTURES

.1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.

.2 Inform Departmental Representative of conflicting installation. Install as directed.

1.14 FASTENINGS

.1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

.2 Prevent electrolytic action between dissimilar metals and materials.

.3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.

.4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.

.5 Keep exposed fastenings to a minimum, space evenly and install neatly.

.6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.15 FASTENINGS - EQUIPMENT

.1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.

.2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No.304 stainless steel for exterior areas.

.3 Bolts may not project more than one diameter beyond nuts.

.4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.16 PROTECTION OF WORK IN PROGRESS

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

1.17 EXISTING UTILITIES

.1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.

.2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Field engineering survey services to measure and stake site.

.2 Survey services to establish and confirm inverts for Work.

.3 Recording of subsurface conditions found via Daylighting.

1.2 REFERENCES

.1 Owner's identification of existing survey control points and property limits.

1.3 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.4 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor (or approved equivalent), licensed to practice in Place of Work, acceptable to Departmental Representative.

1.5 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Departmental Representative.

.4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.6 SURVEY REQUIREMENTS

.1 Establish two (2) permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data, in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement.

.4 Stake slopes.

.5 Establish pipe invert elevations.

.6 Establish lines and levels for mechanical and electrical work.

1.7 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

.2 Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.8 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.9 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 Record locations of maintained, re-routed and abandoned service lines.

.3 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

1.10 SUBMITTALS

.1 Submit name and address of Surveyor to Departmental Representative.

.2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform and do not conform to Contract Documents.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00.

.2 Submit written request in advance of cutting or alteration which affects:
- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.

.3 Include in request:
- .1 Identification of project.
- .2 Location and description of affected Work.
- .3 Statement on necessity for cutting or alteration.
- .4 Description of proposed Work, and products to be used.
- .5 Alternatives to cutting and patching.
- .6 Effect on Work of Owner or separate contractor.
- .7 Written permission of affected separate contractor.
- .8 Date and time work will be executed.

1.2 MATERIALS

.1 Required for original installation.

.2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00.

1.3 PREPARATION

.1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.

.2 After uncovering, inspect conditions affecting performance of Work.

.3 Beginning of cutting or patching means acceptance of existing conditions.

.4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.

.5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

.1 Execute cutting, fitting, and patching, including excavation and fill, to complete Work.

.2 Fit several parts together, to integrate with other Work.

.

.3 Uncover Work to install ill-timed Work.

.4 Remove and replace defective and non-conforming Work.

.5 Remove samples of installed Work for testing.

.6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.

.7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.

.8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.

.9 Restore work with new products in accordance with requirements of Contract Documents.

.10 Submit proposed materials, finishes and installation method for patching to Departmental Representative for approval, prior to patching.

.11 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Progressive cleaning.

.2 Final cleaning.

1.2 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 PROJECT CLEANLINESS

.1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.

.2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative.

.3 Clear snow and ice from access to building, bank/pile snow in designated areas only.

.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 clearly marked separate bins for recycling. Refer to Section01 74 20.

.7 Remove waste material and debris from site and deposit in waste container at end of each working day.

.8 Dispose of waste materials and debris off site.

.9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.10 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

.11 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.4 FINAL CLEANING

.1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Prior to final review remove surplus products, tools, construction machinery and equipment.

.3 Remove waste products and debris including that caused by Owner or other Contractors.

.4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.

.5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.6 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

.7 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.

.8 Remove dirt and other disfiguration from exterior surfaces.

.9 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.

.10 Clean roofs, downspouts, and drainage systems.

.11 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.

.12 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures.

.13 Clean lighting reflectors, lenses, and other lighting surfaces.

.14 Sweep and wash clean paved areas.

.15 Remove snow and ice from access to building.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 WASTE MANAGEMENT GOALS

.1 Accomplish maximum control of solid construction waste.

.2 Preserve environment and prevent pollution and environment damage.

1.3 DEFINITIONS

.1 Class III: non-hazardous waste - construction renovation and demolition waste.

.2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.

.3 Demolition Waste Audit (DWA): relates to actual waste generated from project.

.4 Inert Fill: inert waste - exclusively asphalt and concrete.

.5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.11 Separate Condition: refers to waste sorted into individual types.

.12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.

.13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.

.14 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA.

1.4 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Unless specified otherwise, materials for removal do not become Contractor's property unless approved by the Departmental Representative.

.3 Protect, stockpile and store salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect surface drainage, mechanical and electrical from damage and blockage.

.6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

1.5 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

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

.3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.6 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

1.7 WASTE AND RECYCLING PROCESSING SITES

.1 When required, the Contractor must contact the following agencies to confirm where to dispose waste and recycling materials:

.1 Waste - Ministry of Environment and Energy (MEE)
- .1 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
- .2 Telephone: 800-565-4923 or 416-323-4321.
- .3 Fax: 416-323-4682.

.2 Recycling - Recycling Council of Ontario (RCO)
- .1 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
- .2 Telephone: 416-657-2797.
- .3 Fax: 416-960-8053.
- .4 Email: rco@rco.on.ca.
- .5 Internet: http://www.rco.on.ca/.

1.8 SCHEDULING

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

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 APPLICATION

.1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Environmental Protection Act (CEPA):

.1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 ACCEPTANCE OF WORK PROCEDURES

.1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.

.1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and submit verification that corrections have been made.

.2 Request Departmental Representative's Inspection.

.2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify defects and deficiencies. Contractor to correct Work as directed.

.3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Equipment and systems: tested and fully operational.

.4 Certificates required by Electrical Safety Authority: submitted.

.5 Operation of systems have been demonstrated to Owner’s personnel.

.6 Work is complete and ready for final inspection.

.4 Final Inspection: when Completion tasks are done, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.

.5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for certificate of Substantial Performance.

.6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.7 Final Payment: when Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.

.8 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

.1 In accordance with Section 01 74 11 - Cleaning.

.2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 As-built, samples, and specifications.

.2 Product data, materials and finishes, and related information.

.3 Operation and maintenance data.

.4 Warranties and bonds.

.5 Final site survey.

1.2 MEASUREMENT FOR PAYMENT

.1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Warranty Meeting:

.1 Convene meeting one (1) week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify Project requirements.

.2 Review manufacturer's installation instructions and warranty requirements.

.2 Departmental Representative to establish communication procedures for:

.1 Notifying construction warranty defects.

.2 Determine priorities for type of defects.

.3 Determine reasonable response time.

.3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.

.4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.4 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative four (4) final copies of operating and maintenance manuals in English and French.

.3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.

.4 Provide evidence, if requested, for type, source and quality of products supplied.

.5 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.6 Copies will be returned after final inspection, with Departmental Representative's comments.

.7 Revise content of documents as required prior to final submittal.

.8 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.9 Pay costs of transportation.

1.5 FORMAT

.1 Organize data as instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.

.4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.5 Arrange content by systems under Section numbers and sequence of Table of Contents.

.6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.7 Text: manufacturer's printed data, or typewritten data.

.8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.9 Provide 1:1 scaled CAD files in .dwg format. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with NRC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.6 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 Date of submission; names.

.2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.

.3 Schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.7 AS-BUILTS AND SAMPLES

.1 Maintain, in addition to requirements in General Conditions, at site for Owner one (1) record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

.

.6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit files on USB compatible with NRC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

.7 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.8 RECORDING ACTUAL SITE CONDITIONS

.1 Record information on set of red lined drawings, provided by Departmental Representative.

.2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.

.3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.4 Contract Drawings and shop drawings: mark each item to record actual construction, including:

.1 Measured depths of elements of foundation in relation to finish first floor datum.

.2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

.3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.4 Field changes of dimension and detail.

.5 Changes made by change orders.

.6 Details not on original Contract Drawings.

.7 References to related shop drawings and modifications.

.5 Specifications: mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, and field test records, required by individual specifications sections.

.7 Provide digital photographs, if requested, for site records.

1.9 FINAL SURVEY

.1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.10 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports.

1.11 MATERIALS AND FINISHES

.1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.

.2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

.4 Additional Requirements: as specified in individual specifications sections.

1.12 MAINTENANCE MATERIALS

.1 Spare Parts:

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

.2 Extra Stock Materials:

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

.3 Special Tools:

.1 Provide special tools, in quantities specified in individual specification sections.
.2 Provide items with tags identifying their associated function and equipment.
.3 Deliver to location as directed; place and store.
.4 Receive and catalogue items.
.1 Submit inventory listing to Departmental Representative.
.2 Include approved listings in Maintenance Manual.

1.13 DELIVERY, STORAGE AND HANDLING

.1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.

.2 Store in original and undamaged condition with manufacturer's seal and labels intact.

.3 Store components subject to damage from weather in weatherproof enclosures.

.4 Store paints and freezable materials in a heated and ventilated room.

.5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.14 WARRANTIES AND BONDS

.1 Develop warranty management plan to contain information relevant to Warranties.

.2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.

.3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.

.4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.

.5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.

.6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

.4 Verify that documents are in proper form, contain full information, and are notarized.

.5 Co-execute submittals when required.

.6 Retain warranties and bonds until time specified for submittal.

.7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

.8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.

.9 Include information contained in warranty management plan as follows:

.1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.

.2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include transformers and commissioned systems.

.3 Provide list for each warranted equipment, item, feature of construction or system indicating:

.1 Name of item.

.2 Model and serial numbers.

.3 Location where installed.

.4 Name and phone numbers of manufacturers or suppliers.

.5 Names, addresses and telephone numbers of sources of spare parts.

.6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.

.7 Cross-reference to warranty certificates as applicable.

.8 Starting point and duration of warranty period.

.9 Summary of maintenance procedures required to continue warranty in force.

.10 Cross-Reference to specific pertinent Operation and Maintenance manuals.

.11 Organization, names and phone numbers of persons to call for warranty service.

.12 Typical response time and repair time expected for various warranted equipment.

.4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.

.5 Procedure and status of tagging of equipment covered by extended warranties.

.6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

.10 Respond in a timely manner to oral or written notification of required construction warranty repair work.

.11 Written verification will follow oral instructions. Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.15 WARRANTY TAGS

.1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.

.2 Attach tags with copper wire and spray with waterproof silicone coating.

.3 Leave date of acceptance until project is accepted for occupancy.

.4 Indicate following information on tag:

.1 Type of product/material.
.2 Model number.
.3 Serial number.
.4 Contract number.
.5 Warranty period.
.6 Inspector's signature.
.7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

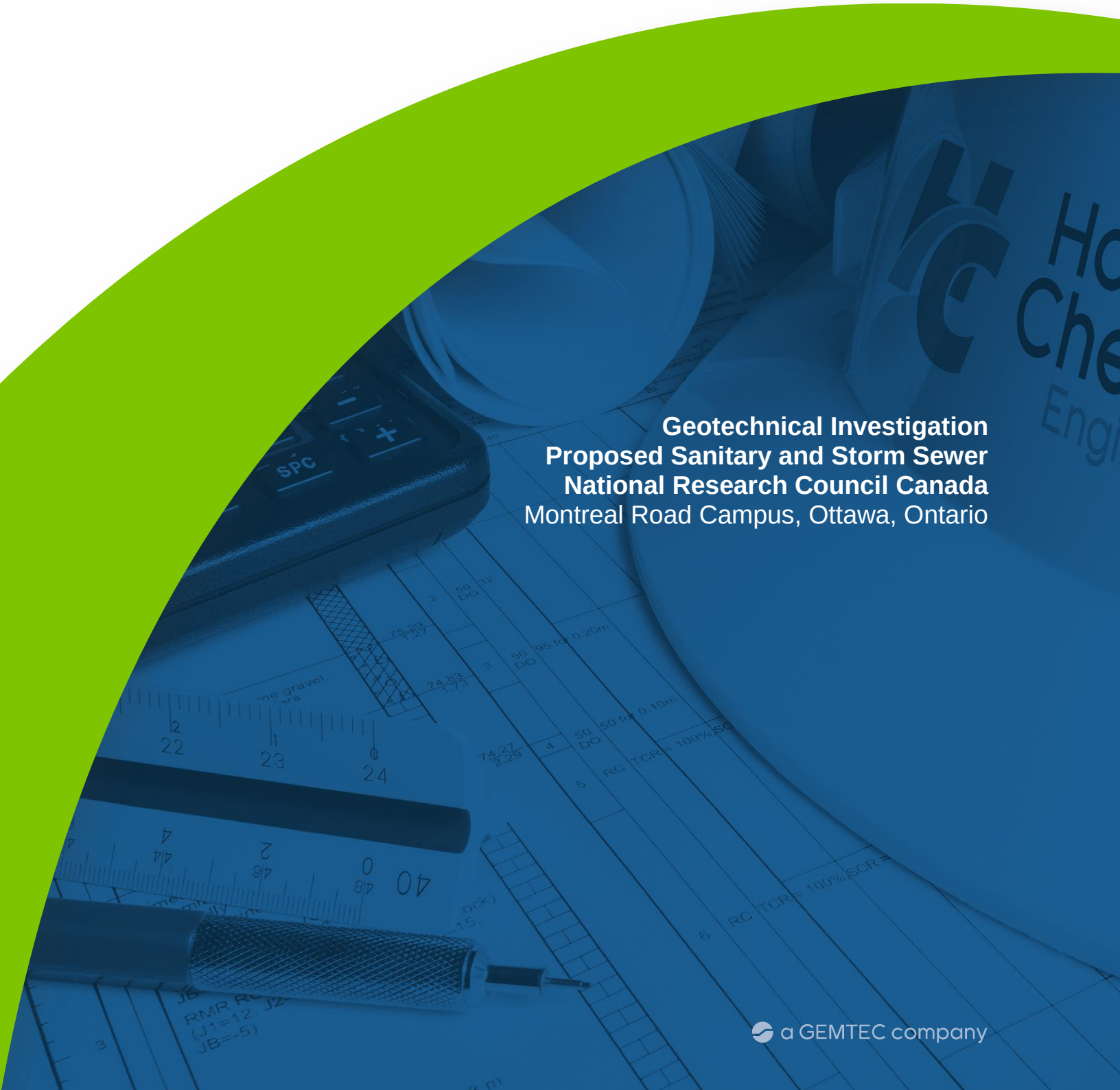
3.1 NOT USED

.1 Not Used.

END OF SECTION

APPENDIX A

Houle Chevrier Engineering



Geotechnical Investigation
Proposed Sanitary and Storm Sewer
National Research Council Canada
Montreal Road Campus, Ottawa, Ontario

a GEMTEC company

Submitted to:

National Research Council Canada
1200 Montreal Road
Ottawa, Ontario
K1A 0R6

Geotechnical Investigation
Proposed Sanitary and Storm Sewer
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March 11, 2016
Project: 62739.10

EXECUTIVE SUMMARY

This report provides the results of a geotechnical and limited environmental investigation associated with the proposed construction of new sanitary and storm sewers along a proposed 3 kilometre alignment within north portion of the Montreal Road Campus of the National Research Council Canada. Stormwater management areas are also being considered as part of the project.

At the time of our report preparation, detailed design information, including the exact service alignments, invert depths of the services and details of the stormwater management area(s) were not available.

In general, the subsurface conditions across the site consist of overburden deposits ranging from about 0.6 to over 5.2 metres thick, underlain by limestone bedrock. The overburden is generally composed of sandy fill material, silty clay, silty sand and glacial till. Where confirmed by coring, the elevation of the bedrock surface ranges from about 90.9 to 102.4 metres, geodetic datum. The groundwater levels measured in the installed piezometers ranged from 0.4 to 4.2 metres below ground surface (elevation 79.2 to 99.2 metres geodetic datum). Possible hydrocarbon contamination was noted in several boreholes. As a result a limited number of environmental boreholes were advanced at selected locations.

Based on the results of our investigation, it is our opinion that the most significant constraints for the proposed infrastructure project will be shallow bedrock, high groundwater levels, boulders within the overburden deposits and potentially petroleum hydrocarbon (PHC) impacted soils. PHC contaminated soil was identified around one (1) borehole location, borehole 16-105E. The contaminated soil can be excavated and remediated (i.e. biopile, land farming, etc.,) at a suitable location of on the property or transported offsite for disposal as waste in accordance with Ontario Regulation 347.

A City of Ottawa Sewer Use permit is required in order to discharge the construction water to the sanitary sewer. Preliminary testing has been performed for benzene, toluene, ethylbenzene, xylenes, and petroleum hydrocarbons. The discharge guidelines were exceeded at one (1) location, borehole 16-105E. Groundwater pumped from the Site during the infrastructure work will need to be evaluated in accordance with City of Ottawa By-Law 2003-514 (Schedule A: Table 1 - Limits for Sanitary and Combined Sewers Discharge; and, Table 2 - Limits for Storm Sewer Discharge).

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1.0 INTRODUCTION

This report presents the results of a subsurface investigation carried out at the Montreal Road Campus of the National Research Council Canada (NRC) in Ottawa, Ontario (refer to Key Plan, Figure 1). The purpose of the investigation was to assess the subsurface soil, bedrock and groundwater conditions with a limited borehole investigation and to provide design and construction recommendations for the proposed storm and sewer service alignments, proposed storm water management areas, and roadway structure reconstruction.

The investigation undertaken by Houle Chevrier Engineering Ltd. (HCEL) was carried out in general accordance with our proposal to NRC dated October 5, 2015. Subsequent to the initial scope of work, HCEL advanced additional geotechnical boreholes to delineate the inferred bedrock surface. Also, a limited number of environmental boreholes were advanced in an attempt to delineate suspected hydrocarbon contamination encountered during the initial investigation.

A separate, targeted environmental subsurface investigation was carried out concurrently by HCEL at the request of the NRC due to a fuel oil spill at Building M7. The results of that investigation will be provided in a separate report.

This report presents the findings of our investigation and provides preliminary geotechnical design recommendations.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Project Description

It is understood that plans are being prepared to construct sanitary and storm sewers throughout the north side of the Montreal Road Campus of the NRC to replace the existing, combined storm and sanitary sewers. The alignment for the proposed services is about 3 kilometers in length. Based on preliminary plans provided to us, we understand that two (2) storm water management areas may be included in the scope of the project.

The existing roadways along the alignment will be either by fully reconstructed or partially reconstructed within the trenches only.

The invert depths for the proposed sanitary and storm sewers were not available during report preparation. Therefore, we have assumed that invert depths will range between about 3 and 4 meters below ground surface.

2.2 Review of Geology Maps

Surficial geology maps of the Ottawa area indicate that the site is underlain by shallow bedrock. Drift thickness maps indicate that the thickness of the overburden deposits ranges from about 0 to 1 meters in the vicinity of the site. Bedrock geology maps of the Ottawa area indicate that the

overburden deposits are underlain by limestone and dolostone bedrock of the Gull River formation and shale of the Rockcliffe formation.

3.0 SUBSURFACE INVESTIGATION

3.1 Geotechnical Investigation

The field investigation for our original scope of work consisted of fifty-one (51) boreholes. This work was undertaken between November 23, 2015 and December 10, 2015. Six (6) additional boreholes were added to delineate the bedrock (boreholes 15-12A, B, and C, 15-16A and B, and 15-20A). These additional boreholes were advanced between January 5 and 8, 2016. Three (3) boreholes from the initial investigation (boreholes 15-02, 15-41 and 15-55) encountered suspected hydrocarbon impacted soils, therefore, eight (8) environmental boreholes were advanced to further delineate potential hydrocarbon contamination (boreholes 16-102E, 16-104E, 15-105E, 16-106E, and 16-108E to 16-111E). The field work for the environmental boreholes was undertaken between December 23, 2015 and January 15, 2016.

In total, sixty-five (65) boreholes were advanced across the site.

The boreholes were advanced using either a CME 55 truck mounted drill rig and a CME 45 track mounted drill rig, supplied and operated by George Downing Estate Drilling Limited of Grenville-sur-la-Rouge, Quebec, and Marathon Drilling of Ottawa, Ontario.

The soil conditions in the boreholes were identified by examining the materials retrieved from the 50 mm diameter drive open sampler at regular depth intervals and manually sampling the upper portion of the holes. In situ shear vane testing was carried out, where possible, within the silty clay deposits to determine the undrained shear strength. Remolded shear vane testing was also carried out to assess the sensitivity of the cohesive soil deposits. The groundwater conditions in the boreholes were observed within the hollow stem augers, and open boreholes where possible. In addition, standpipe piezometers were installed within fifteen (15) of the boreholes from which static groundwater measurements were obtained.

The Record of Borehole sheets are provided in Appendix A. The borehole locations are shown on the attached Borehole Location Plan, Figure 2.

Following the field work, the soil and bedrock samples were returned to our laboratory at 32 Steacie Drive in Ottawa, Ontario for examination by a geotechnical engineer. Selected soil samples were tested for moisture, grain size distribution, and Atterberg limits. Selected bedrock core samples were tested for unconfined compressive strength.

The borehole locations were selected by HCEL and NRC and positioned in the field using our Trimble R10 GPS survey instrument. The elevations in this report and on the Record of Borehole sheets are referenced to geodetic datum.

4.0 SUBSURFACE CONDITIONS

4.1 General

As previously indicated, the soil and groundwater conditions identified in the boreholes are given on the Record of Borehole sheets (Appendix A). The logs indicate the subsurface conditions at the specific test locations only. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted. The precision with which subsurface conditions are indicated depends on the method of exploration, the frequency and recovery of samples, the method of sampling, and the uniformity of the subsurface conditions. Subsurface conditions at other than the borehole locations may vary from the conditions encountered in the boreholes. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties.

The groundwater conditions described in this report refer only to those observed at the place and time of observation noted in the report. These conditions may vary seasonally or as a consequence of construction activities in the area.

The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil involves judgement and Houle Chevrier Engineering Ltd. does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice.

The following presents an overview of the subsurface conditions encountered in the boreholes advanced as part of this investigation.

4.2 Summary of Subsurface Conditions

An overview of the soil, bedrock and groundwater conditions encountered at the borehole locations are summarized in Table 4.1 and described in detail in the following sections. Detailed Record of Borehole sheets are provided in Appendix A.

Table 4.1: Summary of Overburden, Bedrock and Groundwater Conditions

BH	Ground Elevation	Fill* Thickness	Clay Depth	Glacial Till Depth	Bedrock Depth	Groundwater Depth
	(metres)					
15-01	100.3	1.4	--	--	1.4 C	3.0 P
15-02	98.7	2.0	--	4.6	4.7 AR	2.5 P
15-03	104.2	1.7	--	--	1.7 AR	--
15-04	104.4	2.6	--	--	2.6 AR	--

BH	Ground Elevation	Fill* Thickness	Clay Depth	Glacial Till Depth	Bedrock Depth	Groundwater Depth
	(metres)					
15-05	104.1	0.7	--	--	0.7 AR	--
15-06	100.3	1.9	--	1.9	3.0 AR	--
15-07	99.8	NL	NL	NL	4.3 AR	NL
15-08	99.2	1.2	1.2	--	--	--
15-09	98.5	0.8	1.3	3.4	3.8 AR	--
15-10	99.9	1.7	--	1.7	2.9 AR	--
15-11	99.7	1.8	1.8	1.9	3.0 AR	--
15-12	99.8	NL	NL	NL	1.0 AR	NL
15-12A	98.6	1.2	2.3	3.7	--	--
15-12B	98.9	2.3	--	2.3	4.7 AR	--
15-12C	98.8	2.3	--	2.3	--	--
15-13	98.8	1.8	--	2.3	4.2 AR	--
15-14	98.7	0.8	--	0.8	2.2 AR	--
15-15	98.7	0.7	0.9	1.6	--	--
15-16	98.8	0.7	--	--	1.0 AR	--
15-16A	98.8	2.4	--	2.4	--	--
15-16B	98.8	0.5	0.5	1.5	--	3.7
15-17	98.9	0.2	0.2	1.9	4.9 AR	--
15-18	98.8	1.7	1.7	4.6	--	3.2 P
15-19	98.9	1.3	1.3	--	--	--
15-20	99.1	0.3	--	--	0.6 AR	--
15-20A	99.0	0.6	--	--	0.6 C	--
15-21	99.0	1.2	--	1.2	4.4 C	2.1 P

BH	Ground Elevation	Fill* Thickness	Clay Depth	Glacial Till Depth	Bedrock Depth	Groundwater Depth
	(metres)					
15-22	96.9	0.1	0.3	2.1	2.2 AR	--
15-23	98.4	1.7	1.7	2.5	--	--
15-24	96.5	0.9	0.9	4.9	--	--
15-25	96.6	0.5	0.5	--	--	--
15-26	97.1	1.0	1.0	--	--	--
15-27	97.3	0.5	0.5	--	--	--
15-28	94.2	1.3	1.6	--	--	--
15-29	93.7	--	0.6	--	--	0.4 P
15-30	92.8	0.8	0.8	--	--	--
15-31	92.8	1.5	1.5	--	--	--
15-32	92.3	0.9	0.9	--	--	2.6 P
15-33	93.7	NL	NL	NL	--	--
15-34	93.5	1.3	1.3	--	--	--
15-35	93.8	0.6	0.6	1.6	3.9 AR	--
15-36	97.7	2.6	--	2.6	4.8 AR	--
15-37	94.4	0.8	--	--	0.8 AR	--
15-38	96.5	1.5	--	1.5	1.8 AR	--
15-39	95.9	NL	NL	NL	0.8 AR	--
15-40	95.6	0.5	--	--	0.9 AR	--
15-41	93.7	0.9	--	0.9	2.2 AR	--
15-42	84.1	0.7	0.7	4.1	--	--
15-43	84.8	1.8	2.0	4.6	--	--
15-44	85.7	0.6	--	--	1.0 AR	--

BH	Ground Elevation	Fill* Thickness	Clay Depth	Glacial Till Depth	Bedrock Depth	Groundwater Depth
	(metres)					
15-45	99.4	NL	NL	NL	2.4 AR	--
15-46	99.3	1.2	--	--	1.2 AR	--
15-47	99.4	1.9	--	--	1.9 C	3.3 P
15-54	78.8	0.3	0.3	3.3	--	--
15-55	78.9	1.2	1.2	3.9	--	--
15-56A	78.8	4.7	--	4.7	--	3.2 P
15-56B	79.9	4.8	--	4.8	--	-
16-102E	103.4	1.4	--	--	--	--
16-104E	103.0	0.7	--	--	0.7 C	3.8 P
15-105E	98.8	2.3	3.6	-	4.9 AR	2.7 P
16-106E	98.0	2.3	--	2.3	2.8 AR	1.9 P
16-108E	93.5	--	--	0.8	2.4 C	2.6 P
16-109E	93.1	1.1	--	--	1.1 C	3.6 P
16-110E	83.4	--	0.1	3.5	4.6 AR	4.2 P
16-111E	83.1	--	0.2	3.3	--	3.3 P

**** = Combined thickness of pavement structure, fill and possible fill soils***

AR = Auger refusal, probable bedrock depth but not proven by rock coring

C = Bedrock proven by rock coring

NL = Soil conditions not logged (Auger Probe only)

P = Stabilized groundwater level measured in standpipe piezometer

E = Borehole put down for environmental screening purposes

4.2.1 Pavement Structure

Asphaltic concrete was encountered at all borehole locations with the exception of boreholes 15-22, 15-29, 15-37, 15-39, 16-108E, 16-110E and 16-111E. The thickness of the asphaltic concrete ranges from about 5 to 280 millimeters, averaging 110 millimeters.

It should be noted that a 530 millimeter thick concrete layer was encountered directly below the asphaltic concrete surface at borehole 15-16A.

The asphaltic concrete surface is underlain by a granular base/subbase layer ranging in thickness from about 100 to 1,700 millimeters, averaging 600 millimeters. The granular base/subbase is generally composed of sand and gravel with trace to some silt.

Three (3) grain size distribution tests were undertaken on selected samples of the granular base/subbase. The results are provided on Figure B1 (Appendix B) along with the Ontario Provincial Standard Specification (OPSS) Granular B Type I envelope and summarized in the following table.

Table 4.2: Summary of Grain Size Distribution Tests (Granular Base/Subbase)

Location	Sample Number	Sample Depth(metres)	Gravel (%)	Sand (%)	Silt & Clay (%)
BH 15-2	1	0.2 – 0.9	52	32	16
BH 15-8	1	0.1 - 0.2	45	44	11
BH 15-38	1	0.1 – 0.3	33	52	14

The results show that the samples generally meet the grain size distribution requirements for OPSS Granular B Type I, with the exception of the fines content (percent passing the 0.075 millimetre sieve). The fines content measured ranges from 11 to 16 percent compared to the fines limit for OPSS Granular B Type I of 8 percent.

4.2.2 Fill

Fill or possible fill was encountered at most of the borehole locations. The fill is generally composed of sand with varying amounts of silt and gravel. Foreign debris such as steel, ash, wood and insulation was encountered within the fill at a few of the borehole locations. It should be noted that it is difficult to differentiate between native sand and sand fill within the relatively small split spoon sample sizes when no foreign debris is encountered. Therefore, soil identified as fill could potentially be native soil. In our opinion, this should not affect the design considerations for this project.

The thickness of the fill/ possible fill ranges from about 0.1 to 4.8 meters, averaging 1.2 meters.

The standard penetration test (SPT) N values recorded within the fill range from 3 to over 50 blows per 0.3 meters of penetration, which reflects a highly variable very loose to very dense relative density.

4.2.3 Sand

Native deposits of sand were encountered in six (6) of the sixty-five (65) boreholes (15-02, 15-09, 15-12A, 15-13, 15-22, and 15-105E). The sand can generally be described as brown, fine to course grained with trace to some silt. Hydrocarbon odour was noted within the sand layer at borehole 15-02.

The thickness of the sand ranges from about 0.2 to 2.6 meters.

The SPT N values recorded within the native sand range from 4 to 47 blows per 0.3 meters of penetration, which reflects a highly variable very loose to dense relative density.

4.2.4 Topsoil, Former Topsoil

Topsoil was encountered from ground surface at borehole locations 15-29, 15-37, 16-108E, 16-110E and 16-111E. A layer of probable former topsoil was encountered below the fill material in borehole 15-28. The topsoil is generally composed of a dark brown silty clay or sandy silt with trace organic material. The topsoil/ former topsoil thickness typically ranges from about 130 to 760 millimetres.

4.2.5 Silty Clay

Native deposits of silty clay were encountered at twenty-eight (28) of the sixty-five (65) boreholes. The thickness of the silty clay typically ranges from about 0.2 to greater than 5.5 metres. It should be noted that boreholes were terminated within the silty clay layer at ten (10) locations (15-19, 15-25 to 32 inclusive, and 15-34).

At the majority of the borehole locations, the upper portion of the silty clay has been desiccated to form a weathered crust. The SPT N values recorded within the weathered crust generally range between 2 and 24 blows per 0.3 metres of penetration. Based on our local experience and our review of the soil samples, N values within the silty clay deposit which are greater than about 2 blows per 0.3 metres would be indicative of a stiff to very stiff consistency.

The silty clay below the weathered crust is grey to grey brown. The undrained shear strength was measured in boreholes 15-26, 15-27, 15-29, 15-31, 15-32, and 15-34. At these borehole locations the undrained shear strength ranges from 42 to 61 kilopascals, which corresponds to a firm to stiff consistency. The corresponding remolded values range from 6 to 13 kilopascals. The ratio of the undrained shear strength to the remolded shear strength indicates that the sensitivity of the grey silty clay deposit is medium to extra-sensitive.

Representative samples of the silty clay were tested for:

- Moisture content;
- Grain size distribution; and,
- Atterberg limits.

Three (3) grain size distribution tests were undertaken on selected samples of silty clay. The results are provided on Figure B3 (Appendix B) and summarized in Table 4.3.

Table 4.3: Summary of Grain Size Distribution Tests (Silty Clay)

Location	Sample Number	Sample Depth(metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH 15-25	3	1.5 – 2.1	0	1	32	67
BH 15-29	4	2.3 – 2.9	0	1	39	61

Four (4) Atterberg limits tests were undertaken on selected samples of the silty clay obtained. The results are provided on Figure B4 (Appendix B) and the Record of Borehole sheets and summarized in Table 4.4.

Table 4.4: Summary of Atterberg Limits and Moisture Content Tests

Location	Sample Number	Sample Depth (metres)	Moisture (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index(%)
BH 15-08	4	1.5 - 2.1	34.5	54.5	22.9	31.6
BH 15-15	3	0.8 - 1.4	25.9	50.1	24.3	25.9
BH 15-26	8	3.8 - 4.4	76.2	57.7	24.1	33.6
BH 15-29	6	4.6 – 5.2	76.7	56.2	26.6	29.7

The moisture contents of the silty clay within the weathered crust zone are below the liquid limit value (boreholes 15-08 sample 4 and 15-15 sample 3). In contrast, the moisture of contents of the grey silty clay are above the liquid limit value (borehole 15-26 Sample 8 and borehole 15-29 Sample 6).

The results of the Atterberg limit tests indicate that the cohesive soils at the site have a high plasticity.

4.2.6 Glacial Till

Native deposits glacial till were encountered at thirty-three (33) of the sixty-five (65) borehole locations. The thickness of the glacial till deposits range from about 0.1 to greater than 3.6

meters. The thicknesses of the glacial till deposits were estimated from the auger refusal depths. It should be noted that auger refusal could occur on boulders within the glacial till. Therefore, the thicknesses should be taken as approximate.

Glacial till is a heterogeneous mixture of all grain sizes. For this site, the glacial till composition is generally described as grey to grey brown silty sand with some clay and gravel, and likely containing varying amounts of cobbles and boulders.

The SPT N values recorded within the glacial till generally ranged between 2 and over 50 blows per 0.3 metres, averaging 32 blows. The highly variable test results likely represent the presence of cobbles and boulders within the glacial till.

Rotary diamond drilling was used to core through boulders at three (3) of the borehole locations (BH 15-12C, 15-16B and 15-21).

Four (4) grain size distribution tests were undertaken on samples of the glacial till obtained from boreholes 15-13, 15-16A, 15-54 and 15-105E. The results are provided on Figures B2 and B3 (Appendix B) and summarized in Table 4.5.

Table 4.5: Summary of Grain Size Distribution and Moisture Content Tests (Glacial Till)

Location	Sample Number	Sample Depth(metres)	Moisture (%)	Gravel (%)	Sand(%)	Silt & Clay (%)
BH 15-13	5	2.1 – 2.8	14.6	3	53	44*
BH 15-16A	4	2.9 – 3.5	10.7	9	54	37*
BH 15-54	7	4.6 – 5.2	8.2	14	54	31*
BH 15-105E	5	3.8 – 4.4	-	10	52	38

* Combined percentage of material passing the 0.075 mm sieve (silt and clay).

4.2.7 Soil Chemistry Relating to Corrosion

Soil corrosivity testing (pH, sulfate, resistivity, and conductivity) was completed on three (3) soil samples. The test results are provided in Appendix E and summarized in Table 4.6.

Table 4.6: Summary of Chemical Test Results

Location	pH	Sulphate Content (μg/g)	Resistivity (Ohm.m)	Conductivity (μS/cm)
BH 15-08	7.25	160	7.85	1270
BH 15-22	7.27	195	27.1	369
BH 15-35	7.90	19	70.5	142

4.2.8 Bedrock

Bedrock was cored and proven at seven (7) borehole locations across the site using HQ sized diamond coring equipment. The confirmed bedrock depths range from about 0.6 to 4.4 metres below surface grade (elevation 90.9 to 102.4 meters, geodetic datum). Auger refusal was encountered at depths ranging from 0.6 to 4.9 metres (elevation 78.8 to 103.3 meters, geodetic datum). It should be noted that auger refusal can also occur on cobbles and boulders found in glacial till.

The bedrock type encountered is generally grey limestone with shale seams.

The rock quality designation (RQD) ranges from 0 to 100 percent, averaging 57 percent. Therefore, the average bedrock quality may be described as fair.

Unconfined compressive strength tests were carried out on five (5) bedrock core samples. The compressive strength ranges from 39 to 194 MPa; therefore the bedrock strength classification is very strong on average.

The results are provided in Appendix C and summarized in Table 4.7.

Table 4.7: Summary of Compressive Strength Analysis (Bedrock)

Location	Sample Depth (metres)	Unconfined Compressive Strength(MPa)
BH 15-01	3.0 – 3.1	193.7
BH 15-20A	0.6 – 0.7	134.3
BH 15-47	3.1 – 3.4	145.4

Location	Sample Depth (metres)	Unconfined Compressive Strength(MPa)
BH 16-104E	1.2 – 1.3	38.7
BH 16-109E	1.5 – 1.7	111.4

Photos of the bedrock cores collected are presented in appended Figures D1 to D7 (Appendix D).

4.2.9 Groundwater Conditions

The groundwater conditions in the open boreholes were observed prior to backfilling. In addition, standpipe piezometers were installed in fifteen (15) of the boreholes from which stabilized groundwater measurements were taken.

A summary of the stabilized groundwater levels measured in the piezometers are presented in Table 4.8. Refer to the Record of Borehole sheets for estimated groundwater levels observed in the open boreholes shortly after drilling.

Table 4.8: Summary of Groundwater Levels in Piezometers

Location	Waterlevel Date	Well Screen Formation	Groundwater Depth Below Ground Surface (metres)	Geodetic Elevation (metres)
BH 15-01	Jan. 27, 2016	Bedrock	3.01	97.29
BH 15-02	Jan. 27, 2016	Fill/Sand	2.50	96.16
BH 15-18	Jan. 27, 2016	Silty Clay	3.24	95.56
BH 15-21	Jan. 27, 2016	Bedrock	2.08	96.95
BH 15-29	Jan. 27, 2016	Silty Clay	0.43	93.30
BH 15-32	Feb 05, 2016	Silty Clay	2.56	89.75
BH 15-47	Jan. 27, 2016	Bedrock	3.34	96.08
BH 15-56A	Jan 27, 2016	Fill/Glacial Till	3.21	75.58
BH 16-104E	Jan. 25, 2016	Bedrock	3.82	99.20
BH 15-105E	Jan. 25, 2016	Sand/Silty Clay	2.66	97.16

Location	Waterlevel Date	Well Screen Formation	Groundwater Depth Below Ground Surface (metres)	Geodetic Elevation (metres)
BH 16-106E	Jan. 25, 2016	Fill/Glacial Till	1.86	96.18
BH 16-108E	Jan. 25, 2016	Bedrock	2.63	90.72
BH 16-109E	Jan. 25, 2016	Bedrock	3.58	89.53
BH 16-110E	Jan. 25, 2016	Silty Clay /Glacial Till	4.15	79.20
BH 16-111E	Jan. 25, 2016	Glacial Till	3.33	79.72

It should be noted that the groundwater levels may be higher during wet periods of the year such as the early spring or following periods of precipitation.

5.0 ENVIRONMENTAL SCREENING

Seven (7) environmental boreholes / monitoring wells were drilled at three (3) locations where possible petroleum hydrocarbon (PHC) odours were noted during the geotechnical drilling. The three (3) locations are described below and are shown in the attached Figure 3 and 4.

Table 5.1: Summary of Environmental Borehole Locations

Location	Area of Potential Environmental Concern (APEC)[1]	Geotechnical Borehole	Environmental Borehole / Monitoring Well
Near intersection of Douglas St. and Kuhring Ave. (Figure 3)	APEC #2	BH15-2	BH16-104(B)E / BH16-105E / BH16-106E
Roadway north of building M-40 (Figure 4)	APEC #1	BH15-55	BH16-110E / BH16-111E
North end of building M-35, near entrance (Figure 4)	APEC #1	BH15-41	BH16-108E / BH16-109E

Notes: APEC as defined in Limited Supplemental Phase II ESA by Stantec, 2012

Originally only five (5) monitoring wells were planned; however, all seven (7) boreholes were equipped with 50 mm diameter PVC wells in order to supplement the lack of soil samples, which was due to thin soil cover at some locations.

5.1 Combustible Gas Measurements

Combustible vapour measurements were undertaken on the all soil samples collected at the seven (7) environmental borehole locations using an RKI Eagle Portable Multi-Gas Detector - Type 101. Generally the headspace vapours measured were less than 15 ppm, with the exception of samples from BH16-105E. The soil gas readings at this location were 90 ppm in sample SA-3B and 70 ppm in sample SA-4. Sample SA-3B was sent to an analytical laboratory for testing, as described below in Section 5.2.

5.2 Analytical Testing

Based on soil gas readings, select soil samples from each borehole were submitted to an analytical laboratory for testing. A groundwater sample was collected from each monitoring well and submitted for testing. The analytical testing results are presented in the following two (2) sections.

5.2.1 Soil

Seven (7) soil samples were sent to Agat Laboratories for analysis of benzene, toluene, ethylbenzene, xylenes and petroleum hydrocarbons (F1 to F4 Canada Wide Standards Method). The laboratory Certificate of Analyses are included in Appendix F. Only one (1) of the analyzed parameters was detected at concentrations above the laboratory reporting limits.

The analytical results are presented in appended Table G1 (Appendix G). The PHC F2 fraction in soil sample SA-3B from BH16-105 was 2600 mg/kg, which exceeds the CCME Canada Wide Standard (CWS) of 260 mg/kg - Tier 1 levels (commercial land use, non-potable groundwater, coarse-textured soil).

5.2.2 Groundwater

All monitoring wells were purged a minimum of three (3) times or until the well was dry prior to sampling. The wells were first checked for light non-aqueous phase liquid (LNAPL) using an oil/water interface probe. LNAPL was not detected at any of the well locations although a petroleum sheen was noted in the purge water from monitoring well BH16-105E

Seven (7) groundwater samples and two QA/QC samples (one field blank and one trip blank) were sent to Agat Laboratories for analysis of benzene, toluene, ethylbenzene, xylenes and petroleum hydrocarbons (F1 to F4 Canada Wide Standards Method). The laboratory Certificate of Analyses are included in Appendix F. The groundwater PHC analytical results are presented in the appended Table G2 (Appendix G).

Low levels of toluene were detected in two (2) of the groundwater samples collected from BH16-108E and BH16-111E; however, the concentrations did not exceed applicable guidelines. Benzene, toluene, ethylbenzene and xylene were not detected above the laboratory reporting limits in any of the other groundwater samples.

PHCs were detected in the groundwater samples collected from BH16-104E (110 ug/L - F3 fraction) and BH16-105E (9500 ug/L – F2 fraction). Only the sample from BH16-105E exceeded the applicable standard.

The possible extent of the PHC contaminated soil and groundwater in the area around BH16-105E is shown in the attached Figure 3.

6.0 RECOMMENDATIONS

6.1 General

The information in the following sections is provided for the guidance of the design engineers and is intended for the design of this project only. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety and equipment capabilities.

6.2 Background

Although specific project details were not known to HCEL during report preparation, it is our understanding that the project will consist of the following:

- About three (3) kilometres of new storm and sanitary sewers;
- Full roadway reconstruction in some areas;
- Roadway reinstatement within service trenches only in some areas; and,
- Two (2) stormwater management pond areas.

6.3 Excavation

6.3.1 Overburden Excavation

Assuming maximum service trench depths of about 3 to 4 metres, the overburden excavations will generally be carried out through the existing pavement structure, fill, native sand, silty clay and glacial till. It should be noted that boulders are to be expected within the glacial till layer.

The sides of the overburden excavations should be sloped in accordance with the requirements in Ontario Regulation 213/91 under the Occupational Health and Safety Act. According to the Act, the fill soils and native overburden soils can be classified as Type 3 soil and, accordingly, allowance should be made excavation slopes of 1 horizontal to 1 vertical extending upwards from the base of the excavation. As an alternative or where space constraints dictate, the

underground service installations could be carried out within a tightly fitting braced steel trench box, which is specifically designed for this purpose.

No unusual constraints are expected in excavating the overburden materials above the groundwater level. In contrast, excavation below the groundwater level could present some constraints, especially in the sandy soil zones (fill and native), which are prone to sloughing/flowing below the groundwater table. Therefore, flatter side slopes of 2 horizontal to 1 vertical or flatter may be required for excavation of the sandy soils below the groundwater table.

6.3.2 Bedrock Excavation

Possible bedrock, determined from auger refusal, was noted at thirty (30) of the sixty five (65) borehole locations. Bedrock was cored and proven at seven (7) of the boreholes locations. Possible bedrock and proven bedrock were observed a depths ranging from 0.6 to 4.9 metres below existing surface grade, averaging 2.5 metres. Therefore, bedrock excavation is anticipated along the proposed service trenches.

Bedrock was not encountered within the borehole depths (upper 5.2 metres) advanced within the proposed stormwater management pond areas at the north and southwest ends of the site (boreholes 15-29, 15-30 15-31, 15-32, 15-56A and 15-56B). Provided that the base of the ponds do not extend more than 5.2 metres below existing surface grade, bedrock excavation would not be expected.

Localized bedrock removal within the service trenches could be carried out using hoe ramming techniques in conjunction with line drilling on close centres. Provided that good bedrock excavation techniques are used, the bedrock could be excavated using near vertical side walls. Any loose rock should be scaled from the sides of the excavation.

The vibration effects of hoe ramming are usually minor and localized compared with blasting. Monitoring of the hoe ramming could be carried out to measure the vibrations to ensure that they are below acceptable threshold values

The bedrock could also be removed using blasting techniques. Any blasting should be carried out under the supervision of a blasting specialist engineer. As a guideline for blasting, the suggested peak vibration limits at the nearest structure or service are provided in Table 6.1.

Table 6.1 – Peak Vibration Limits

Frequency of Vibration (Hz)	Vibration Limits (millimetres/second)
<10	5
10 to 40	5 to 50 (interpolated)
>40	50

It is pointed out that these criteria, although conservative, were established to prevent damage to existing buildings and services in good condition; more stringent criteria may be required to prevent damage to freshly placed (uncured) concrete or vibration sensitive equipment or utilities. Monitoring of the blasting should be carried out to ensure that the blasting meets the limiting vibration criteria. Pre-construction condition surveys of nearby structures and existing buried services are considered essential. The effects due to vibration from blasting can be controlled by limiting the size and amount of charge, using delayed detonation techniques, and the like. To reduce the effects of vibration on nearby services, we suggest that the separation distance between any blasting and existing underground services be at least 3 metres. Any bedrock removal within these limits could be carried out using hoe ramming techniques in conjunction with line drilling on close centres.

Monitoring of the blasting and hoe ramming should be carried out to measure the vibrations to check that they are below the threshold values outlined in Table 6.1. It is noted that the vibration intensities required to cause damage to structures and services are much greater than the vibration intensities that can be felt by building occupants. Therefore, it is important that preconstruction surveys be carried out on nearby structures as a precautionary measure in the event of possible claims for damages due to the construction. Also, staff should be consulted regarding any vibration sensitive tests or equipment on site to ensure that the threshold values noted in Table 5.1 are appropriate.

6.4 Groundwater Pumping

Stabilized groundwater levels were measured at the fifteen (15) standpipe piezometer locations installed across the site. The stabilized groundwater levels ranged from 0.4 to 4.2 metres below surface grade (elevation 79.2 to 99.2 metres, geodetic datum).

Stabilized groundwater levels measured at each standpipe piezometer are summarized in Table 4.8.

Assuming that the service trench excavations will extend 3 to 4 metres below grade, some level of dewatering will be required for excavations extending below the groundwater table. The

anticipated rate of groundwater inflow into the excavations is expected to be relatively low within the silty clay and glacial till overburden since these soils have a low hydraulic conductivity. Conversely, the rate of groundwater inflow will be more substantial for excavations extending into the sandy fill, native sand and fractured bedrock below the groundwater table.

It should be noted that heavy localized groundwater seepage could be expected within the existing services trenches. This heavy groundwater flow would be temporary and could be handled by pumping from filtered sumps within the excavation.

A City of Ottawa Sewer Use permit is required in order to discharge the construction water to the sanitary sewer. Preliminary testing has been performed for benzene, toluene, ethylbenzene, xylenes, and petroleum hydrocarbons only. Groundwater pumped from the Site during the infrastructure work will need to be evaluated in accordance with City of Ottawa By-Law 2003-514 (Schedule A: Table 1 - Limits for Sanitary and Combined Sewers Discharge; and, Table 2 - Limits for Storm Sewer Discharge). Although the City of Ottawa does not have a discharge limit for petroleum hydrocarbons, we understand that a combined PHC value (sum of F1 to F4) of 500 ug/L has been used for other infrastructure projects. The applicability of the limit for this project should be confirmed. The PHC concentration at borehole location BH16-105E exceeds the 500 ug/L discharge limit.

Suitable detention and filtration will be required before discharging the water to any sewers. The contractor should be required to prepare and submit an excavation and groundwater management plan for review and approval as part of the contract.

As noted above service excavations are expected to extend into the groundwater table at some locations across the site. Depending on the final excavation depths and the quantity of open excavations expected during construction, the rate of groundwater inflow into the excavations could exceed 50,000 litres per day. Therefore, we suggest that a Permit to Take Water (PTTW) be obtained from the Ministry of the Environment and Climate Change (MOECC) in advance of the construction. Issuance of the permit by the MOECC usually takes 3 to 4 months.

6.5 Underground Utilities

6.5.1 Pipe Bedding

The bedding for the proposed service pipes should be in accordance with OPSD 802.010 and 802.031 for flexible and rigid pipes in Type 3 overburden excavations, respectively. The bedding for the proposed service pipes should be in accordance with OPSD 802.013 and OPSD 802.033 for flexible and rigid pipes in bedrock excavations, respectively. The pipe bedding material should consist of at least 150 millimetres of well graded crushed stone meeting OPSS for Granular A.

In areas where unsuitable material exists below the pipe subgrade level, or where the subgrade becomes disturbed, the unsuitable/disturbed material should be removed and replaced with a

subbedding layer of compacted granular material, such as that meeting OPSS Granular B Type II (50 or 100 millimetre minus crushed stone). To provide adequate support for the pipe in the long term in areas where subexcavation of material is required below design subgrade level, the excavations should be sized to allow a 1 horizontal to 2 vertical spread of granular material down and out from the bottom of the pipe.

Cover material, from pipe spring line to at least 300 millimetres above the top of the pipe, should consist of granular material, such as OPSS Granular A.

The use of clear crushed stone as bedding or subbedding material should not be permitted.

The subbedding, bedding and cover materials should be compacted in maximum 200 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value.

6.5.2 Trench Backfill

To reduce the potential for differential frost heaving between the area over the trench and the adjacent roadway, frost compatible borrow fill (i.e. on site borrow) should be used as backfill between the roadway subgrade level and the depth of seasonal frost penetration (i.e., 1.8 metres below finished grade). The backfill materials within the zone of frost penetration should match the materials exposed on the trench walls. Backfill below the zone of seasonal frost penetration could consist of either acceptable native material, on-site fill or imported granular material conforming to OPSS Granular B Type I.

To minimize future settlement of the backfill and achieve an acceptable subgrade for the roadways, curbs, etc., the trench backfill should be compacted in maximum 300 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value.

The native silty clay, silty sand and glacial till materials are sensitive to changes in moisture content and precipitation. Depending on the weather conditions encountered during the construction, the specified densities may not be possible to achieve, and, as a consequence, some settlement of these backfill materials could occur. Consideration could be given to implementing one or a combination of the following measures to reduce post construction settlement above the trench, depending on the weather conditions encountered during the construction:

- Allow the overburden materials to dry prior to compaction;
- Reuse any wet materials in the lower part of the trench and make provision to defer final paving of surface course (i.e., the Superpave 12.5 asphaltic concrete) for 3 months, or longer, to allow the trench backfill settlement to occur and thereby improve the final roadway appearance.

- Avoid reusing any wet materials within the trench. If additional material is required for trench backfill, consideration could be given to using relatively dry on-site material or imported fill, such as OPSS Select Subgrade Material or Granular B Type I, below the zone of frost penetration.

6.5.3 Seepage Barriers

The granular bedding in the service trench could act as a "French Drain", which could promote groundwater lowering. As such, we suggest that seepage barriers be installed along the service trenches at strategic locations at a horizontal spacing of about 100 metres. The seepage barriers should begin at subgrade level and extend vertically through the granular pipe bedding and granular surround to within the native backfill materials, and horizontally across the full width of the service trench excavation. The seepage barriers could consist of 1.5 metre wide dykes of compacted weathered silty clay. The weathered silty clay should be compacted in maximum 300 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value. The locations of the seepage barriers could be provided as the design progresses.

6.6 Stormwater Management Ponds

6.6.1 Excavation

The two (2) proposed stormwater management pond locations have been identified as the area to the north of the campus (boreholes 15-56A and 15-56B) and the area to the southwest of the campus (boreholes 15-29, 15-30 15-31 and 15-32). At the time of report preparation, the exact locations, sizes and elevations of the proposed stormwater management ponds had not been finalized.

The general overburden excavation recommendations outlined in Section 5.3.1 would be applicable for the stormwater management pond excavations. The main constraint for the excavation of the stormwater ponds (southwest) will be equipment mobility on the native silty clay deposits. These soils are susceptible to softening in the presence of heavy construction traffic. As such, excavation and removal of soil, including trimming to final grade, should be carried out from existing ground surface, if possible. It is suggested that temporary haul roadways constructed at or above the existing ground surface consist of a relatively thick layer of granular material (say 600 millimetres, or more) of Granular B Type II or well shattered and graded blast rock. A woven geotextile separator meeting OPSS 1860 Class II requirement is suggested.

Provided that excavation depths do not extend more than 5.2 metres below existing surface grade, bedrock excavation is not expected.

6.6.2 Long Term Side Slopes

We recommend that the stormwater management ponds be designed using permanent side slopes not steeper than 3 horizontal to 1 vertical. Although steeper side slopes could be used, it

has been our experience that 3 horizontal to 1 vertical slopes minimize the risks of localized sloughing due freeze thaw action and groundwater seepage. If steeper side slopes are required, we recommend that they be no steeper than 2 horizontal to 1 vertical and blanketed with a 300 millimetre thick layer (minimum) of rip-rap or Granular B Type II fill.

In our opinion, long term global slope instability for the proposed stormwater management ponds should not be an issue. Once the location, size and depth of the ponds are finalized, HCEL should verify the long term stability.

All exposed slopes should be protected from erosion using either a vegetated cover or a 300 millimetre thick granular blanket.

6.6.3 Berm Construction

Earth berms may be required around the perimeter of the proposed ponds. Permanent berm construction may be carried out on or in the vicinity of the crest of the slopes. Berms may be constructed using on-site borrow fill such as the native silty clay and glacial till overburden. The material shall be placed within 2 percent of its optimum moisture content and compacted to at least 95 percent of the maximum standard Proctor dry density.

Permanent berms should have final slopes of not steeper than 2 horizontal to 1 vertical. The slopes should be protected from erosion using a vegetated cover or a 300 millimetre thick granular blanket.

6.6.4 Short and Long Term Groundwater Inflow to the Proposed Pond

Excavation for the proposed stormwater management pond(s) will be carried out through deposits of silty clay, fill and glacial till. If the excavations extend below the groundwater table, groundwater flow should be expected into the ponds, both under short and long term conditions. It is our opinion that both short and long term groundwater inflow into the pond(s) will be relatively small due to the relatively low hydraulic conductivity of the native overburden soils (i.e. likely in the order of 1×10^{-6} to 1×10^{-8} cm/sec).

6.6.5 Permeability and Percolation Rate of Overburden Soils

For preliminary design purposes, the permeability and percolation time (T-Time) estimates outlined in Table 6.2 may be used for the stormwater management pond design. These values are estimates only based on our local experience and the results of the grain size distribution tests.

Table 6.2: Estimate of Permeability and Percolation Time

Soil Type	Coefficient of Permeability (cm/sec)	Percolation Time (min/cm)
Sandy Fill	10^{-3} - 10^{-5}	8 - 20
Silty Clay	10^{-8} and less	Greater than 50
Glacial Till	10^{-6} and less	Greater than 50

6.6.6 Buoyant Uplift of the Structures

To reduce the potential for surface and groundwater inflow into the related structures (i.e. manholes, inlet and outlet control structures, etc), the walls and bottom of the structures should be made water tight and buoyant uplift of the structures should be checked.

To account for possible stormwater runoff into the backfill material around the excavation, it is suggested that the maximum water level be used to assess uplift. Additional resistance to buoyant uplift could be achieved by extending the footings beyond the concrete structure and filling the void above the footing extension with compacted granular material. Assuming that OPSS Granular B Type II is used as backfill and that the backfill is compacted to at least 95 percent of the standard Proctor dry density value, the buoyant unit weight of the backfill could be taken as 11.5 kilonewtons per cubic metre. Additional details on buoyant uplift resistance could be provided if necessary.

6.7 Corrosion of Buried Concrete and Steel

The measured sulphate concentration in three (3) soil samples collected range from 19 to 195 micrograms per gram. According to Canadian Standards Association (CSA) “Concrete Materials and Methods of Concrete Construction”, the concentration of sulphate in the soil can be classified as low. For low exposure conditions, any concrete that will be in contact with the native soil or groundwater could be batched with General Use (GU) type cement.

The soil samples collected have resistivity values ranging from 785 to 7050 Ohm-centimetres and pH ranging from 7.3 to 7.9. Therefore, the soil can generally be classified as slightly aggressive to non-aggressive towards unprotected steel.

6.8 Roadways

It is understood that full width roadway reconstruction will be undertaken across much of the site following the installation of the storm and sanitary sewer services. In some areas, the pavement

structure will only be reinstated within the trench. We provide the following recommendations for full roadway reconstruction and trench reinstatement.

6.8.1 Subgrade Preparation

In preparation for the construction of the roadways, any loose/soft, wet, organic or deleterious materials should be removed from the proposed subgrade surface. Prior to placing granular fill the exposed subgrade should be proof rolled with a large (minimum 10 tonne) vibratory steel drum roller under dry conditions and inspected and approved by geotechnical personnel. Any soft areas that are evident from the proof rolling should be sub-excavated and replaced with suitable earth borrow.

In areas where abrupt changes in the frost susceptibility of the subgrade materials are encountered, frost tapers and/or some subexcavation of materials may be required to prevent future localized differential frost heaving of the pavement structure. The frost taper and subexcavation requirements should be assessed at the time of construction by geotechnical personnel.

The roadway subgrade surfaces should be made smooth and crowned or sloped prior to placing the granular materials to promote drainage of the roadway base and subbase materials.

6.8.2 Pavement Structure

The pavement structure was designed using the Ontario Ministry of Transportation (MTO) Pavement Design and Rehabilitation Manual (SDO-90-01). In the absence of traffic data, we provide the following preliminary pavement structure design section for an AADT of 1000 to 2000 with 10 percent trucks:

- 40 millimetre of Superpave 12.5
- 60 millimetres of Superpave 19.0
- 150 millimetre of OPSS Granular A
- 450 millimetres of OPSS Granular B Type II

The above pavement design conservatively assumes that the subgrade soils are silty clay containing more than 55 percent fines (i.e. percent passing the 0.075 millimetre sieve). If traffic data is available the above pavement structure design can be reviewed and adjusted accordingly.

The above pavement structure can be used for areas where full roadway reconstruction will be undertaken as well as the trench reinstatement areas.

6.8.3 Asphaltic Concrete

The asphaltic concrete should consist of a 40 millimetre surface layer of Superpave 12.5 (Traffic Level B) over one (1) 60 millimetre thick layer of Superpave 19.0 (Traffic Level B).

Performance grade PG 58-34 asphaltic concrete should be specified unless slow moving heavy traffic is anticipated.

6.8.4 Compaction Requirements

All imported granular materials should be placed in maximum 200 millimetre thick lifts and should be compacted to at least 98 percent of the standard Proctor dry density value using suitable vibratory compaction equipment.

6.8.5 Pavement Drainage

If possible, it is suggested that filter wrapped, perforated subdrains be installed at the catch basins in the roadways. The catch basins should be provided with 3 metre (minimum) long perforated stub drains which extend in at least two (2) directions from the catch basin at the pavement subgrade level.

6.8.6 Pavement Transitions

New pavements will abut the existing pavements along the service trench reinstatement areas and in areas where the full roadway reconstruction will terminate at an existing roadway. The following is suggested to improve the performance of the joint between the new and the existing pavements:

- Neatly saw cut the existing asphaltic concrete;
- Remove the asphaltic concrete and slope the bottom of the excavation within the existing granular base and subbase at 1 horizontal to 1 vertical, or flatter, to avoid undermining the existing asphaltic concrete.
- To avoid cracking of the asphaltic concrete due to an abrupt change in the thickness of the roadway granular materials where new pavement areas join with the existing pavements, the granular depths should taper up or down at 5 horizontal to 1 vertical, or flatter, to match the existing pavement structure.
- Remove (mill off) 50 millimetres of the existing asphaltic concrete to a distance of at least 300 millimetres at the joint and tack coat the asphaltic concrete at the joint in accordance with the requirements in OPSS 310.

6.8.7 Pavement Resurfacing

In the event that a new layer of asphaltic concrete is placed across the entire roadway width for the trench reinstatement areas we provide the following recommendations:

- The overlay should consist of at least 40 millimetres of Superpave 12.5 (Traffic Level B) asphaltic concrete; and

- Milling should be carried out, where required, and a tack coat should be applied before placing the overlay.

The design life of the overlay alternative is expected to be 5 to 10 years. Reflective cracking of the asphaltic concrete should be expected within 1 to 2 years after construction. Crack sealing will be required periodically following resurfacing to reduce deterioration of the pavement due to the ingress of water.

6.8.8 Reuse of Existing Granular Material

Consideration could be given to stockpiling the existing granular base/subbase material for possible re-use following the sewer construction. The material should be stockpiled and assessed by geotechnical personnel to determine a suitable use (e.g. trench backfill, earth borrow, or possibly base/subbase material as part of the new pavement structure).

6.8.9 Effects of Existing Service Trenches

Differential frost heaving could occur in areas where abrupt changes in the frost susceptibility of the subgrade materials exist. The locations of any service trenches that cause differential frost heaving issues during the winter period should be identified at the design stage. To mitigate future differential frost heaving at these locations, granular frost tapers (sloped at 5 horizontal to 1 vertical, or flatter) and/or some subexcavation of materials could be carried out as part of the rehabilitation. The frost heave treatment could be assessed at the time of the construction by geotechnical personnel.

6.8.10 Effects of Soil Disturbance and Construction Traffic

The pavement structure guidelines above assume that the trench backfill is adequately compacted, and prepared as described in this report. If the subgrade surface becomes disturbed or wetted due to construction operations or precipitation, the Granular B Type II thickness given above may not be adequate and it may be necessary to increase the thickness of the Granular B Type II subbase. The adequacy of the design pavement thickness should be assessed by geotechnical personnel at the time of construction.

If the granular pavement materials above the trenches are to be used by construction traffic, it may be necessary to increase the thickness of the Granular B Type II, install a woven geotextile separator between the subgrade surface and the granular material, or a combination, to prevent pumping and disturbance to the subbase material. The contractor should be made responsible for their construction access.

7.0 ADDITIONAL DESIGN CONSIDERATIONS

7.1 Excess Soil Management Plan

The petroleum hydrocarbon contaminated soil around borehole BH16-105E can be excavated and remediated (biopile, land farming, etc.,) at a suitable location of on the property or transported offsite for disposal as waste in accordance with Ontario Regulation 347.

This report does not constitute an excess soil management plan. The disposal requirements for excess soil from the site have not been assessed.

7.2 Monitoring Well Abandonment

All fifteen (15) monitoring wells (standpipe piezometers) installed as part of this investigation should be decommissioned by a licensed well technician. The well abandonment could be carried out in advance of, or during the construction.

7.3 Winter Construction

In order to carry out the work during freezing temperatures and maintain adequate performance of the trench backfill as a roadway subgrade, the service trenches should be opened for as short a time as practicable and the excavations should be carried out only in lengths which allow all of the construction operations, including backfilling, to be fully completed in one working day. The materials on the sides of the trenches should not be allowed to freeze. In addition, the backfill should be excavated, stored and replaced without being disturbed by frost or contaminated by snow or ice.

7.4 Design Review and Construction Observations

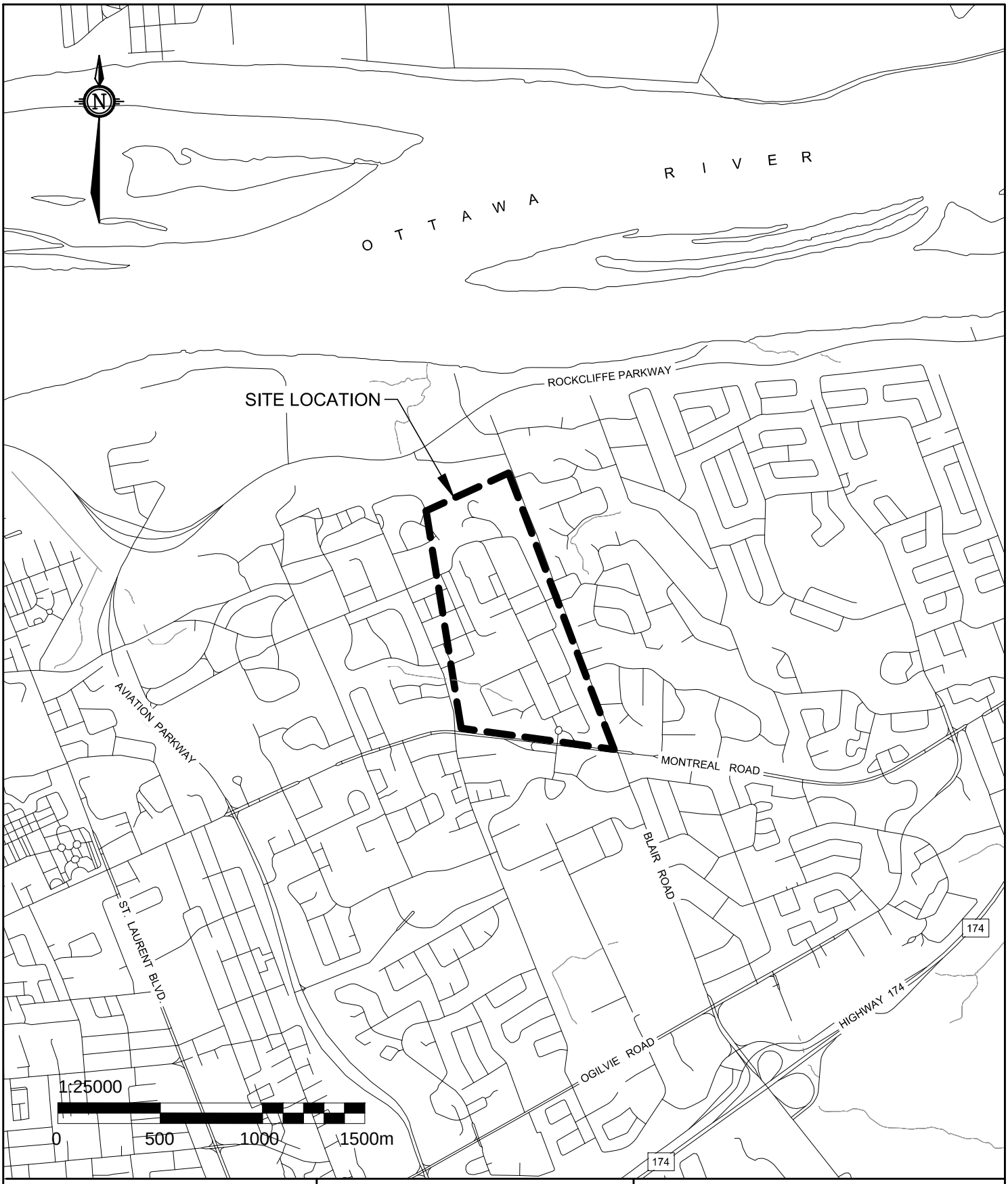
The details for the proposed service upgrades and stormwater management ponds were not available to us at the time of report preparation. It is recommended that the design drawings be reviewed by the geotechnical engineer as the design progresses to ensure that the guidelines provided in this report have been interpreted as intended.

The subgrade surfaces for the proposed services and roadways should be inspected by experienced geotechnical personnel to ensure that suitable materials have been reached and properly prepared. The placing and compaction of earth fill and imported granular materials should be inspected to ensure that the materials used conform to the grading and compaction specifications.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, contact the undersigned.

Serge Bourque, M.Eng., P.Eng.,
Principal, Operations Manager

Brent Wiebe, P.Eng.,
Senior Geotechnical Engineer



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Project	Drawing
GEOTECHNICAL INVESTIGATION PROPOSED SANITARY & STORM SEWER MONTREAL ROAD CAMPUS OTTAWA, ONTARIO	KEY PLAN

Drwn By	Chkd By	Date	Project No.	Revision No.	
P.C.	S.B.	MARCH 2016	62739.10	0	**FIGURE 1**

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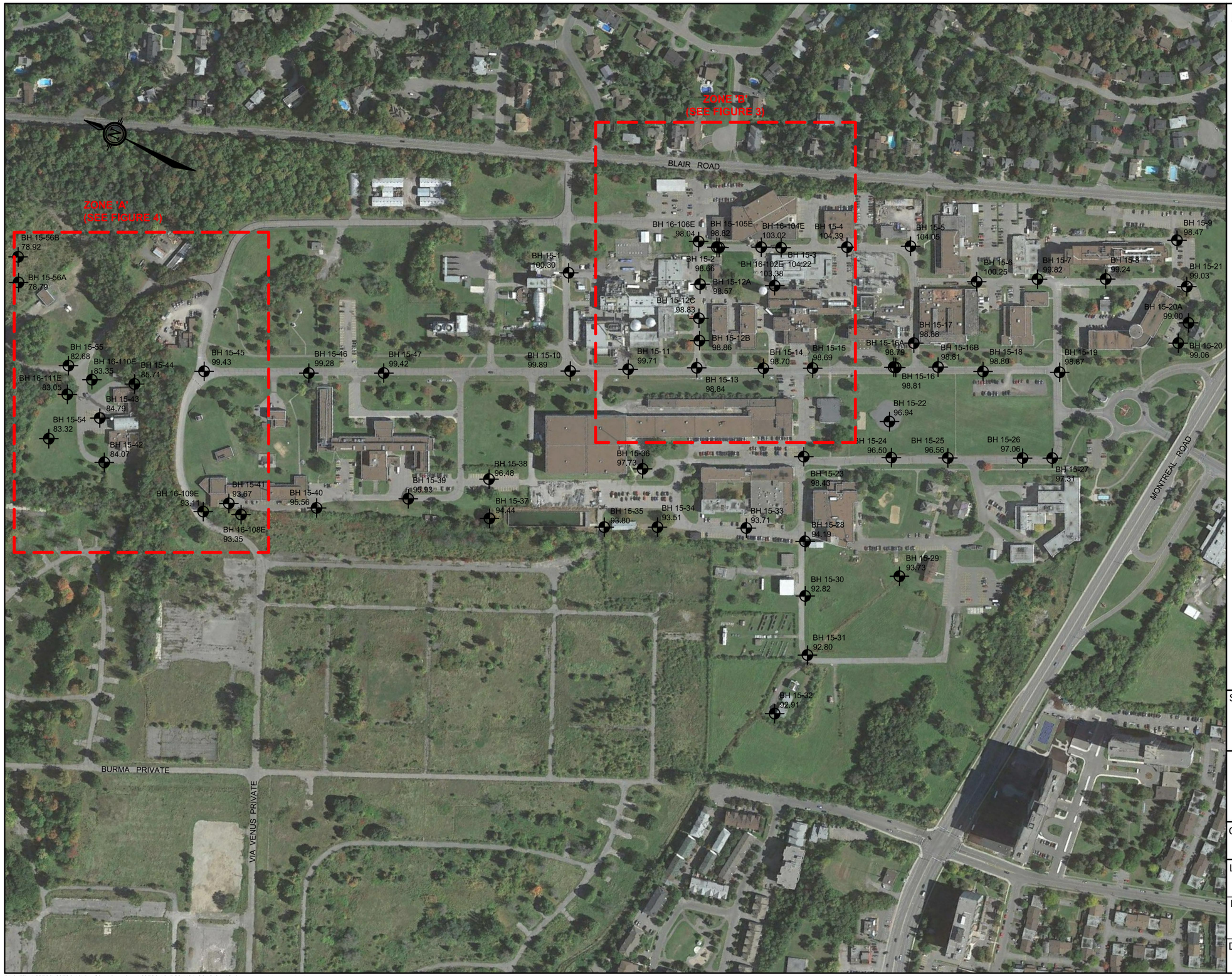

LEGEND

BH 15-1
99.99

BOREHOLE LOCATION IN PLAN
(current investigation by Houle Chevrier Engineering Ltd.)

GROUND SURFACE ELEVATION IN METRES
GEODETIC DATUM

Scale 1:4000

0 80 160 240m

Houle Chevrier Engineering

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Client: NATIONAL RESEARCH COUNCIL CANADA		Project: 62739.10
Location: MONTREAL ROAD CAMPUS OTTAWA, ON		
Drwn by: P.C.	Chkd by: S.B.	BOREHOLE LOCATION PLAN
Date: MARCH 2016	Rev.: 0	**FIGURE 2**

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Project	Drawing
GEOTECHNICAL INVESTIGATION MONTREAL ROAD CAMPUS OTTAWA, ONTARIO	DETAILED SITE PLAN ZONE 'B'

Drwn By	Chkd By	Date	Project No.	Revision No.	
P.C.	S.B.	MARCH 2016	62739.10	0	**FIGURE 3**

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Project	Drawing
GEOTECHNICAL INVESTIGATION MONTREAL ROAD CAMPUS OTTAWA, ONTARIO	DETAILED SITE PLAN ZONE 'A'

Drwn By	Chkd By	Date	Project No.	Revision No.	
P.C.	S.B.	MARCH 2016	62739.10	0	**FIGURE 4**

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APPENDIX A

Record of Borehole Sheets

LIST OF ABBREVIATIONS AND TERMINOLOGY

SAMPLE TYPES

AS auger sample
CS chunk sample
DO drive open
MS manual sample
RC rock core
ST slotted tube
TO thin-walled open Shelby tube
TP thin-walled piston Shelby tube
WS wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance, N

The number of blows by a 63.5 kg hammer dropped 760 millimetres required to drive a 50 mm drive open sampler for a distance of 300 mm. For split spoon samples where less than 300 mm of penetration was achieved, the number of blows is reported over the sampler penetration in mm.

Dynamic Penetration Resistance

The number of blows by a 63.5 kg hammer dropped 760 mm to drive a 50 mm diameter, 60° cone attached to 'A' size drill rods for a distance of 300 mm.

WH

Sampler advanced by static weight of hammer and drill rods.

WR

Sampler advanced by static weight of drill rods.

PH

Sampler advanced by hydraulic pressure from drill rig.

PM

Sampler advanced by manual pressure.

SOIL TESTS

C consolidation test
H hydrometer analysis
M sieve analysis
MH sieve and hydrometer analysis
U unconfined compression test
Q undrained triaxial test
V field vane, undisturbed and remoulded shear strength

SOIL DESCRIPTIONS

Relative Density	'N' Value
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Consistency	Undrained Shear Strength (kPa)
Very soft	0 to 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very Stiff	over 100

LIST OF COMMON SYMBOLS

c_u undrained shear strength
e void ratio
C_c compression index
c_v coefficient of consolidation
k coefficient of permeability
I_p plasticity index
n porosity
u pore pressure
w moisture content
w_L liquid limit
w_P plastic limit
ϕ^1 effective angle of friction
γ unit weight of soil
γ^1 unit weight of submerged soil
σ normal stress

PROJECT: 62739.10

RECORD OF BOREHOLE 15-01

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 30, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - +, rem. V - ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp ⊖ W ⊖ Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		100.30									
	Power Auger, 200mm Diameter Hollow Stem	Asphaltic Concrete		100.13									
		Brown sand and grave,l trace silt (BASE/SUBBASE)		0.17	1	C.S.							
				0.28									
		Loose, brown fine to medium sand, trace to some gravel, trace silt (Possible FILL)			2	C.S.							
1					3	50 D.O.	8						
				98.93									
		Possible WEATHERED BEDROCK		1.37									
2				98.17									
	HQ Rotary Drilling	Grey LIMESTONE BEDROCK with shale seams		2.13	4	R.C.	TCR = 99% SCR =34% RQD = 0%					U.C.S. 193.7 MPa	51 mm Diameter, 1.52 metres long well screen.
3					5	R.C.	TCR = 100% SCR =81% RQD = 71%						
4				96.08									
		End of borehole		4.22									
5													
6													
7													
8													
9													
10													

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/27	3.01 ∇	97.29

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-02

SHEET 1 OF 1

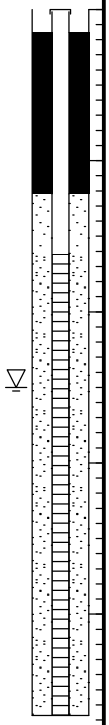
LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 25, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - + Q - ●; rem. V - ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.66									
		Asphaltic Concrete		98.46									
		Grey brown crushed sandy gravel, trace silt (BASE/SUBBASE)		0.20	1	C.S.					○		
				97.75									
1		Compact, brown fine to medium sand, trace silt, steel pieces (FILL)		0.91	2	50 D.0.	23						
					3	50 D.0.	15						
2		Loose, brown fine to medium SAND, trace silt		96.70 1.96									
					4	50 D.0.	4						
		Dense, grey fine to medium SAND, trace silt, strong hydrocarbon odour noted		95.94 2.72									
3					5	50 D.0.	47						
		Loose, grey fine to coarse SAND, some gravel		94.85 3.81	6	50 D.0.	5						
4		Grey silty clay trace sand, some gravel (GLACIAL TILL)		94.09 4.57	7	50 D.0.	50 for 75mm						
		Auger refusal, end of borehole		4.67									
5													
6													
7													
8													
9													
10													



GROUNDWATER OBSERVATIONS		
DATE	DEPTH (m)	ELEV. (m)
16/01/27	2.50 ∇	96.16

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-03

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 23, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		104.22									
		Asphaltic Concrete		104.09									Cold Patch
		Crushed sand and gravel (BASE/SUBBASE)		0.13	1	C.S.							
				103.84									
		Compact, brown fine to medium sand, trace to some gravel, trace silt (Possible FILL)		0.38	2	C.S.							
1					3	50 D.O.	19						Backfilled with soil cuttings
				102.52	4	50 D.O.	50 for 75mm						
		Auger refusal, end of borehole		1.70									
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-04

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 23, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		104.39					Cold Patch
		Asphaltic concrete		104.25 / 0.14					
		Crushed sand and gravel (BASE/SUBBASE)		103.98 / 0.41	1	C.S.			
					2	C.S.			
1		Dense, dark brown sand and gravel (FILL)			3	50 D.O.	33		Backfilled with soil cuttings
2					4	50 D.O.	45		
					5	50 D.O.	50 for 75mm		
		Auger refusal, end of borehole		101.75 / 2.64					
3									
4									
5									
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-05

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 23, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - +, rem. V - ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		104.05									
		Asphaltic concrete		103.92 / 0.13									Cold patch
		Black, crushed sand and gravel (BASE/SUBBASE)		103.69 / 0.36	1	C.S.							
		Dark brown silty clay, some gravel and cobbles (FILL)		103.31 / 0.74	2	C.S.							Backfilled with soil cuttings
1		Auger refusal, end of borehole											
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-06

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 23, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		100.25					Cold patch
		Asphaltic concrete		0.08	1	C.S.			
		Crushed sand and gravel (BASE/SUBBASE)		99.49 / 0.76	2	C.S.			
1		Compact, grey sand and gravel (FILL)			3	50 D.O.	10		Backfilled with soil cuttings
				98.37 / 1.88	4	50 D.O.	34		
2		Very dense, grey brown silty sand, some gravel, possible cobbles (GLACIAL TILL)			5	50 D.O.	60		
3		Auger refusal, end of borehole		97.25 / 3.00					
4									
5									
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ● ; rem. V - ⊕ U - ○ : 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI : 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-07

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 23, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		99.82									
		Overburden conditions not logged											Backfilled with soil cuttings
1													
2													
3													
4				95.50									
		Auger refusal, end of probehole		4.32									
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-08

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: December 1, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		99.24					Cold patch
		Asphaltic concrete		0.08	1	C.S.			
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)		0.28	2	C.S.			
		Former asphaltic concrete							
		Grey crushed sand and gravel (FORMER BASE/SUBBASE)		98.45 / 0.79					
1		Compact, brown, fine to medium sand, some silt, trace gravel (FILL)		98.07 / 1.17	3	50 D.O.	11		Backfilled with soil cuttings
		Very stiff, grey brown SILTY CLAY (Weathered Crust)			4	50 D.O.	24	See Fig B4	
2					5	50 D.O.	13		
3					6	50 D.O.	10		
4				95.13 / 4.11	7	50 D.O.	4		
		Stiff, grey SILTY CLAY with silty sand seams, trace gravel		94.67 / 4.57					
		Grey SILTY CLAY, trace gravel			8	50 D.O.	3		
5		End of Borehole		94.06 / 5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp W Wl; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-09

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 23, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊢—○ W —⊣ Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.47							
		Asphaltic concrete		0.08	1	C.S.					Cold patch
		Possible old asphaltic concrete		0.18	2	C.S.					
		Brown crushed sand and gravel (BASE/SUBBASE)		97.68	3	C.S.					
1		Compact, brown fine to medium SAND, trace silt		0.79 / 97.17	4	50 D.O.	23				Backfilled with soil cuttings
		Very stiff, grey SILTY CLAY		1.30							
2					5	50 D.O.	16				
					6	50 D.O.	15				
3				95.09	7	50 D.O.	23				
		Grey brown silty sand, some gravel, cobbles, possible boulders (GLACIAL TILL)		3.38 / 94.66							
4		Possible WEATHERED BEDROCK		3.81 / 94.33							
		Auger refusal, end of borehole		4.14							
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-10

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 25, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		99.89					Cold patch
		Asphaltic concrete		99.70					
		Crushed sand and gravel, trace silt, black coated (BASE/SUBBASE)		0.19 / 99.48	1				
		Loose, brown sandy silt trace clay some gravel, cobbles and boulders (FILL)		0.41	2	59 D.O.	9		Backfilled with soil cuttings
1				98.21					
		Very dense, grey brown silty sand/sandy silt, some gravel (GLACIAL TILL)		1.68	3	59 D.O.	20		
2					4	59 D.O.	50 for 100mm		
				96.99					
3		Auger refusal, end of borehole		2.90					
4									
5									
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-11

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 24, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		99.71									
		Asphaltic concrete		0.10	1	C.S.							Cold patch
		Grey to black crushed sand and gravel (BASE/SUBBASE)		99.00	2	C.S.							
1		Loose, brown, fine to medium SAND, trace to some silt (Possible FILL)		0.71	3	50 D.O.	5						Backfilled with soil cuttings
2		Very stiff, grey brown SILTY CLAY, trace sand		97.93 / 1.78	4	50 D.O.	8						
		Very dense, grey brown sandy silt, some gravel, trace clay (GLACIAL TILL)		1.93	5	50 D.O.	50 for 0mm						
3		Auger refusal, end of borehole		96.76 / 2.95									
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-12

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 24, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.81									Backfilled with soil cuttings
		Overburden conditions not logged											
1		Auger refusal, end of probehole		97.79 / 1.02									
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-12 A

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 5, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface							
		Asphaltic concrete		0.13					Cold patch
		Crushed sand and gravel (BASE/SUBBASE)			1	G.S.			
1					2	50 D.O.	13		Backfilled with soil cuttings
		Compact, brown fine to medium SILTY SAND		1.22					
2					3	50 D.O.	15		
		Very stiff, grey SILTY CLAY, some seashells		2.29	4	50 D.O.	11		
3		Very stiff, grey SILTY CLAY		3.05	5	50 D.O.	6		
		Grey silty sand and gravel, probable cobbles and boulders (GLACIAL TILL)		3.66					
4		Borehole terminated due to broken components on drill.		3.73					
5									
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-12 B

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: January 7, 2016

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - + Q - ●; rem. V - ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.86									
		Asphaltic concrete		98.73									Cold patch
		Crushed sand and gravel (BASE/SUBBASE)		0.13	1	G.S.							
				98.10 / 0.76									
1		Compact to dense, dark grey sand and gravel, with some cobbles (FILL MATERIAL)			2	50 D.O.	39						Backfilled with soil cuttings
					3	50 D.O.	10						
2				96.57 / 2.29									
		Loose to compact, brown silty fine to medium sand, trace clay and gravel, with probable cobbles and boulders (GLACIAL TILL)			4	50 D.O.	7						
3					5	50 D.O.	14						
		Wet											
4					6	50 D.O.	>50 for 100 mm						
					7	50 D.O.	>50 for 25 mm						
		Auger refusal, end of borehole		94.13 / 4.73									
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-12 C

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 7-8, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200 mm Diameter Hollow Stem	Ground Surface		98.83					Cold patch
		Asphaltic concrete		0.05					
1		Crushed sand and gravel (BASE/SUBBASE)		97.43					Backfilled with soil cuttings
		Very loose, dark brown silty sand (Probable FILL)		1.40	1	50 D.O.	4		
2				96.54					
		Dense, brown silty sand, some gravel, trace clay, probable cobbles and boulders (GLACIAL TILL)		2.29	2	50 D.O.	44		
3					3	50 D.O.	39		
	HQ Rotary Drilling	Boulders		95.30 / 3.53	4	R.C.			
4					5	50 D.O.	51		
					6	50 D.O.	>50 for 100 mm		
5					7	50 D.O.	17		
		End of borehole		93.66 / 5.17					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-13

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 24, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.84							Cold patch
		Asphaltic concrete		98.71							
		Grey to black crushed sand and gravel, trace silt, (BASE/SUBBASE)		0.13	1	C.S.					
					2	C.S.					
1					3	50 D.O.	14				Backfilled with soil cuttings
		Pieces of brown silty clay and brown fine to medium sand, some crushed stone (FILL)		97.62 / 1.22							
		Brown fine to medium SAND, trace to some silt		97.09 / 1.75	4	50 D.O.	6		○		
2		Very dense, grey brown silty sand/sandy silt, trace to some gravel, possible cobbles and boulders (GLACIAL TILL)		96.50 / 2.34	5	50 D.O.	14		○		
3					6	50 D.O.	65				
4					7	50 D.O.	50 for 125mm				
		Auger refusal, end of borehole		94.60 / 4.24							
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-14

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 24, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.70							
		Asphaltic Concrete		98.56 / 0.14	1	C.S.					Cold patch
		Crushed sand and gravel, trace silt and cobbles (BASE/SUBBASE)		97.94 / 0.76	2	A.S.					
1		Very dense, grey brown silty sand/sandy silt, some gravel, cobbles (GLACIAL TILL)			3	50 D.O.					Backfilled with soil cuttings
2				96.46 / 2.24	4	50 D.O.					
		Auger refusal, end of borehole									
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-15

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 24, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.69					Cold patch
		Asphaltic Concrete		0.10	1	C.S.			
		Black to grey crushed sand and gravel, trace silt (BASE/SUBBASE)		97.95	2	C.S.			
1		Very stiff, grey brown SILTY CLAY (Weathered Crust)		0.74	3	50 D.O.	15	See Fig B4	Backfilled with soil cuttings
2		Loose to compact, grey brown silty sand, some gravel, (GLACIAL TILL)		97.09 1.60	4	50 D.O.	20		
					5	50 D.O.	22		
3					6	50 D.O.	26		
4					7	50 D.O.	7		
5					8	50 D.O.	5		
		End of Borehole		93.51 5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ● rem. V - ⊕ U - ○ (20 40 60 80)

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W ⊢ Wl (20 40 60 80)

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-16

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 24, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.81									
		Asphaltic Concrete		98.66									Cold patch
		Crushed sand and gravel, trace silt (BASE/SUBBASE)		0.15	1	C.S.							
					2	C.S.							
				98.10									
		Possible WEATHERED BEDROCK		0.71	3	50 D.O.	50 for 75 mm						
1		Auger refusal, end of borehole		97.77 / 1.04									Backfilled with soil cuttings
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-16 A

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 7, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200 mm Diameter Hollow Stem	Ground Surface		98.79					Cold patch
		Asphaltic concrete		98.66 / 0.13					
		Concrete		98.13 / 0.66					
		Grey sand and gravel (BASE/SUBBASE)		97.93 / 0.86					
1		Compact, brown sand, some gravel, trace silt (possible FILL)			1	50 D.O.	13		Backfilled with soil cuttings
					2	50 D.O.	17		
2				96.35 / 2.44					
		Compact, brown to grey silty sand, some gravel , trace clay, probable cobbles and boulders (GLACIAL TILL)			3	50 D.O.	16		
3					4	50 D.O.	11		
4					5	50 D.O.	25		
5				93.61 / 5.18	6	50 D.O.	22		
		End of borehole							
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-16 B

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: January 6, 2016

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - + Q - ●; rem. V - ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		98.81									
		Asphaltic concrete		98.68									Cold patch
		Dark grey sand and gravel (BASE/SUBBASE)		0.13									
				98.30									
		Very stiff, brown SILTY CLAY		0.51									
1	Power Auger, 200 mm Diameter Hollow Stem				1	50 D.O.	19						Backfilled with soil cuttings
				97.29									
		Compact, brown to grey silty sand, trace clay and gravel, probable cobbles and boulders (GLACIAL TILL)		1.52	2	50 D.O.	19						
2													
					3	50 D.O.	19						
3					4	50 D.O.	20						
		Wet		3.74									Groundwater observed at depth of 3.74 metres in open borehole
4					5	50 D.O.	>50 for 50 mm						
				94.51									
	HQ Rotary Drilling	Boulder		4.30	6	R.C.							
5													
				93.63									
		End of borehole		5.18									
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

PROJECT: 62739.10

RECORD OF BOREHOLE 15-17

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 25, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.88					Cold patch
		Asphaltic concrete		0.08	1	C.S.			
		Grey crushed sand and gravel trace silt (BASE/SUBBASE)		0.23					
		Very stiff, grey brown SILTY CLAY (Weathered Crust)							
1					2	50 D.O.	12		Backfilled with soil cuttings
				97.03	3	50 D.O.	16		
2		Very loose to compact, grey brown silty sand, trace clay, some gravel, probable cobbles and boulders (GLACIAL TILL)		1.85					
					4	50 D.O.	14		
3					5	50 D.O.	9		
4					6	50 D.O.	2		
				93.95	7	50 D.O.	50 for 150 mm		
5		Auger refusal, end of borehole		4.93					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp W Wl; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-18

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 24, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		98.80				
		Asphaltic concrete		98.52				
		Brown sand and gravel, trace silt (BASE/SUBBASE)		0.28	1	C.S.		
				0.46				
1		Compact, brown silty sand, some gravel, cobbles and boulders (FILL)			2	50 D.O.	23	
				97.15				
		Very stiff, grey brown SILTY CLAY (Weathered Crust)		1.65	3	50 D.O.	19	
2					4	50 D.O.	16	
3					5	50 D.O.	16	
4					6	50 D.O.	5	
				94.23				
		Loose, grey silty sand, trace gravel (GLACIAL TILL)		4.57	7	50 D.O.	9	
5				93.62				
		End of borehole		5.18				
6								
7								
8								
9								
10								

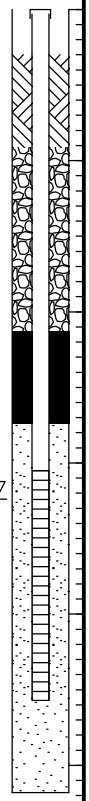
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

PIEZOMETER OR STANDPIPE INSTALLATION



51 mm Diameter, 1.52 metres long well screen.

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/27	3.24 ▽	95.56

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-19

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 1, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp 20 — W 40 60 — Wl 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		98.87									Cold patch
		Asphaltic concrete		0.10									
		Crushed sand and gravel, trace silt (BASE/SUBBASE)		98.11	1	C.S.							
1		Boulder (FILL)		0.76 / 97.55	2	50 D.O.	50 for 75 mm						Backfilled with soil cuttings
		Very stiff, grey brown SILTY CLAY (Weathered Crust)		1.32	3	50 D.O.	13						
2					4	50 D.O.	16						
3					5	50 D.O.	13						
4					6	50 D.O.	9						
5		Stiff, grey SILTY CLAY		93.99 / 4.88	7	50 D.O.	4						
		End of borehole		93.69 / 5.18									
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-20

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 23, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		99.06									
		Asphaltic concrete		0.05	1	C.S.							Cold patch
		Crushed sand and gravel, trace silt (BASE/SUBBASE)		98.76 / 0.30									Backfilled with soil cuttings
		Grey LIMESTONE BEDROCK		98.48									
		Auger refusal, end of borehole		0.58									
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-20 A

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 6, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, Hollow Stem	Ground Surface											
		Asphaltic concrete		0.05									Cold patch
		Crushed sand and gravel, trace silt (BASE/SUBBASE)			1	50 D.O.	>50 for 125 mm						
	HQ Rotary Drilling 200 mm Diameter	Grey LIMESTONE BEDROCK with shale seams		0.58									
1					2	R.C.	TCR = 94%, SCR =33 %, RQD = 27%					U.C.S. 134.3 MPa	Backfilled with soil cuttings
2					3	R.C.	TCR = 100%, SCR = 40%, RQD = 60%						
3		End of borehole		3.18									
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

PROJECT: 62739.10

RECORD OF BOREHOLE 15-21

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 23, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊖ W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		99.03							
	Power Auger 200mm Diameter Hollow Stem	Ashpaltic concrete		0.10							
		Dark brown crushed sand and gravel, trace silt (BASE/SUBBASE)		98.24	1	C.S.					
1		Grey brown silty clay, some gravel, trace sand (FILL)		0.79 97.81	2	50 D.O.	50 for 0 mm				
	HQ Rotary Drilling	Boulder (GLACIAL TILL)		1.22	3	R.C.	TCR = 46% SCR = 18% RQD = NA				
2											
3					4	R.C.	TCR = 11% SCR = 0% RQD = NA				
4					5	R.C.	TCR = 25% SCR = 13% RQD = NA				
		Grey LIMESTONE BEDROCK with shale seams		94.64 4.39							
5					6	R.C.	TCR = 100% SCR = 56% RQD = 44%				51 mm Diameter, 1.52 metres long well screen.
6					7	R.C.	TCR = 95% SCR = 81% RQD = 35%				
		Auger refusal, end of borehole		92.53 6.50							
7											
8											
9											
10											

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/27	2.08 ▽	96.95

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-22

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 26, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		96.94					
		Crushed sand and gravel (BASE/SUBBASE)		0.10 / 96.64					
		Brown fine to medium SAND, trace to some silt		0.30	1	50 D.O.	15		
1		Very stiff, grey brown SILTY CLAY (Weathered Crust)			2	50 D.O.	15		Backfilled with soil cuttings
					3	50 D.O.	10		
2				94.81					
		Grey brown silty clay, some sand, trace gravel (GLACIAL TILL)		2.13 / 2.24					
		Auger refusal, end of borehole							
3									
4									
5									
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊢—○ W —⊣ Wl; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-23

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 1, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		98.43					Cold patch
		Asphaltic concrete		0.03					
		Possible former asphaltic concrete		98.18 / 0.25	1	C.S.			
		Crushed sand and gravel (BASE/SUBBASE)			2	C.S.			
1		Grey brown silty clay (Possible FILL)		97.39 / 1.04	3	50 D.O.	8		Backfilled with soil cuttings
		Very stiff, grey brown silt and clay (WEATHERED CRUST)		96.70 / 1.73	4	50 D.O.	33		
2		Compact, grey brown silty sand, trace clay, some gravel (GLACIAL TILL)		95.97 / 2.46	5	50 D.O.	17		
3					6	50 D.O.	25		
4									
5					7	50 D.O.	19		
		End of borehole		93.25 / 5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ● rem. V - ⊕ U - ○ (20 40 60 80)

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI (20 40 60 80)

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-24

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 30, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		96.50					Cold patch
		Asphaltic concrete		0.08	1	C.S.			
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)			2	A.S.			
				95.69					
1		Dark grey silty clay, some gravel and organic material (FILL)		0.81					
				0.91	3	50 D.O.	11		Backfilled with soil cuttings
		Very stiff, grey brown SILTY CLAY (Weathered Crust)							
2					4	50 D.O.	12		
					5	50 D.O.	6		
3					6	50 D.O.	4		
				92.69					
4		Very loose, grey sandy SILT, some shells		3.81	7	50 D.O.	2		
				91.62	8	50 D.O.	7		
5		Grey sandy silty clay, some gravel (GLACIAL TILL)		4.88					
				91.32					
		End of borehole		5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-25

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 25, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		96.56					Cold patch
		Asphaltic concrete		0.10					
		Crushed sand and gravel, trace silt (BASE/SUBBASE)		96.10	1	C.S.			
		Very stiff, grey brown SILTY CLAY (Weathered Crust)		0.46					
1					2	50 D.O.	13		Backfilled with soil cuttings
2					3	50 D.O.	10		
					4	50 D.O.	7		
3					5	50 D.O.	3		
				92.75					
4		Stiff to firm, grey SILTY CLAY		3.81	6	50 D.O.	2		
5					7	50 D.O.	1		
				91.38					
		End of borehole		5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-26

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 2, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		97.06					Cold patch
		Asphaltic concrete		0.10					
		Grey brown sand and gravel (BASE/SUBBASE)		96.68	1	C.S.			
				0.38	2	C.S.			
		Dark grey silty clay, trace gravel (FILL)		96.09	3	C.S.			
1	Power Auger 200mm Diameter Hollow Stem	Very stiff, grey brown SILTY CLAY (Weathered Crust)		0.97	4	50 D.O.	13		Backfilled with soil cuttings
2					5	50 D.O.	9		
					6	50 D.O.	7		
3					7	50 D.O.	4		
				93.25					
4		Grey brown to grey SILTY CLAY		3.81	8	50 D.O.	2	See Fig B4	
5				91.88					
		End of Borehole		5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: 20 40 60 80 — nat. V - + Q - ● rem. V - ⊕ U - ○

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp 20 — W 40 60 — Wl 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-27

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 25, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		97.31					Cold patch
		Asphaltic concrete		0.10					
		Crushed sand and gravel, trace silt (BASE/SUBBASE)		96.83	1	C.S.			
		Very stiff, grey brown SILTY CLAY (Weathered Crust)		0.48					
1					2	50 D.O.	13		Backfilled with soil cuttings
2					3	50 D.O.	12		
					4	50 D.O.	9		
3				94.26					
		Very stiff to stiff, grey brown SILTY CLAY		3.05	5	50 D.O.	4		
4					6	50 D.O.	3		
5					7	50 D.O.	1		
6		End of borehole		91.37 / 5.94					
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: 20 40 60 80 — nat. V - + Q - ● rem. V - ⊕ U - ○

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp 20 — W 40 60 — Wl 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-28

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 27, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		94.19					Cold patch
		Asphaltic concrete		0.10					
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)		93.43	1	C.S.			
					2	C.S.			
		Compact, black coated sand and gravel (FILL)		0.76					
1		Grey black silty sand, some gravel with black staining (FILL)		0.91 / 92.89	3	50 D.O.	18		Backfilled with soil cuttings
		Possible former TOPSOIL		1.30 / 92.62					
		Very stiff, dark grey SILTY CLAY		1.57	4	50 D.O.	11		
2									
					5	50 D.O.	10		
3									
					6	50 D.O.	3		
4					7	50 D.O.	2		
		Stiff to firm, grey SILTY CLAY		89.62 / 4.57	8	50 D.O.	1		
5				89.01					
		End of borehole		5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp W Wl; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-29

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 26, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		93.73				
		Dark brown silty clay, trace organic material (TOPSOIL)		93.12 / 0.61	1	50 D.O.	8	
1		Very stiff, grey brown SILT and CLAY (Weathered Crust)			2	50 D.O.	15	
2					3	50 D.O.	14	
					4	50 D.O.	8	
3					5	50 D.O.	2	
		Stiff, grey SILTY CLAY		90.05 / 3.68				
4								
5					6	50 D.O.	1	See Fig B4
		End of Borehole		88.55 / 5.18				
6								
7								
8								
9								
10								

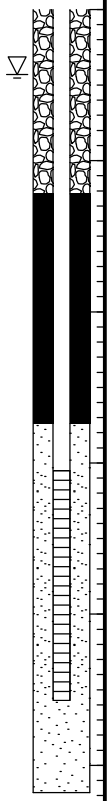
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat. V - + ; rem. V - ⊕ ; Q - ● ; U - ○ (20, 40, 60, 80)

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5}, 10^{-4}, 10^{-3}, 10^{-2}

WATER CONTENT, PERCENT: Wp ⊢—○ W —⊣ Wl (20, 40, 60, 80)

PIEZOMETER OR STANDPIPE INSTALLATION



51 mm Diameter, 1.52 metres long well screen.

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/27	0.43 ▽	93.30

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-30

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: December 1, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		92.82					Cold patch
		Asphaltic concrete		0.05					
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)		92.06 / 0.76					
1		Very stiff, grey brown SILTY CLAY (Weathered Crust)			1	50 D.O.	15		Backfilled with soil cuttings
2					2	50 D.O.	13		
					3	50 D.O.	10		
3					4	50 D.O.	3		
				89.01 / 3.81					
4		Stiff, grey SILTY CLAY			5	50 D.O.	2		
					6	50 D.O.	2		
5				87.64 / 5.18					
		End of borehole							
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-31

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 27, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		92.80					Cold patch
		Asphaltic concrete		0.10					
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)		92.44	1	C.S.			
				0.36	2	C.S.			
		Loose, brown fine to medium sand, trace to some silt, some gravel (Possible FILL)			3	50 D.O.	6		Backfilled with soil cuttings
1				91.28					
		Very stiff, grey brown SILTY CLAY (Weathered Crust)		1.52	4	50 D.O.	13		
2					5	50 D.O.	7		
3					6	50 D.O.	3		
				88.99					
		Stiff to firm, grey SILTY CLAY		3.81	7	50 D.O.	1		
4									
5				87.62					
		End of Borehole		5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-32

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 2, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
0		Ground Surface		92.31				
	Power Auger, 200mm Diameter Hollow Stem	Grey to black crushed sand and gravel (BASE/SUBBASE)			1	C.S.		
				91.78	2	C.S.		
		Brown silty clay, some gravel, trace organics or ash (FILL)		0.53				
				91.42				
1		Very stiff to stiff, grey brown SILTY CLAY (Weathered Crust)		0.89	3	50 D.O.	12	
2					4	50 D.O.	10	
					5	50 D.O.	7	
3					6	50 D.O.	3	
4				87.74				
		Stiff grey SILTY CLAY		4.57	7	50 D.O.	2	
5				87.13				
		End of Borehole		5.18				
6								
7								
8								
9								
10								

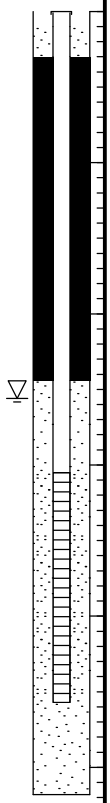
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

PIEZOMETER OR STANDPIPE INSTALLATION



51 mm Diameter, 1.52 metres long well screen.

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/02/05	2.56 ∇	89.75

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-33

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 2, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		93.71									
		Overburden conditions not logged											Backfilled with soil cuttings
1													
2													
3													
4													
5		End of probehole		88.71 / 5.00									
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

PROJECT: 62739.10

RECORD OF BOREHOLE 15-34

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 27, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		93.51					
	Power Auger, 200mm Diameter Hollow Stem	Grey crushed sand and gravel, trace silt (BASE/SUBBASE)		93.10 / 0.41	1	50 D.O.	14		Backfilled with soil cuttings
1		Compact, brown silty sand, trace clay, some grave,l cobbles and boulders (Possible FILL)		92.21 / 1.30	2	50 D.O.	24		
		Very stiff, grey brown SILTY CLAY (Weathered Crust)			3	50 D.O.	11		
2					4	50 D.O.	4		
3					5	50 D.O.	3		
		Stiff to firm, grey SILTY CLAY		89.85 / 3.66					
4									
5					6	50 D.O.	1		
		End of Borehole		88.33 / 5.18					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-35

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 27, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		93.80							
		Asphaltic concrete		0.08							Cold patch
		Grey black crushed sand and gravel or former asphaltic concrete (BASE/SUBBASE)		93.16 / 0.64	1	C.S.					
1		Very stiff, grey brown SILTY CLAY (Weathered Crust)			2	50 D.O.	13				Backfilled with soil cuttings
				92.20 / 1.60							
2		Very dense, grey brown silt sand, some gravel, probable cobbles and boulders (GLACIAL TILL)			3	50 D.O.	50 for 25 mm				
		Boulders			4	50 D.O.	50 for 90 mm				
3					5	50 D.O.	28				
				89.89 / 3.91							
4		Auger refusal, end of borehole									
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-36

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 30, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		97.73					Cold patch
		Asphaltic concrete		0.08					
		Grey black crushed sand and gravel, trace silt (BASE/SUBBASE)		97.22	1	C.S.			
		Grey brown silty clay, trace sand, some gravel (FILL)		0.51 / 96.84	2	C.S.			
1		Loose to compact, brown fine to medium sand, some silt, trace clay (Possible FILL)		0.89	3	50 D.O.	13		Backfilled with soil cuttings
2					4	50 D.O.	9		
		Compact, grey brown silty clay, trace sand, some gravel, (GLACIAL TILL)		95.14 / 2.59	5	50 D.O.	33		
3					6	50 D.O.	21		
4		Dense, grey brown silty sand, some gravel, cobbles and possible boulders (GLACIAL TILL)		93.82 / 3.91	7	50 D.O.	44		
		Auger refusal, end of borehole		92.93 / 4.80					
5									
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-37

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 26, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊢—○ W —⊣ Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		94.44							
		Dark brown silty sand/sandy silt, trace organic material (TOPSOIL)		94.19							
		Brown sand and gravel (FILL)		0.25	1	50 D.O.	12				
				93.60	2	50 D.O.	50 for 100 mm				
1		Auger refusal, end of borehole		0.84							Backfilled with soil cuttings
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-38

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 26, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp ⊢—○ W —⊣ Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		96.48									
		Asphaltic concrete		0.05	1	C.S.							Cold patch
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)			2	C.S.							
				95.72	3	C.S.							
1		Loose, brown silty sand, some gravel, possible cobbles (FILL)		0.76	4	50 D.O.	8						Backfilled with soil cuttings
				94.96									
		Grey brown silty sand, some gravel (GLACIAL TILL)		1.52	5	50 D.O.	50 for 50 mm						
				94.65									
2		Auger refusal, end of borehole		1.83									
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-39

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 26, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80): nat. V - + Q - ●; rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp 20 — W 40 60 — Wl 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		95.93									
		Overburden conditions not logged											Backfilled with soil cuttings
				95.12									
1		Auger refusal, end of probehole		0.81									
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

PROJECT: 62739.10

RECORD OF BOREHOLE 15-40

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 26, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		95.56									
		Asphaltic concrete		0.08									Cold patch
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)		95.10	1	C.S.							
		Possible WEATHERED BEDROCK		0.46 / 94.65									
1		Auger refusal, end of borehole		0.91									Backfilled with soil cuttings
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

PROJECT: 62739.10

RECORD OF BOREHOLE 15-41

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 26, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - +, rem. V - ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp ⊖ W Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		93.67									
		Asphaltic concrete		0.05									Cold patch
		Grey crushed sand and gravel trace silt (BASE/SUBBASE)		93.24	1	C.S.							
		Brown fine to medium sand, trace silt (Possible FILL)		0.43	2	C.S.							
1		Compact, grey silty sand, some gravel, possible cobbles and boulders (GLACIAL TILL)		92.78 / 0.89	3	50 D.O.	25						Backfilled with soil cuttings
		Strong hydrocarbon odour			4	50 D.O.	50 for 130 mm						
2		Auger refusal, end of borehole		91.46 / 2.21									
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-42

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 1, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		84.07					
		Grey crushed sand and gravel, trace silt (BASE/SUBBASE)		83.33 / 0.74	1	C.S.			Backfilled with soil cuttings
1		Very stiff, grey brown SILTY CLAY (Weathered Crust)			2	50 D.O.	13		
2					3	50 D.O.	16		
					4	50 D.O.	10		
3					5	50 D.O.	4		
4		Dense, grey silty sand, some gravel (GLACIAL TILL)		79.93 / 4.14	6	50 D.O.	40		
					7	50 D.O.	24		
5		End of borehole		78.96 / 5.11					
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp W Wl; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-43

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 30, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - +, rem. V - ⊕; Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp ⊖ W ⊖ Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		84.79									Cold patch
		Asphaltic concrete		0.10									
		Crushed sand and gravel, trace silt (BASE/SUBBASE)			1	C.S.							
1					2	C.S.							Backfilled with soil cuttings
				82.96	3	50 D.O.	18						
2		Dark brown clayey silt (possible former TOPSOIL)		1.83 / 1.98									
		Grey brown SILTY CLAY (Weathered Crust)			4	50 D.O.	16						
3					5	50 D.O.	15						
4					6	50 D.O.	9						
				80.22									
		Grey brown silty sand, some gravel and cobbles (GLACIAL TILL)		4.57	7	50 D.O.	50 for 75 mm						
5				79.51									
		End of Borehole		5.28									
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-44

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 30, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp W Wl 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		85.71									
		Asphaltic concrete		0.10	1	A.S.							Cold patch
		Crushed sand and gravel, trace silt (BASE/SUBBASE)		85.10	2	A.S.							
		Possible WEATHERED BEDROCK		0.61									
1		Auger refusal, end of borehole		84.69 / 1.02									Backfilled with soil cuttings
2													
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

RECORD OF BOREHOLE 15-45

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: November 25, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		99.43									
		Overburden conditions not logged											Backfilled with soil cuttings
1													
2				97.02									
		Auger refusal, end of probehole		2.41									
3													
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

PROJECT: 62739.10

RECORD OF BOREHOLE 15-46

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 25, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		99.28							
	Power Auger 200mm Diameter Hollow Stem	Asphaltic concrete		99.13							Cold patch
		Grey crushed sand and gravel, trace silt, possible cobbles (BASE/SUBBASE)		0.15	1	C.S.					
1					2	50 D.O.	50 for 50 mm				Backfilled with soil cuttings
		Auger refusal, end of borehole		98.09 / 1.19							
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-47

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: December 1, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m	SHEAR STRENGTH Cu, kPa (nat. V + Q ●, rem. V ⊕ U ○)	HYDRAULIC CONDUCTIVITY, k, cm/s	WATER CONTENT, PERCENT (Wp W Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		99.42									
		Asphaltic concrete		0.10									
		Brown sand and gravel, trace silt (BASE/SUBBASE)		98.96	1	C.S.							
		Dark grey sand and gravel, some silt (FILL)		0.46	2	C.S.							
1		Black grey silty sand, some clay, trace gravel, probable boulders (Possible FILL)		98.38 1.04	3	50 D.O.	15						
					4	50 D.O.	50 for 80 mm						
2	HQ Rotary Drilling	LIMESTONE BEDROCK with shale seams - 3 25mm thick mud seams within upper 0.3m of rock core - subvertical fractures noted		97.51 1.91	5	R.C.	TCR = 95% SCR = 16% RQD = 0%						
3					6	R.C.	TCR = 98% SCR = 88% RQD = 76%					U.C.S. 145.4 MPa	51 mm Diameter, 1.52 metres long well screen.
4		End of borehole		95.31 4.11									
5													
6													
7													
8													
9													
10													

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/27	3.34 ▽	96.08

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-54

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 26, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp ⊖ W WI 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		78.79									
	Power Auger 200mm Diameter Hollow Stem	Dark brown sandy silt, trace organic and clay, red brick (FILL)		78.51									
		Very stiff, grey brown SILTY CLAY (Weathered Crust)		0.28	1	50 D.O.	7						
1					2	50 D.O.	12						Backfilled with soil cuttings
2					3	50 D.O.	19						
					4	50 D.O.	14						
3				75.49									
		Dense to very dense, grey brown silty sand, some gravel, cobbles and boulders (GLACIAL TILL)		3.30	5	50 D.O.	45						
4					6	50 D.O.	50 for 25 mm						
5					7	50 D.O.	43			○			
				73.61									
		End of borehole		5.18									
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 15-55

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: November 30, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		78.92									Cold patch
		Asphaltic concrete		78.77									
		Grey brown sand and gravel, trace silt (BASE/SUBBASE)		0.15 / 78.54	1	C.S.							
		Dark brown silty clay, trace gravel, wood (FILL)		0.38 / 77.75	2	50 D.O.	12						Backfilled with soil cuttings
1		Very stiff, grey brown SILTY CLAY (Weathered Crust) NOTE: Hydrocarbon odor @ 3.78 metre depth below ground surface		1.17	3	50 D.O.	18						
2					4	50 D.O.	21						
3					5	50 D.O.	18						
4		Grey brown silty sand, some gravel, cobbles and possible boulders (GLACIAL TILL)		75.01 / 3.91	6	50 D.O.	50 for 130 mm						
5					7	50 D.O.	14						
		End of borehole		73.74 / 5.18									
6													
7													
8													
9													
10													

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

PROJECT: 62739.10

RECORD OF BOREHOLE 15-56A

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 10, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		78.79				
		Loose, grey brown silty clay, some gravel and shell pieces, trace organic material (FILL)		78.18 / 0.61	1	50 D.O.	6	
1		Loose to compact, dark grey brown silty sand, some gravel, cobbles, shell and wood fragments (FILL)			2	50 D.O.	17	
2					3	50 D.O.	11	
					4	50 D.O.	4	
3					5	50 D.O.	10	
4		Asphaltic concrete		74.62 / 4.17	6	50 D.O.	35	
		Grey crushed sand and gravel (BASE/SUBBASE)		4.29 / 74.09				
5		Grey sandy silt, some gravel, possible cobbles (GLACIAL TILL)		4.70 / 73.61	7	50 D.O.	15	
		End of borehole		5.18				
6								
7								
8								
9								
10								

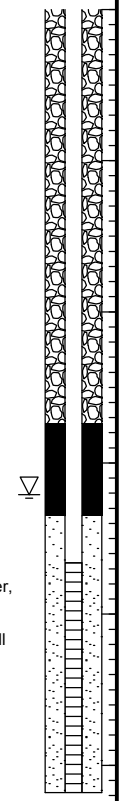
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

PIEZOMETER OR STANDPIPE INSTALLATION



51 mm Diameter, 1.52 metres long well screen.

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/27	3.21 ∇	75.58

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-56B

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: December 10, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200mm Diameter Hollow Stem	Ground Surface		78.92					Backfilled with soil cuttings
		Dark brown silt, some sand and organic material (FILL)		78.74 / 0.18	1	50 D.O.	6		
1		Compact, dark grey silty sand, trace to some gravel with shell fragments (FILL)			2	50 D.O.	17		
2					3	50 D.O.	15		
				76.25 / 2.67	4	50 D.O.	3		
3		Loose, dark grey brown silty sand, some gravel, shell pieces, blue rigid insulation, trace wood (FILL)			5	50 D.O.	8		
				75.47 / 3.45					
4		Grey brown silty clay, trace sand, some gravel (FILL)			6	50 D.O.	17		
				74.60 / 4.32					
		Asphaltic concrete		4.42					
		Probable sand and gravel (BASE/SUBBASE)		74.14 / 4.78	7	50 D.O.	47		
5		Grey silty sand, some gravel, cobbles and boulders (TILL)		73.74 / 5.18					
		End of borehole							
6									
7									
8									
9									
10									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: A.N.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 15-105 E

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: December 23, 2015

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
0	Power Auger, 200 mm Diameter Hollow Stem	Ground Surface		99.82				
		Asphaltic concrete		99.64				
		Crushed sand and gravel (BASE/SUBBASE)		0.18				
				99.06				
1		Loose to compact, brown sand and gravel (FILL)		0.76	1	50 D.O.	16	
2					2	50 D.O.	4	
				97.53				
		Saturated, loose to compact SAND, trace silt, trace shells		2.29	3	50 D.O.	4	
3					4	50 D.O.	18	
				96.24				
		Compact, silty sand, some clay, trace gravel (GLACIAL TILL)		3.58				
4					5	50 D.O.	18	
					6	50 D.O.	50 for 15 mm	
				94.89				
5		Auger refusal, end of borehole		4.93				
6								
7								
8								
9								
10								

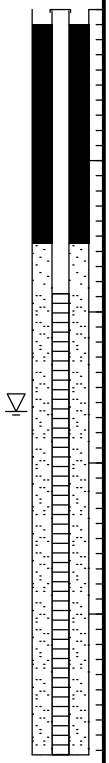
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/25	2.66 ▽	97.16

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED:

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 16-102 E

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: January 15, 2016

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊢—○ W —⊣ Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		103.38							
		Asphaltic concrete		0.05							Cold patch
		Crushed sand and gravel (BASE/SUBBASE)		103.08 / 0.30	1	50 D.O.	69				
1		Light brown fine to medium sand, trace silt (FILL)		102.31 / 1.07	2	50 D.O.	3				Backfilled with soil cuttings
		Blud rigid insulation at 1.07 metres +/-		102.01							
		Borehole terminated due to possible services		1.37							
2											
3											
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 16-104 E

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

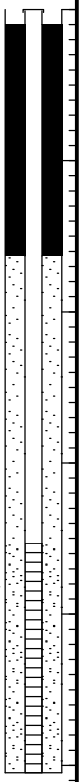
BORING DATE: January 6, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat. V - +, rem. V - ⊕, Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT (Wp W Wl, 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		103.02							
	Power Auger, 200 mm Diameter Hollow Stem	Asphaltic concrete		0.10							Bentonite seal
		Crushed sand and gravel (BASE/SUBBASE)		102.36							
		Grey LIMESTONE BEDROCK with shale seams		0.66							
1					1	R.C.	TCR = 93%, SCR = 96%, RQD = 78%			U.C.S. 38.7 MPa	Filter sand
2					2	R.C.	TCR = 90%, SCR = 68%, RQD = 77%				
3											51 mm Diameter, 1.52 metres long well screen.
4					3	R.C.	TCR = 100%, SCR = 89%, RQD = 95%				
5		End of borehole		97.97 5.05							
6											
7											
8											
9											
10											



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/25	3.82 ∇	99.20

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED:

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

PROJECT: 62739.10

RECORD OF BOREHOLE 16-106 E

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 23, 2015

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) / WATER CONTENT, PERCENT Wp ⊢—○ W —⊣ Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		Ground Surface		98.04							Bentonite seal
0	Power Auger 200 mm Diameter Hollow Stem	Asphaltic concrete		0.10							
		Crushed sand and gravel (BASE/SUBBASE)			1	50 D.O.	12				Filter sand
1				96.77 / 1.27							51 mm Diameter, 1.52 metres long well screen.
		Compact, medium to fine brown sand, trace gravel, trace silt (possible FILL)			2	50 D.O.	15				
2				95.75 / 2.29							
		Silty sand, some gravel, trace clay, trace shells (GLACIAL TILL)			3	50 D.O.	73				
		Auger refusal, end of borehole		95.27 / 2.77							
3											
4											
5											
6											
7											
8											
9											
10											

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/25	1.86 ▽	96.18

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED:

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 16-108 E

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 12, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - + Q - ●; rem. V - ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		93.35									
	Power Auger, 200 mm Diameter Hollow Stem	TOPSOIL		92.59 / 0.76	1	50 D.O.	8						Bentonite seal
1		Compact to dense, grey brown silty sand, some gravel, trace clay, with probable cobbes and boulder (GLACIAL TILL)			2	50 D.O.	26						
					3	50 D.O.	41						
2				90.94 / 2.41	4	50 D.O.	>50 for 75 mm						
	HQ Rotary Drilling	Grey LIMESTONE BEDROCK with shale seams			5	R.C.	TCR = 100%, SCR = 93%, RQD = 90%						Filter sand
3													
4					6	R.C.	TCR = 100%, SCR = 100%, RQD = 100%						51 mm Diameter, 1.52 metres long well screen.
5					7	R.C.	TCR = 100%, SCR = 90%, RQD = 85%						
		End of borehole		87.53 / 5.82									
6													
7													
8													
9													
10													

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/25	2.63 ∇	90.72

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 16-109 E

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 13-14, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - +, rem. V - ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp ⊖ W WI) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200 mm Diameter Hollow Stem	Ground Surface		93.11									
		Asphaltic concrete		0.05									
		Dark brown to grey silty sand and gravel (BASE/SUBBASE)			1	50 D.O.	24						Bentonite seal
1					2	50 D.O.	> 50 for 75 mm						
				91.97									
	HQ Rotary Drilling	Grey LIMESTONE BEDROCK with shale seams		1.14	3	R.C.							
2					4	R.C.	TCR = 100%, SCR = 97%, RQD = 52%					U.C.S. 111.4 MPa	Filter sand
3													51 mm Diameter, 1.52 metres long well screen.
4					5	R.C.	TCR = 94%, SCR = 91%, RQD = 82%						
				88.23	6	R.C.	TCR = 100%, SCR = 100%, RQD = 0%						
5		End of borehole		4.88									
6													
7													
8													
9													
10													

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/25	3.58 ▽	89.53

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 16-110 E

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 11, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT Wp ⊖ W WI (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200mm Diameter Hollow Stem	Ground Surface		83.35									
		TOPSOIL		83.22 / 0.13									
		Very stiff, grey to brown SILTY CLAY			1	50 D.O.	8						Bentonite seal
1					2	50 D.O.	9						
					3	50 D.O.	10						
2													
					4	50 D.O.	10						
3					5	50 D.O.	11						Filter sand; 51 mm Diameter, 1.52 metres long well screen.
		Boulders, probable GLACIAL TILL		79.82 / 3.53									
4					6	50 D.O.	>50 for 125 mm						
					7	50 D.O.	>50 for 25 mm						
		Auger refusal, end of borehole		78.78 / 4.57									
5													
6													
7													
8													
9													
10													

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/25	4.15 ∇	79.20

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

RECORD OF BOREHOLE 16-111 E

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: January 11, 2016

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)
0		Ground Surface		83.05
	Power Auger, 200 mm Diameter Hollow Stem	TOPSOIL		82.90 / 0.15
		Very stiff, brown SILTY CLAY		
				79.75 / 3.30
	HQ Rotary Drilling	Compact, grey brown silty sand, some gravel, trace clay, with cobbles and boulders (GLACIAL TILL)		
				77.66 / 5.39
		End of borehole		

SAMPLES – NUMBER	TYPE	BLOWS/0.3m
1	50 D.O.	10
2	50 D.O.	9
3	50 D.O.	10
4	50 D.O.	9
5	50 D.O.	6
6	50 D.O.	11
7	50 D.O.	17

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

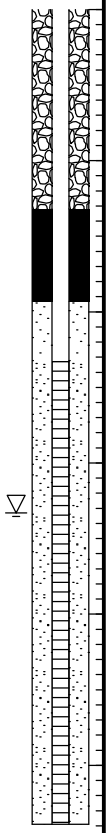
SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

ADDITIONAL LAB. TESTING

PIEZOMETER OR STANDPIPE INSTALLATION



GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
16/01/25	3.33 ▽	79.72

DEPTH SCALE

1 to 50

Houle Chevrier Engineering

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER 2015.GDT 11/2/16

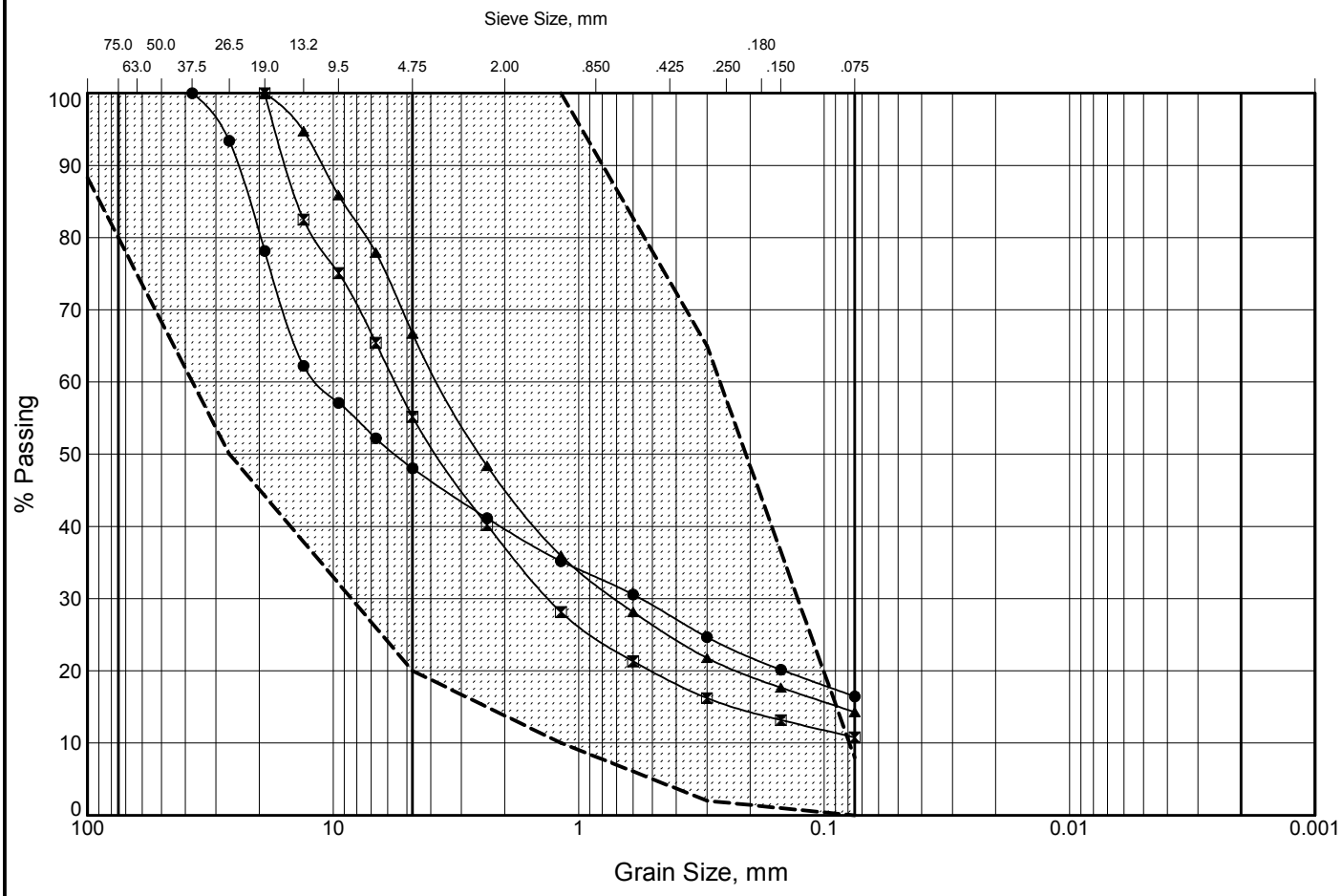
APPENDIX B

Laboratory Index Test Results (Figure B1 to B4)

GRAIN SIZE DISTRIBUTION

BASE/SUBBASE

FIGURE B1



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
	GRAVEL		SAND			

Legend	Borehole	Sample	Depth (m)	% Gravel	% Sand	% Silt & Clay
●	15-02	1	0.2 - 0.9	52	32	16
⊠	15-08	1	0.1 - 0.2	45	44	11
▲	15-38	1	0.1 - 0.3	33	52	14

– – – – Gradation Envelope: OPSS 1010 - GRANULAR B TYPE I

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a GEMTEC company

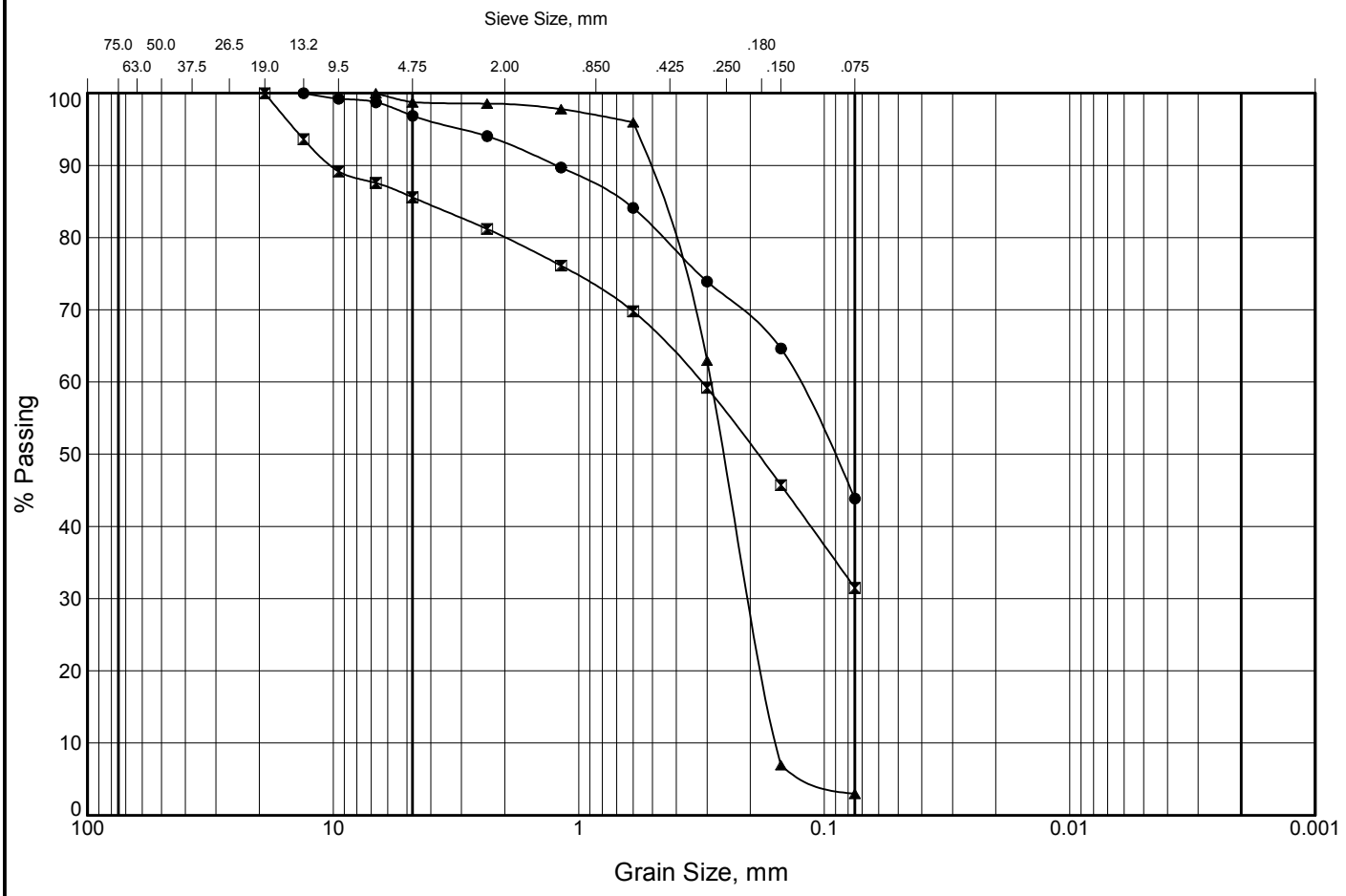
Date: February 2016

Project: 62739.10

SOILS GRAIN SIZE GRAPH UNIFIED % (SIEVE) 62739.10_GNT_V01_2015-12-08.GPJ HOULE CHEVRIER FEB 9 2011.GDT 2-8-16

GRAIN SIZE DISTRIBUTION

FIGURE B2



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT AND CLAY
	GRAVEL		SAND			

Legend	Borehole	Sample	Depth (m)	% Gravel	% Sand	% Silt & Clay
●	15-13	5	2.1 - 2.8	3	53	44
⊠	15-54	7	4.6 - 5.2	14	54	31
▲	16-106 E	2	1.5 - 2.1	1	96	3

Houle Chevrier Engineering
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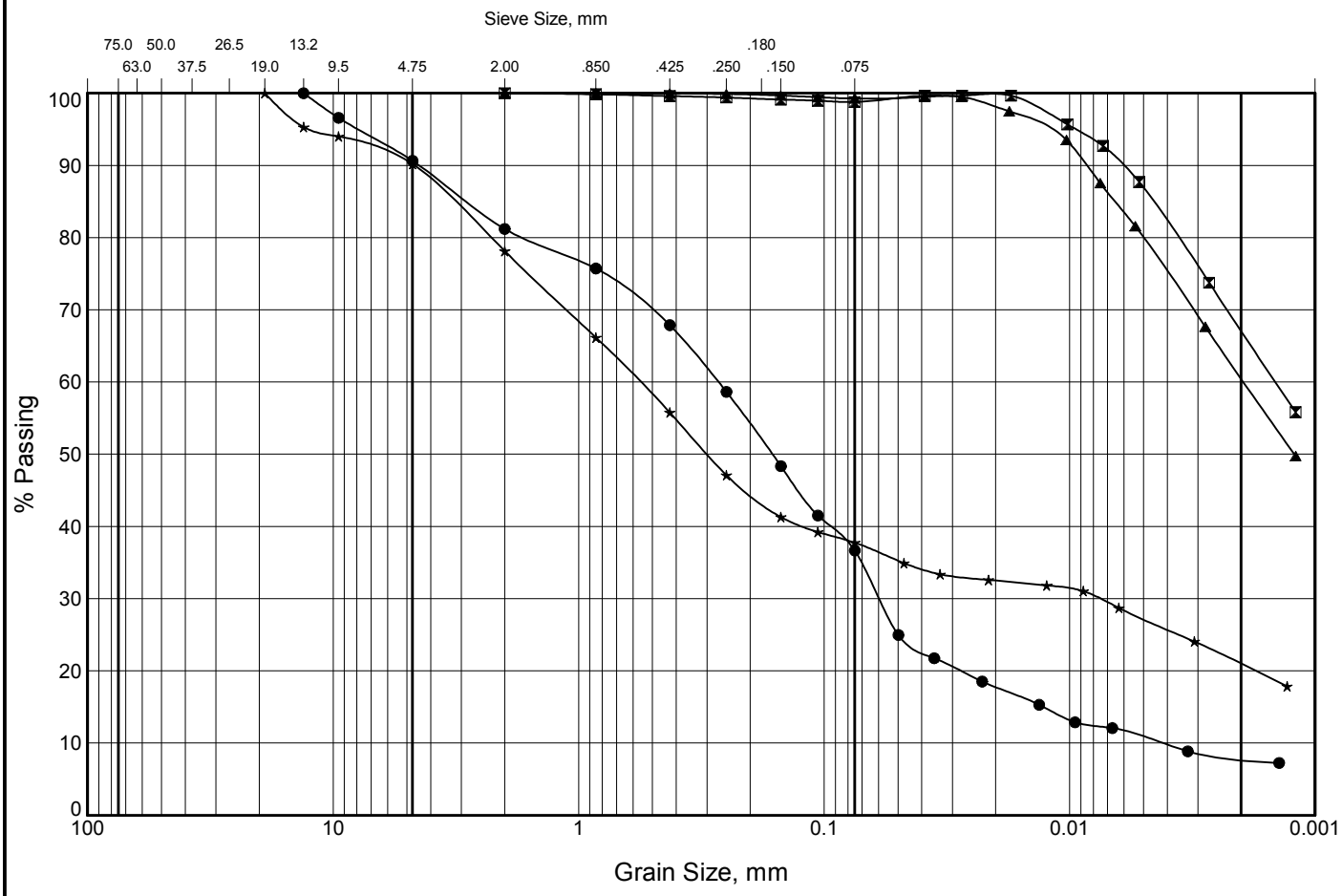
Date: February 2016

Project: 62739.10

GRAIN SIZE DISTRIBUTION

FIGURE B3



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	GRAVEL		SAND				

Legend	Borehole	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	15-16 A	4	2.9 - 3.5	9	54	29	8
⊠	15-25	3	1.5 - 2.1	0	1	32	67
▲	15-29	4	2.3 - 2.9	0	1	39	61
★	15-105 E	5	3.8 - 4.4	10	52	17	21

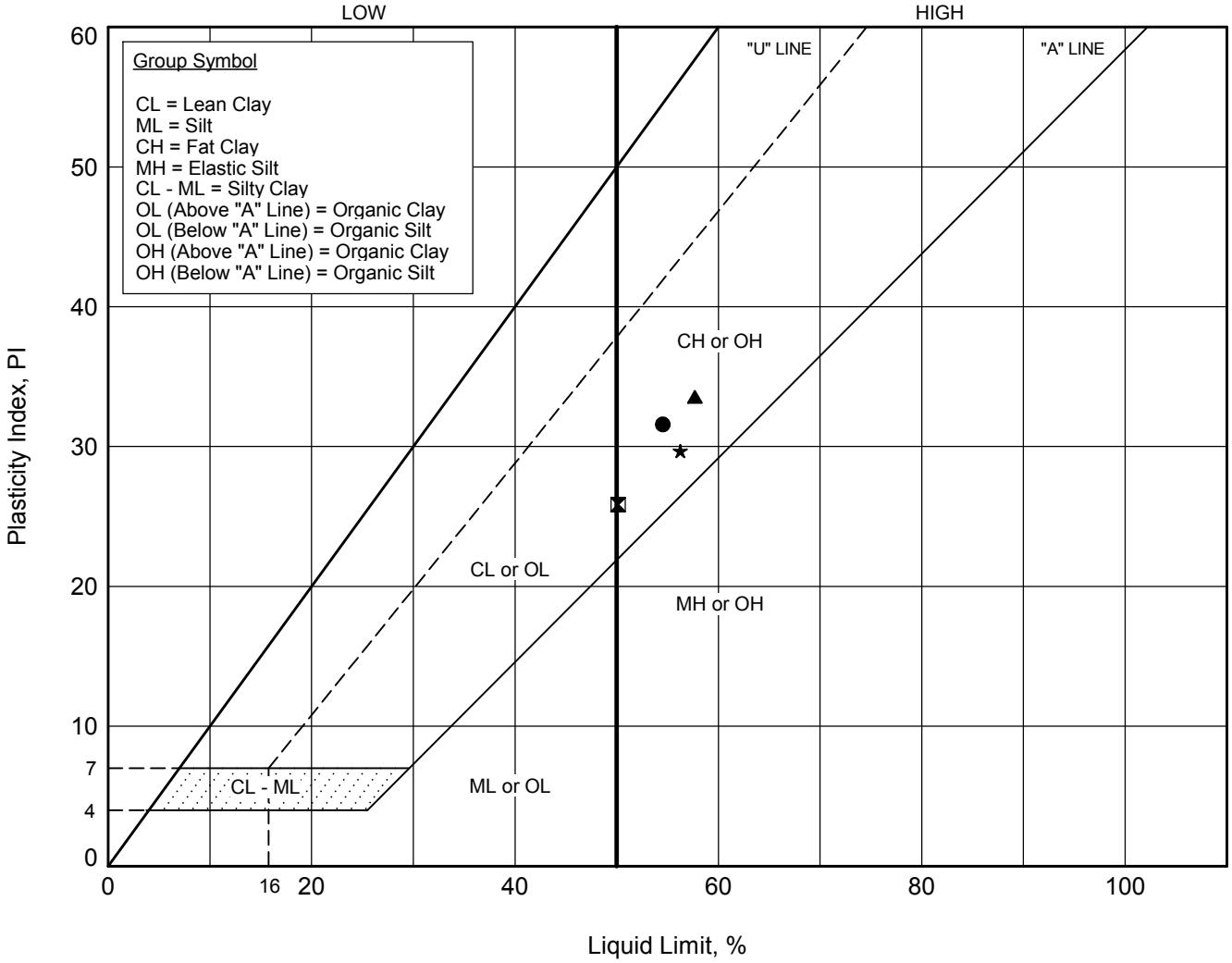
Houle Chevrier Engineering
a GEMTEC company

Date: February 2016

Project: 62739.10

PLASTICITY CHART

FIGURE B4



Legend	Borehole	Sample	Depth (m)	Water Content %	LL %	PL %	PI %
●	15-08	4	1.5 - 2.1	34.5	54.5	22.9	31.6
⊠	15-15	3	0.8 - 1.4	25.9	50.1	24.3	25.9
▲	15-26	8	3.8 - 4.4	76.2	57.7	24.1	33.6
★	15-29	6	4.6 - 5.2	76.7	56.2	26.6	29.7

Houle Chevrier Engineering

Date: January 2016

Project: 62739.10

APPENDIX C

Compressive Strength of Bedrock Core Samples

Houle Chevrier Engineering Ltd.
32 Steacie Drive
Ottawa, ON
K2K 2A9
Tel.: 613-836-1422
Fax.:613-836-9731

COMPRESSIVE STRENGTH of ROCK CORE

CLIENT: National Research Council Canada **PROJECT No.:** 62739.10

Project: Montreal Campus **REPORT NO:** 1

Date Received: n/a **Date Tested:** 15-Jan-16

Lab no.	1	2				
Core ID	15-47 RC6	15-01 RC 4				
Depth	3.05-3.35	2.97-3.12				
Cut length (mm)	n/a	n/a				
Ground length (mm)	124.20	120.59				
Diameter (mm)	63.18	62.86				
Ground Mass (g)	1.05	1.01				
Length:Diameter ratio	1.97	1.92				
Correction factor	1.00	0.99				
Failure load (kN)	455.79	607.48				
Uncorrected Strength (MPa)	145.40	195.70				
Corrected Strength (MPa)	**145.40**	**193.70**				

Remarks

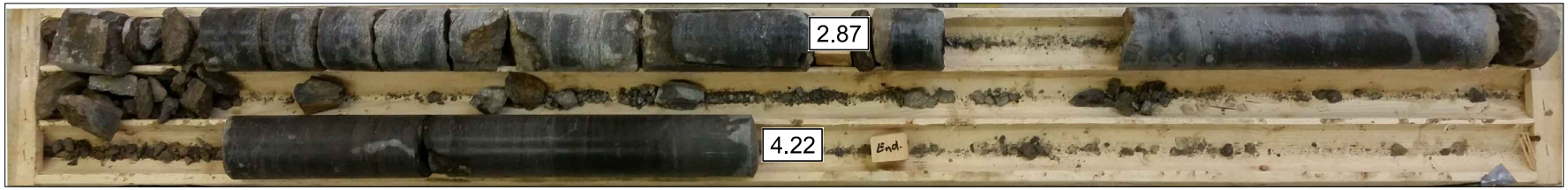
Checked by: Krystle Smith, Laboratory Manager

Reviewed by: Serge Bourque, P.Eng.

APPENDIX D

Photographs of Bedrock Cores

BOREHOLE 15-01
BORING DATE: 30/11/2015
ROCK CORE DEPTHS: 2.1 to 4.2 METERS

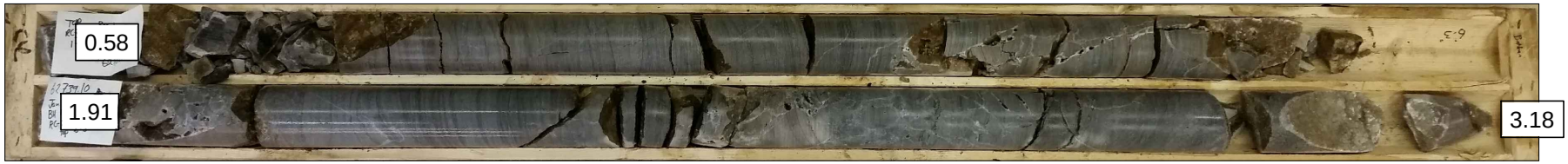


Houle Chevrier Engineering
32 Steacie Drive Ottawa, ON
T: (613) 836-1422 | www.hceng.ca | ottawa@hceng.ca

Project	Drwn By	Chkd By	Date	Drawing
GEOTECHNICAL INVESTIGATION NATIONAL RESEARCH CENTER MONTREAL ST CAMPUS	B.V.	S.B.	FEBRUARY 2016	BOREHOLE 15-01 ROCK CORE PHOTO
	File No. 62739.10	Revision No. 0	**FIGURE D1**	

P:\0. Files\62700\62739.10\Drafting\Drawings\Rockcore Photos\6273910_ROCK CORE PHOTOS_FG01_V01_2016-02-03.dwg, FIGURE C1, 05/02/2016 3:30:22 PM

BOREHOLE 15-20A
BORING DATE: 06/01/2016
ROCK CORE DEPTHS: 0.6 to 3.2 METERS



Houle Chevrier Engineering
32 Steacie Drive Ottawa, ON
T: (613) 836-1422 | www.hceng.ca | ottawa@hceng.ca

Project	Drwn By	Chkd By	Date	Drawing
GEOTECHNICAL INVESTIGATION NATIONAL RESEARCH CENTER MONTREAL ST CAMPUS	B.V.	S.B.	FEBRUARY 2016	BOREHOLE 15-20A ROCK CORE PHOTO
	File No. 62739.10	Revision No. 0	**FIGURE D2**	

P:\0. Files\62700\62739.10\Drafting\Drawings\Rockcore Photos\6273910_ROCK CORE PHOTOS_FG20A_V01_2016-02-03.dwg, FIGURE C1, 05/02/2016 3:30:23 PM

BOREHOLE 15-21C
BORING DATE: 23/11/2016
ROCK CORE DEPTHS: 1.2 to 6.5 METERS

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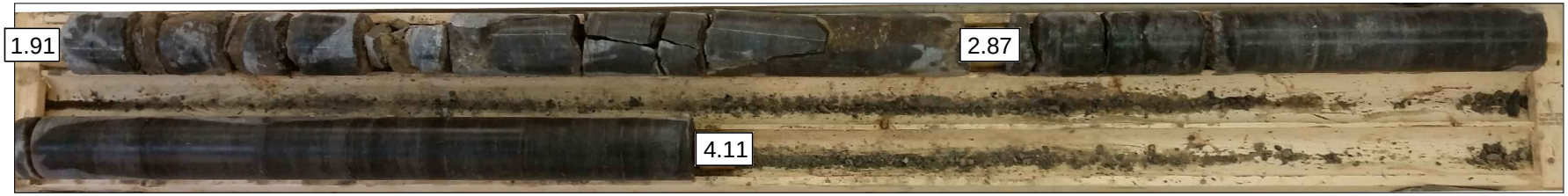
Project	Drwn By	Chkd By	Date	Drawing
GEOTECHNICAL INVESTIGATION NATIONAL RESEARCH CENTER MONTREAL ST CAMPUS	B.V.	S.B.	FEBRUARY 2016	BOREHOLE 15-21C ROCK CORE PHOTO
	File No. 62739.10	Revision No. 0	**FIGURE D3**	

BOREHOLE 15-47
BORING DATE: 01/12/2015
ROCK CORE DEPTHS: 1.9 to 4.1 METERS



Houle Chevrier Engineering
32 Steacie Drive Ottawa, ON
T: (613) 836-1422 | www.hceng.ca | ottawa@hceng.ca

Project	Drwn By	Chkd By	Date	Drawing
GEOTECHNICAL INVESTIGATION NATIONAL RESEARCH CENTER MONTREAL ST CAMPUS	B.V.	S.B.	FEBRUARY 2016	BOREHOLE 15-47 ROCK CORE PHOTO
	File No. 62739.10	Revision No. 0	**FIGURE D4**	

BOREHOLE 16-104 E
BORING DATE: 6/01/2016
ROCK CORE DEPTHS: 0.7 to 5.1 METERS

Houle Chevrier Engineering
32 Steacie Drive Ottawa, ON
T: (613) 836-1422 | www.hceng.ca | ottawa@hceng.ca

Project	Drwn By	Chkd By	Date	Drawing
GEOTECHNICAL INVESTIGATION NATIONAL RESEARCH CENTER MONTREAL ST CAMPUS	B.V.	S.B.	FEBRUARY 2016	BOREHOLE 16-104E ROCK CORE PHOTO
	File No. 62739.10	Revision No. 0	**FIGURE D5**	

P:\0. Files\62700\62739.10\Drafting\Drawings\Rockcore Photos\6273910_ROCK CORE PHOTOS_FG104e_V01_2016-02-03.dwg, FIGURE C1, 05/02/2016 3:30:25 PM

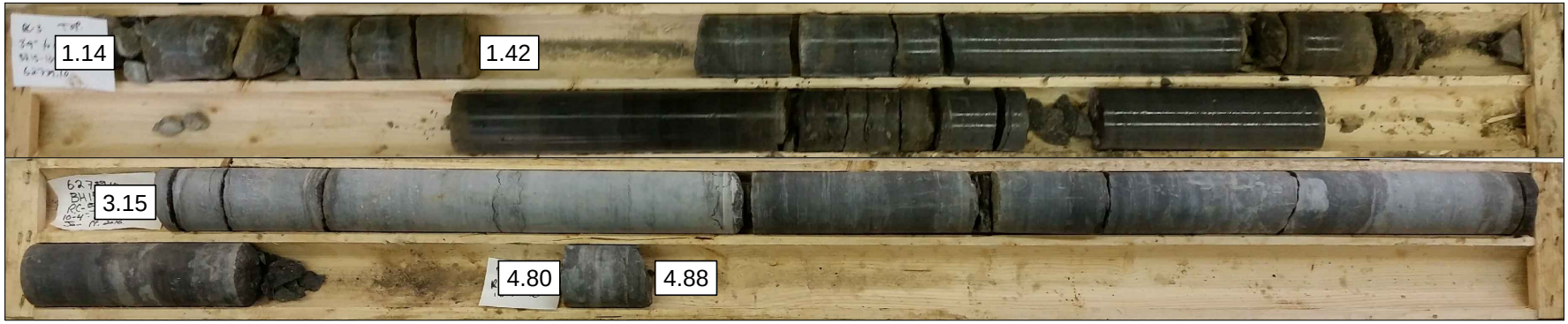
BOREHOLE 16-108E
BORING DATE: 12/01/2016
ROCK CORE DEPTHS: 2.4 to 5.8 METERS

Houle Chevrier Engineering
32 Steacie Drive Ottawa, ON
T: (613) 836-1422 | www.hceng.ca | ottawa@hceng.ca

Project	Drwn By	Chkd By	Date	Drawing
GEOTECHNICAL INVESTIGATION NATIONAL RESEARCH CENTER MONTREAL ST CAMPUS	B.V.	S.B.	FEBRUARY 2016	BOREHOLE 16-108E ROCK CORE PHOTO
	File No. 62739.10	Revision No. 0	**FIGURE D6**	

P:\0. Files\62700\62739.10\Drafting\Drawings\Rockcore Photos\6273910_ROCK CORE PHOTOS_FG108E_V01_2016-02-03.dwg, FIGURE C1, 05/02/2016 3:30:25 PM

BOREHOLE 16-109E
BORING DATE: 13-14/01/2016
ROCK CORE DEPTHS: 1.1 to 4.9 METERS



Houle Chevrier Engineering
32 Steacie Drive Ottawa, ON
T: (613) 836-1422 | www.hceng.ca | ottawa@hceng.ca

Project	Drwn By	Chkd By	Date	Drawing
GEOTECHNICAL INVESTIGATION NATIONAL RESEARCH CENTER MONTREAL ST CAMPUS	B.V.	S.B.	FEBRUARY 2016	BOREHOLE 16-109E ROCK CORE PHOTO
	File No. 62739.10	Revision No. 0	**FIGURE D7**	

P:\0. Files\62700\62739.10\Drafting\Drawings\Rockcore Photos\6273910_ROCK CORE PHOTOS_FG109e_V01_2016-02-03.dwg, FIGURE C1, 05/02/2016 3:30:26 PM

APPENDIX E

Chemical Testing of Soil

PARACEL LABORATORIES LTD.
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1-800-749-1947
www.paracellabs.com

Certificate of Analysis

Houle Chevrier

32 Steacie Drive
Kanata, ON K2K 2A9
Attn: Serge Bourque

Client PO:
Project: 62739.10
Custody:

Report Date: 11-Jan-2016
Order Date: 6-Jan-2016

Order #: 1602118

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1602118-01	BH 15-35 SA4
1602118-02	BH 15-8 SA5
1602118-03	BH 15-22 SA3

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Certificate of Analysis

Report Date: 11-Jan-2016

Client: **Houle Chevrier**

Order Date:6-Jan-2016

Client PO:

Project Description: 62739.10

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC, water extraction	8-Jan-16	8-Jan-16
Conductivity	MOE E3138 - probe @25 °C, water ext	7-Jan-16	7-Jan-16
pH, soil	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	7-Jan-16	7-Jan-16
Resistivity	EPA 120.1 - probe, water extraction	7-Jan-16	7-Jan-16
Solids, %	Gravimetric, calculation	7-Jan-16	7-Jan-16

PARACEL LABORATORIES LTD.

Order #: 1602118

Certificate of Analysis

Report Date: 11-Jan-2016

Client: **Houle Chevrier**

Order Date:6-Jan-2016

Client PO:

Project Description: 62739.10

	Client ID:	BH 15-35 SA4	BH 15-8 SA5	BH 15-22 SA3	-
	Sample Date:	27-Nov-15	01-Dec-15	26-Nov-15	-
	Sample ID:	1602118-01	1602118-02	1602118-03	-
	MDL/Units	Soil	Soil	Soil	-
Physical Characteristics					
% Solids	0.1 % by Wt.	92.3	70.8	71.4	-
General Inorganics					
Conductivity	5 uS/cm	142 [1]	1270 [1]	369 [1]	-
pH	0.05 pH Units	7.90 [1]	7.25 [1]	7.27 [1]	-
Resistivity	0.10 Ohm.m	70.5	7.85	27.1	-
Anions					
Sulphate	5 ug/g dry	19 [1]	160 [1]	195 [1]	-

Certificate of Analysis

Report Date: 11-Jan-2016

Client: **Houle Chevrier**

Order Date:6-Jan-2016

Client PO:

Project Description: 62739.10

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Sulphate	ND	5	ug/g						
General Inorganics									
Conductivity	ND	5	uS/cm						
Resistivity	ND	0.10	Ohm.m						

Certificate of Analysis
Client: **Houle Chevrier**
Client PO:

Report Date: 11-Jan-2016
Order Date:6-Jan-2016
Project Description: 62739.10

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Sulphate	ND	5	ug/g dry	ND				20	
General Inorganics									
Conductivity	148	5	uS/cm	142			4.1	6.2	
pH	7.88	0.05	pH Units	7.90			0.3	10	
Resistivity	67.7	0.10	Ohm.m	70.5			4.1	20	
Physical Characteristics									
% Solids	89.5	0.1	% by Wt.	91.8			2.6	25	

Certificate of Analysis

Report Date: 11-Jan-2016

Client: **Houle Chevrier**

Order Date:6-Jan-2016

Client PO:

Project Description: 62739.10

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Sulphate	96.6	5	ug/g	ND	96.6	78-111			

Qualifier Notes:

Login Qualifiers :

Sample - One or more parameter received past hold time - Proceed with analysis
Applies to samples: BH 15-35 SA4, BH 15-8 SA5, BH 15-22 SA3

Sample Qualifiers :

1 : Holding time had been exceeded upon sample receipt.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

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www.paracellabs.com

Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name:	Houle Chevrier Engineering Ltd.	Project Reference:	62739.10
Contact Name:	Serge Bourque	Quote #	
Address:	32 Steacie Drive, Ottawa, Ontario, K2K 2A9	PO #	
Telephone:	613-836-1422	Email Address:	Sbourque@hcengi.ca

TAT: ☑ Regular ☐ 3 Day ☐ 2 Day ☐ 1 Day

Date Required: _____

Criteria: ☐ O. Reg. 153/04 (As Amended) Table __ ☐ RSC Filing ☐ O. Reg. 558/00 ☐ PWQO ☐ CCME ☐ SUB (Storm) ☐ SUB (Sanitary) Municipality: _____ ☐ Other: _____

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

Paracel Order Number: 1602118

Required Analyses

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken Date	Sample Taken Time	Ph SO4	Elec Resist		250ml x 2							
1	BH 15-35 SA 4	S		2	Nov 27/15		☒	☒	☐	☐	↓	☐	☐	☐	☐	☐	☐
2	BH 15-6 SA5	S		2	Dec 1/15		☒	☒	☐	☐	↓	☐	☐	☐	☐	☐	☐
3	BH 15-22 SA3	S		2	Nov 26/15		☒	☒	☐	☐	↓	☐	☐	☐	☐	☐	☐
4							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
5							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
6							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
7							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
8							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
9							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
10							☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments: Proceed with analysis regardless of hold times as per Andrew - RS.

Method of Delivery: Walk-in

Relinquished By (Sign): ABell	Received by Driver/Depot: Karen Gill	Received at Lab:	Verified By:
Relinquished By (Print): Andrew Bell	Date/Time: Jan 6/16 1:39	Date/Time: Jan 6/16 5:35	Date/Time: Jan 6/16 5:43
Date/Time: Jan 6/16 1:35	Temperature: 15.1 °C	Temperature: 12.8 °C	pH Verified [N] By: N/A

APPENDIX F

Laboratory Certificates of Analysis

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: HOULE CHEVRIER
32 STEACIE DRIVE
OTTAWA, ON K2K2A9
(613) 836-1422

ATTENTION TO: Katherine Rispoli

PROJECT: 62739.10

AGAT WORK ORDER: 15T056416

TRACE ORGANICS REVIEWED BY: Gyulhan Yalamova, Report Reviewer

DATE REPORTED: Jan 06, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
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CANADA L4Z 1Y2
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FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 15T056416

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

PHCs F1 - F4 (Soil)

DATE RECEIVED: 2015-12-24

DATE REPORTED: 2016-01-06

		SAMPLE DESCRIPTION:		BH106 SA2	BH105 SA2	BH105 SA3B
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		12/23/2015	12/23/2015	12/23/2015
Parameter	Unit	G / S	RDL	7311454	7311458	7311460
Benzene	µg/g		0.02	<0.02	<0.02	<0.02
Toluene	µg/g		0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g		0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g		0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g		5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5	<5	<5
F2 (C10 to C16)	µg/g		10	<10	<10	2600
F3 (C16 to C34)	µg/g		50	<50	<50	<50
F4 (C34 to C50)	µg/g		50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA	NA
Moisture Content	%		0.1	19.5	8.8	16.4
Surrogate	Unit	Acceptable Limits				
Terphenyl	%	60-140		61	103	130

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7311454-7311460 Results are based on sample dry weight.
The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 15T056416

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jan 06, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
PHCs F1 - F4 (Soil)															
Benzene	7312041		< 0.02	< 0.02	NA	< 0.02	109%	60%	130%	114%	60%	130%	118%	60%	130%
Toluene	7312041		< 0.08	< 0.08	NA	< 0.08	95%	60%	130%	105%	60%	130%	127%	60%	130%
Ethylbenzene	7312041		< 0.05	< 0.05	NA	< 0.05	98%	60%	130%	111%	60%	130%	121%	60%	130%
Xylene Mixture	7312041		< 0.05	< 0.05	NA	< 0.05	103%	60%	130%	120%	60%	130%	124%	60%	130%
F1 (C6 to C10)	7312041		< 5	< 5	NA	< 5	110%	60%	130%	103%	85%	115%	99%	70%	130%
F2 (C10 to C16)	7310053		< 10	< 10	NA	< 10	107%	60%	130%	98%	80%	120%	100%	70%	130%
F3 (C16 to C34)	7310053		< 50	< 50	NA	< 50	104%	60%	130%	95%	80%	120%	103%	70%	130%
F4 (C34 to C50)	7310053		< 50	< 50	NA	< 50	92%	60%	130%	98%	80%	120%	97%	70%	130%

Comments: The soil sample was prepared in the lab using the Methanol extraction technique. The sample was not field preserved with methanol and an Encore was not provided for analysis.
When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 15T056416

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID

AGAT Laboratories

Lg Cooler

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: HCEC
Contact: K. RISPOLI
Address: 32 SEACLIFF DR. OTTAWA, ON
Phone: (613) 836-1422 Fax:
Reports to be sent to:
1. Email: krispoli@hceng.ca
2. Email: spelkey@hceng.ca

Project Information:

Project: 62739.10
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm

Region ____ *Indicate One*

☐ Regulation 558
☒ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Laboratory Use

Work Order #:
Cooler Quantity: 1ST 0564160
Arrival Temperatures: 8° | 8° | 8°
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days
Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day
OR Date Required (Rush Surcharges May Apply):
Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

(Check Applicable)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☒ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH106 SA2	23/12/15		2	S								X	X							
BH105 SA2	23/12/15		2	S								X	X							
BH 105 SA3B	23/12/15		2	S								X	X							

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
K. Rispoli K. RISPOLI	23/12/15		Simon	24/12/15	11:00
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page ____ of ____
Nº: T 011397

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: HOULE CHEVRIER
32 STEACIE DRIVE
OTTAWA, ON K2K2A9
(613) 836-1422

ATTENTION TO: Katherine Rispoli

PROJECT: 62739.10

AGAT WORK ORDER: 16T058448

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Jan 18, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 16T058448

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

PHCs F1 - F4 (Soil)

DATE RECEIVED: 2016-01-11

DATE REPORTED: 2016-01-18

		SAMPLE DESCRIPTION:		BH15-111 SA-3
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		1/8/2015
Parameter	Unit	G / S	RDL	7320088
Benzene	µg/g		0.02	<0.02
Toluene	µg/g		0.08	<0.08
Ethylbenzene	µg/g		0.05	<0.05
Xylene Mixture	µg/g		0.05	<0.05
F1 (C6 to C10)	µg/g		5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5
F2 (C10 to C16)	µg/g		10	<10
F3 (C16 to C34)	µg/g		50	<50
F4 (C34 to C50)	µg/g		50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA
Moisture Content	%		0.1	30.8
Surrogate	Unit	Acceptable Limits		
Terphenyl	%	60-140		107

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7320088 Results are based on sample dry weight.
The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Certified By:

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Quality Assurance

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16T058448

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jan 18, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
PHCs F1 - F4 (Soil)															
Benzene	7315670		< 0.02	< 0.02	NA	< 0.02	115%	60%	130%	109%	60%	130%	96%	60%	130%
Toluene	7315670		< 0.08	< 0.08	NA	< 0.08	108%	60%	130%	106%	60%	130%	95%	60%	130%
Ethylbenzene	7315670		< 0.05	< 0.05	NA	< 0.05	116%	60%	130%	111%	60%	130%	97%	60%	130%
Xylene Mixture	7315670		< 0.05	< 0.05	NA	< 0.05	116%	60%	130%	114%	60%	130%	99%	60%	130%
F1 (C6 to C10)	7315670		< 5	< 5	NA	< 5	99%	60%	130%	101%	85%	115%	113%	70%	130%
F2 (C10 to C16)	7324497		< 10	< 10	NA	< 10	95%	60%	130%	99%	80%	120%	100%	70%	130%
F3 (C16 to C34)	7324497		< 50	< 50	NA	< 50	102%	60%	130%	101%	80%	120%	99%	70%	130%
F4 (C34 to C50)	7324497		< 50	< 50	NA	< 50	81%	60%	130%	100%	80%	120%	94%	70%	130%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable(NA).

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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16T058448

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID

AGAT Laboratories

Sim Blue

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #: 16T 058448

Cooler Quantity:

Arrival Temperatures: 9 | 8.9 | 9.1

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: HOULE CHEVRIER ENGINEERING LTD.
Contact: K. RISPOLI
Address: 32 STEACIE DRIVE
OTTAWA, ON
Phone: Fax:
Reports to be sent to:
1. Email: krispoli@hceng.ca
2. Email: spelkey@hceng.ca

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*

☐ Regulation 558
☒ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on Certificate of Analysis ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: 62739.10
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

(Check Applicable)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr⁶⁺ ☐ EC ☐ FOG ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☒ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH15-111 SA-3	JAN.8/15		2	S								X	X							

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
K. Rispoli K. RISPOLI	JAN 8/15		Simran	9/1/15	935
Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page _____ of _____

Nº: T017205

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CLIENT NAME: HOULE CHEVRIER
32 STEACIE DRIVE
OTTAWA, ON K2K2A9
(613) 836-1422

ATTENTION TO: Katherine Rispoli

PROJECT: 62739.10

AGAT WORK ORDER: 16T060260

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

DATE REPORTED: Jan 22, 2016

PAGES (INCLUDING COVER): 9

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 16T060260

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

PHCs F1 - F4 (-BTEX) (Soil)

DATE RECEIVED: 2016-01-16

DATE REPORTED: 2016-01-22

		SAMPLE DESCRIPTION:		BH102 SA-2
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		1/15/2016
Parameter	Unit	G / S	RDL	7329966
F1 (C6 to C10)	µg/g		5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5
F2 (C10 to C16)	µg/g		10	<10
F3 (C16 to C34)	µg/g		50	<50
F4 (C34 to C50)	µg/g		50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA
Moisture Content	%		0.1	4.4
Surrogate	Unit	Acceptable Limits		
Terphenyl	%	60-140		85

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7329966 Results are based on sample dry weight.
The C6-C10 fraction is calculated using toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified without the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By: NPopnikolof

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AGAT WORK ORDER: 16T060260

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil

DATE RECEIVED: 2016-01-16

DATE REPORTED: 2016-01-22

		SAMPLE DESCRIPTION:		BH102 SA-2
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		1/15/2016
Parameter	Unit	G / S	RDL	7329966
Dichlorodifluoromethane	µg/g		0.05	<0.05
Chloromethane	ug/g		0.11	<0.11
Vinyl Chloride	ug/g		0.02	<0.02
Bromomethane	ug/g		0.05	<0.05
Chloroethane	ug/g		0.08	<0.08
Trichlorofluoromethane	ug/g		0.05	<0.05
Acetone	ug/g		0.50	<0.50
1,1-Dichloroethylene	ug/g		0.05	<0.05
Methylene Chloride	ug/g		0.05	<0.05
TRANS-1,2-Dichloroethylene	ug/g		0.05	<0.05
Methyl tert-butyl Ether	ug/g		0.05	<0.05
1,1-Dichloroethane	ug/g		0.02	<0.02
Methyl Ethyl Ketone	ug/g		0.50	<0.50
CIS 1,2-Dichloroethylene	ug/g		0.02	<0.02
Chloroform	ug/g		0.04	<0.04
1,2-Dichloroethane	ug/g		0.03	<0.03
1,1,1-Trichloroethane	ug/g		0.05	<0.05
Carbon Tetrachloride	ug/g		0.05	<0.05
Benzene	ug/g		0.02	<0.02
1,2-Dichloropropane	ug/g		0.03	<0.03
Trichloroethylene	ug/g		0.03	<0.03
Bromodichloromethane	ug/g		0.04	<0.04
CIS-1,3-Dichloropropene	ug/g		0.05	<0.05
Methyl Isobutyl Ketone	ug/g		0.50	<0.50
TRANS-1,3-Dichloropropene	ug/g		0.04	<0.04
1,1,2-Trichloroethane	ug/g		0.04	<0.04
Toluene	ug/g		0.05	<0.05
2-Hexanone	ug/g		0.26	<0.26
Dibromochloromethane	ug/g		0.03	<0.03
Ethylene Dibromide	ug/g		0.04	<0.04

Certified By: NPopnikolof

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Certificate of Analysis

AGAT WORK ORDER: 16T060260

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Soil

DATE RECEIVED: 2016-01-16

DATE REPORTED: 2016-01-22

		SAMPLE DESCRIPTION:		BH102 SA-2
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		1/15/2016
Parameter	Unit	G / S	RDL	7329966
Tetrachloroethylene	ug/g		0.05	<0.05
1,1,1,2-Tetrachloroethane	ug/g		0.04	<0.04
Chlorobenzene	ug/g		0.05	<0.05
Ethylbenzene	ug/g		0.05	<0.05
m & p-Xylene	ug/g		0.05	<0.05
Bromoform	ug/g		0.03	<0.03
Styrene	ug/g		0.05	<0.05
1,1,2,2-Tetrachloroethane	ug/g		0.05	<0.05
o-Xylene	ug/g		0.05	<0.05
1,3-Dichlorobenzene	ug/g		0.05	<0.05
1,4-Dichlorobenzene	ug/g		0.05	<0.05
1,2-Dichlorobenzene	ug/g		0.05	<0.05
1,2,4-Trichlorobenzene	ug/g		0.05	<0.05
Xylene Mixture (Total)	ug/g		0.05	<0.05
1,3-Dichloropropene (Cis + Trans)	µg/g		0.04	<0.04
n-Hexane	µg/g		0.05	<0.05
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	60-130		105
4-Bromofluorobenzene	% Recovery	70-130		89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7329966 The sample was analysed using the high level technique. The sample was extracted in the lab using methanol, a small amount of the methanol extract was diluted in water and the purge & trap GC/MS analysis was performed. Results are based on the dry weight of the soil.

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Quality Assurance

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16T060260

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jan 22, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Volatile Organic Compounds in Soil															
Dichlorodifluoromethane	7236400		< 0.05	< 0.05	NA	< 0.05	77%	60%	130%	88%	60%	130%	86%	60%	130%
Chloromethane	7236400		< 0.11	< 0.11	NA	< 0.11	85%	60%	130%	84%	60%	130%	74%	60%	130%
Vinyl Chloride	7236400		< 0.02	< 0.02	NA	< 0.02	84%	60%	130%	84%	60%	130%	83%	60%	130%
Bromomethane	7236400		< 0.05	< 0.05	NA	< 0.05	76%	60%	130%	81%	60%	130%	81%	60%	130%
Chloroethane	7236400		< 0.08	< 0.08	NA	< 0.08	83%	60%	130%	83%	60%	130%	85%	60%	130%
Trichlorofluoromethane	7236400		< 0.05	< 0.05	NA	< 0.05	92%	60%	130%	90%	60%	130%	85%	60%	130%
Acetone	7236400		< 0.50	< 0.50	NA	< 0.50	105%	60%	130%	107%	60%	130%	115%	60%	130%
1,1-Dichloroethylene	7236400		< 0.05	< 0.05	NA	< 0.05	77%	60%	130%	77%	60%	130%	97%	60%	130%
Methylene Chloride	7236400		< 0.05	< 0.05	NA	< 0.05	86%	60%	130%	99%	60%	130%	113%	60%	130%
TRANS-1,2-Dichloroethylene	7236400		< 0.05	< 0.05	NA	< 0.05	98%	60%	130%	96%	60%	130%	123%	60%	130%
Methyl tert-butyl Ether	7236400		< 0.05	< 0.05	NA	< 0.05	116%	60%	130%	92%	60%	130%	120%	60%	130%
1,1-Dichloroethane	7236400		< 0.02	< 0.02	NA	< 0.02	93%	60%	130%	87%	60%	130%	109%	60%	130%
Methyl Ethyl Ketone	7236400		< 0.50	< 0.50	NA	< 0.50	95%	60%	130%	96%	60%	130%	113%	60%	130%
CIS 1,2-Dichloroethylene	7236400		< 0.02	< 0.02	NA	< 0.02	102%	60%	130%	118%	60%	130%	119%	60%	130%
Chloroform	7236400		< 0.04	< 0.04	NA	< 0.04	109%	60%	130%	120%	60%	130%	107%	60%	130%
1,2-Dichloroethane	7236400		< 0.03	< 0.03	NA	< 0.03	111%	60%	130%	118%	60%	130%	121%	60%	130%
1,1,1-Trichloroethane	7236400		< 0.05	< 0.05	NA	< 0.05	75%	60%	130%	91%	60%	130%	105%	60%	130%
Carbon Tetrachloride	7236400		< 0.05	< 0.05	NA	< 0.05	95%	60%	130%	87%	60%	130%	118%	60%	130%
Benzene	7236400		< 0.02	< 0.02	NA	< 0.02	79%	60%	130%	82%	60%	130%	118%	60%	130%
1,2-Dichloropropane	7236400		< 0.03	< 0.03	NA	< 0.03	105%	60%	130%	98%	60%	130%	119%	60%	130%
Trichloroethylene	7236400		< 0.03	< 0.03	NA	< 0.03	89%	60%	130%	91%	60%	130%	110%	60%	130%
Bromodichloromethane	7236400		< 0.04	< 0.04	NA	< 0.04	105%	60%	130%	94%	60%	130%	100%	60%	130%
CIS-1,3-Dichloropropene	7236400		< 0.05	< 0.05	NA	< 0.05	99%	60%	130%	80%	60%	130%	85%	60%	130%
Methyl Isobutyl Ketone	7236400		< 0.50	< 0.50	NA	< 0.50	106%	60%	130%	118%	60%	130%	107%	60%	130%
TRANS-1,3-Dichloropropene	7236400		< 0.04	< 0.04	NA	< 0.04	96%	60%	130%	85%	60%	130%	74%	60%	130%
1,1,2-Trichloroethane	7236400		< 0.04	< 0.04	NA	< 0.04	119%	60%	130%	111%	60%	130%	102%	60%	130%
Toluene	7236400		< 0.05	< 0.05	NA	< 0.05	88%	60%	130%	93%	60%	130%	95%	60%	130%
2-Hexanone	7236400		< 0.26	< 0.26	NA	< 0.26	113%	60%	130%	115%	60%	130%	101%	60%	130%
Dibromochloromethane	7236400		< 0.03	< 0.03	NA	< 0.03	105%	60%	130%	98%	60%	130%	81%	60%	130%
Ethylene Dibromide	7236400		< 0.04	< 0.04	NA	< 0.04	114%	60%	130%	104%	60%	130%	96%	60%	130%
Tetrachloroethylene	7236400		< 0.05	< 0.05	NA	< 0.05	81%	60%	130%	86%	60%	130%	84%	60%	130%
1,1,1,2-Tetrachloroethane	7236400		< 0.04	< 0.04	NA	< 0.04	95%	60%	130%	94%	60%	130%	78%	60%	130%
Chlorobenzene	7236400		< 0.05	< 0.05	NA	< 0.05	100%	60%	130%	102%	60%	130%	97%	60%	130%
Ethylbenzene	7236400		< 0.05	< 0.05	NA	< 0.05	93%	60%	130%	97%	60%	130%	91%	60%	130%
m & p-Xylene	7236400		< 0.05	< 0.05	NA	< 0.05	99%	60%	130%	103%	60%	130%	95%	60%	130%
Bromoform	7236400		< 0.03	< 0.03	NA	< 0.03	113%	60%	130%	94%	60%	130%	72%	60%	130%
Styrene	7236400		< 0.05	< 0.05	NA	< 0.05	92%	60%	130%	95%	60%	130%	91%	60%	130%
1,1,2,2-Tetrachloroethane	7236400		< 0.05	< 0.05	NA	< 0.05	108%	60%	130%	120%	60%	130%	106%	60%	130%
o-Xylene	7236400		< 0.05	< 0.05	NA	< 0.05	102%	60%	130%	104%	60%	130%	98%	60%	130%

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Quality Assurance

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16T060260

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jan 22, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
1,3-Dichlorobenzene	7236400		< 0.05	< 0.05	NA	< 0.05	101%	60%	130%	100%	60%	130%	89%	60%	130%
1,4-Dichlorobenzene	7236400		< 0.05	< 0.05	NA	< 0.05	104%	60%	130%	104%	60%	130%	93%	60%	130%
1,2-Dichlorobenzene	7236400		< 0.05	< 0.05	NA	< 0.05	107%	60%	130%	105%	60%	130%	91%	60%	130%
1,2,4-Trichlorobenzene	7236400		< 0.05	< 0.05	NA	< 0.05	92%	60%	130%	92%	60%	130%	75%	60%	130%
1,3-Dichloropropene (Cis + Trans)	7236400		< 0.04	< 0.04	NA	< 0.04	98%	60%	130%	83%	60%	130%	80%	60%	130%
n-Hexane	7236400		< 0.05	< 0.05	NA	< 0.05	97%	60%	130%	104%	60%	130%	78%	60%	130%
PHCs F1 - F4 (-BTEX) (Soil)															
F1 (C6 to C10)	7328028		< 5	< 5	NA	< 5	82%	60%	130%	89%	85%	115%	94%	70%	130%
F2 (C10 to C16)	7323931		< 10	< 10	NA	< 10	100%	60%	130%	100%	80%	120%	99%	70%	130%
F3 (C16 to C34)	7323931		< 50	< 50	NA	< 50	102%	60%	130%	99%	80%	120%	101%	70%	130%
F4 (C34 to C50)	7323931		< 50	< 50	NA	< 50	84%	60%	130%	94%	80%	120%	100%	70%	130%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: NPopnikolof

AGAT Laboratories

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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16T060260

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P &T GC / FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method, SW846 5035	P & T GC / FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	GRAVIMETRIC ANALYSIS
Moisture Content	VOL-91-5009	CCME Tier 1 Method, SW846 5035,8015	BALANCE
Terphenyl	VOL-91-5009		GC/FID
Dichlorodifluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Acetone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
TRANS-1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl tert-butyl Ether	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
CIS 1,2-Dichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Benzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
CIS-1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
TRANS-1,3-Dichloropropene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
2-Hexanone	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Styrene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

5835 COOPERS AVENUE
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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16T060260

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,4-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,2,4-Trichlorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Xylene Mixture (Total)	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5002	EPA SW-846 5035 & 8260	(P&T)GC/MS

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Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #: 16T060260

Cooler Quantity:

Arrival Temperatures: 4 | 4 | 4

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Report Information:

Company: HOULE CHEVRIER ENG. LTD.
Contact: K. RISPOLI
Address: 32 STEACIE DR.
OTTAWA ON
Phone: (613)836-1422 Fax:
Reports to be sent to:
1. Email: krispoli@hceng.ca
2. Email: spelkey@hceng.ca

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm

Region ____ *Indicate One*

☐ Regulation 558
☒ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
____ *Indicate One*

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: 62739.10
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

(Check Applicable)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐B-HWS ☐Cl ☐CN⁻ ☐Cr⁶⁺ ☐EC ☐FOC ☐NO_3/NO_2 ☐Total N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH_3 ☐TKN ☐NO_3 ☐NO_2 ☐NO_3/NO_2	Volatiles: ☒VOC ☐BTEX ☐THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH102 SA-2	15/01/16	1PM	2	S								X	X							

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	
K. RISPOLI K. RISPOLI	15/01/16	5:30PM	Jan.16/16	9:30		Page ____ of ____
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	Nº: T 011310

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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CLIENT NAME: HOULE CHEVRIER
32 STEACIE DRIVE
OTTAWA, ON K2K2A9
(613) 836-1422

ATTENTION TO: Katherine Rispoli; Shaun Pelkey

PROJECT: 62739.10

AGAT WORK ORDER: 16Z059332

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Jan 20, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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FAX (905)712-5122
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Certificate of Analysis

AGAT WORK ORDER: 16Z059332

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli; Shaun Pelkey

SAMPLING SITE:

SAMPLED BY:

PHCs F1 - F4 (Soil)

DATE RECEIVED: 2016-01-13

DATE REPORTED: 2016-01-20

		SAMPLE DESCRIPTION:		BH15-108 SA-3	BH15-110 SA-3
		SAMPLE TYPE:		Soil	Soil
		DATE SAMPLED:		1/12/2016	1/12/2016
Parameter	Unit	G / S	RDL	7326083	7326087
Benzene	µg/g		0.02	<0.02	<0.02
Toluene	µg/g		0.08	<0.08	<0.08
Ethylbenzene	µg/g		0.05	<0.05	<0.05
Xylene Mixture	µg/g		0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g		5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5	<5
F2 (C10 to C16)	µg/g		10	<10	<10
F3 (C16 to C34)	µg/g		50	<50	<50
F4 (C34 to C50)	µg/g		50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA	NA
Moisture Content	%		0.1	8.2	28.5
Surrogate	Unit	Acceptable Limits			
Terphenyl	%	60-140		98	82

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7326083-7326087 Results are based on sample dry weight.
The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Certified By:

AGAT Laboratories

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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16Z059332

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli; Shaun Pelkey

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jan 20, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
PHCs F1 - F4 (Soil)															
Benzene	7319431		0.06	0.08	NA	< 0.02	115%	60%	130%	109%	60%	130%	96%	60%	130%
Toluene	7319431		< 0.08	< 0.08	NA	< 0.08	108%	60%	130%	106%	60%	130%	95%	60%	130%
Ethylbenzene	7319431		< 0.05	< 0.05	NA	< 0.05	116%	60%	130%	111%	60%	130%	97%	60%	130%
Xylene Mixture	7319431		< 0.05	< 0.05	NA	< 0.05	116%	60%	130%	114%	60%	130%	99%	60%	130%
F1 (C6 to C10)	7319431		< 5	< 5	NA	< 5	99%	60%	130%	101%	85%	115%	113%	70%	130%
F2 (C10 to C16)	7324497		< 10	< 10	NA	< 10	95%	60%	130%	99%	80%	120%	100%	70%	130%
F3 (C16 to C34)	7324497		< 50	< 50	NA	< 50	102%	60%	130%	101%	80%	120%	99%	70%	130%
F4 (C34 to C50)	7324497		< 50	< 50	NA	< 50	81%	60%	130%	100%	80%	120%	94%	70%	130%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable(NA).

Certified By:

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MISSISSAUGA, ONTARIO
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FAX (905)712-5122
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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16Z059332

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli; Shaun Pelkey

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID

AGAT Laboratories

Short Holding Time
Unpreserved Soil for Volatiles

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #: 167059332

Cooler Quantity: 1

Arrival Temperatures: 7.0 | 6.8 | 6.5
7 | 6.2 | 6.3

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: MOULE CHEVRIER ENG LTD.
Contact: K. RISPOLI
Address: 32 STEACIE DR. OTTAWA, ON
Phone: (613) 836-1422 Fax:
Reports to be sent to:
1. Email: krispoli@hceng.ca
2. Email: spelkey@hceng.ca

Regulatory Requirements: ☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ *Indicate One*

☐ Regulation 558
☒ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: 62739.1D
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

(Check Applicable)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN⁻ ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☒ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH15-108 SA-3	JAN 12/16	11AM	2	S								X	X							
BH15-110 SA-3	↓	11AM	2	S								X	X							

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
K. Rispoli K. RISPOLI	13/01/16		1405, Smith. Jan Bonnitly LBerthelet	13-Jan-16	14h15
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
			Simon	16/1/14	9:00

Page 1 of 1

№: T017207

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CLIENT NAME: HOULE CHEVRIER
32 STEACIE DRIVE
OTTAWA, ON K2K2A9
(613) 836-1422

ATTENTION TO: Katherine Rispoli, Shaun McEwen

PROJECT: 62739.10

AGAT WORK ORDER: 16Z059663

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Jan 20, 2016

PAGES (INCLUDING COVER): 5

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16Z059663

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli, Shaun McEwen

SAMPLING SITE:

SAMPLED BY:

PHCs F1 - F4 (Soil)

DATE RECEIVED: 2016-01-14

DATE REPORTED: 2016-01-20

		SAMPLE DESCRIPTION:		BH15-109 SA2
		SAMPLE TYPE:		Soil
		DATE SAMPLED:		1/13/2016
Parameter	Unit	G / S	RDL	7329469
Benzene	µg/g		0.02	<0.02
Toluene	µg/g		0.08	<0.08
Ethylbenzene	µg/g		0.05	<0.05
Xylene Mixture	µg/g		0.05	<0.05
F1 (C6 to C10)	µg/g		5	<5
F1 (C6 to C10) minus BTEX	µg/g		5	<5
F2 (C10 to C16)	µg/g		10	<10
F3 (C16 to C34)	µg/g		50	<50
F4 (C34 to C50)	µg/g		50	<50
Gravimetric Heavy Hydrocarbons	µg/g		50	NA
Moisture Content	%		0.1	19.5
Surrogate	Unit	Acceptable Limits		
Terphenyl	%	60-140		104

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7329469 The soil sample was prepared in the lab using the Methanol extraction technique. The sample was not field preserved with methanol and an Encore was not provided for analysis.
Results are based on sample dry weight.
The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and n-C34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16-C50 and are only determined if the chromatogram of the C34 - C50 hydrocarbons indicates that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6 - C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 + nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.
Quality Control Data is available upon request.

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16Z059663

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli, Shaun McEwen

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: Jan 20, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
PHCs F1 - F4 (Soil)															
Benzene	7328028		< 0.02	< 0.02	NA	< 0.02	94%	60%	130%	63%	60%	130%	84%	60%	130%
Toluene	7328028		< 0.08	< 0.08	NA	< 0.08	95%	60%	130%	61%	60%	130%	87%	60%	130%
Ethylbenzene	7328028		< 0.05	< 0.05	NA	< 0.05	98%	60%	130%	61%	60%	130%	82%	60%	130%
Xylene Mixture	7328028		< 0.05	< 0.05	NA	< 0.05	99%	60%	130%	68%	60%	130%	84%	60%	130%
F1 (C6 to C10)	7328028		< 5	< 5	NA	< 5	82%	60%	130%	89%	85%	115%	94%	70%	130%
F2 (C10 to C16)	7324497		< 10	< 10	NA	< 10	95%	60%	130%	99%	80%	120%	100%	70%	130%
F3 (C16 to C34)	7324497		< 50	< 50	NA	< 50	102%	60%	130%	101%	80%	120%	99%	70%	130%
F4 (C34 to C50)	7324497		< 50	< 50	NA	< 50	81%	60%	130%	100%	80%	120%	94%	70%	130%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable(NA).

Certified By:

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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16Z059663

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli, Shaun McEwen

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Toluene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Ethylbenzene	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
Xylene Mixture	VOL-91-5009	EPA SW-846 5035 & 8260	P & T GC/MS
F1 (C6 to C10)	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5009	CCME Tier 1 Method	P & T GC/FID
F2 (C10 to C16)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F3 (C16 to C34)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
F4 (C34 to C50)	VOL-91-5009	CCME Tier 1 Method, EPA SW846 8015	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5009	CCME Tier 1 Method	BALANCE
Moisture Content	VOL-91-5009	CCME Tier 1 Method	BALANCE
Terphenyl	VOL-91-5009		GC/FID

AGAT Laboratories

Short Holding Time
Lg Cooler

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
www.agatlabs.com webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #: 1670596 63

Cooler Quantity: 1

Arrival Temperatures: 9.6 | 9.1 | 10.0
4° | 5° | 4°

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes:

Report Information:

Company: HOULE CHEVRIER ENG LTD.
Contact: K. RISPOLI
Address: 32 STEACIE DR
OTTAWA, ON
Phone: (613) 836-1422 Fax:
Reports to be sent to:
1. Email: krispoli@heeng.ca
2. Email: spelkey@heeng.ca

Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ (Indicate One)
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ____ (Indicate One)

☐ Regulation 558
☒ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other ____ (Indicate One)

Is this submission for a **Record of Site Condition**? ☐ Yes ☒ No

Report Guideline on Certificate of Analysis ☒ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: 62739.10
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

(Check Applicable)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO_3/NO_2 ☐ Total N ☐ Hg ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3/NO_2	Volatiles: ☐ VOC ☒ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH15/09 SA 2	JAN 13/16	1PM	2	S								X	✓							

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	
K. Rispoli K. RISPOLI	JAN 14/16		Bethelot	14-Jan-16	10h00	Page ____ of ____
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign): Simon	16/1/15	8:45	N°: T 011309

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CLIENT NAME: HOULE CHEVRIER
32 STEACIE DRIVE
OTTAWA, ON K2K2A9
(613) 836-1422

ATTENTION TO: Katherine Rispoli

PROJECT: 62739.10

AGAT WORK ORDER: 16Z062589

TRACE ORGANICS REVIEWED BY: Oksana Gushyla, Trace Organics Lab Supervisor

DATE REPORTED: Feb 02, 2016

PAGES (INCLUDING COVER): 10

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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Certificate of Analysis

AGAT WORK ORDER: 16Z062589

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:ML

O. Reg. 153(511) - PHCs F1 - F4 (-BTEX) (Water)

DATE RECEIVED: 2016-01-26

DATE REPORTED: 2016-02-02

				Well others A
		SAMPLE DESCRIPTION:		GW-101
		SAMPLE TYPE:		Water
		DATE SAMPLED:		1/25/2016
Parameter	Unit	G / S	RDL	7351485
F1 (C6 to C10)	µg/L		25	<25
F1 (C6 to C10) minus BTEX	µg/L		25	<25
F2 (C10 to C16)	µg/L		100	<100
F3 (C16 to C34)	µg/L		100	<100
F4 (C34 to C50)	µg/L		100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA
Surrogate	Unit	Acceptable Limits		
Terphenyl	%	60-140		89

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7351485 The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153, results are considered valid without determining the PAH contribution if not requested by the client.

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16Z062589

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:ML

O. Reg. 153(511) - PHCs F1 - F4 (Water)

DATE RECEIVED: 2016-01-26

DATE REPORTED: 2016-02-02

		SAMPLE DESCRIPTION:		BH108E GW-1	BH109E GW-1	BH110E GW-1	BH111E GW-1	Well others A GW-1	Field blank	Trip blank
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016	1/25/2016
Parameter	Unit	G / S	RDL	7351429	7351437	7351441	7351446	7351468	7351494	7351503
Benzene	µg/L		0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L		0.20	0.49	<0.20	<0.20	0.27	<0.20	<0.20	<0.20
Ethylbenzene	µg/L		0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Xylene Mixture	µg/L		0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
F1 (C6 to C10)	µg/L		25	<25	<25	<25	<25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L		25	<25	<25	<25	<25	<25	<25	<25
F2 (C10 to C16)	µg/L		100	<100	<100	<100	<100	<100	<100	<100
F3 (C16 to C34)	µg/L		100	<100	<100	<100	<100	<100	<100	<100
F4 (C34 to C50)	µg/L		100	<100	<100	<100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L		500	NA	NA	NA	NA	NA	NA	NA
Surrogate	Unit	Acceptable Limits								
Terphenyl	%	60-140		96	101	115	104	92	66	62

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

7351429-7351503 The C6-C10 fraction is calculated using Toluene response factor.
The C10 - C16, C16 - C34, and C34 - C50 fractions are calculated using the average response factor for n-C10, n-C16, and nC34.
Gravimetric Heavy Hydrocarbons are not included in the Total C16 - C50 and are only determined if the chromatogram of the C34 - C50 Hydrocarbons indicated that hydrocarbons >C50 are present.
The chromatogram has returned to baseline by the retention time of nC50.
Total C6-C50 results are corrected for BTEX contributions.
This method complies with the Reference Method for the CWS PHC and is validated for use in the laboratory.
nC6 and nC10 response factors are within 30% of Toluene response factor.
nC10, nC16 and nC34 response factors are within 10% of their average.
C50 response factor is within 70% of nC10 + nC16 nC34 average.
Linearity is within 15%.
Extraction and holding times were met for this sample.
Fractions 1-4 are quantified with the contribution of PAHs. Under Ontario Regulation 153/04, results are considered valid without determining the PAH contribution if not requested by the client.
NA = Not Applicable

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16Z062589

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

SAMPLING SITE:

ATTENTION TO: Katherine Rispoli

SAMPLED BY:ML

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2016-01-26

DATE REPORTED: 2016-02-02

				Well others A
		SAMPLE DESCRIPTION:		GW-101
		SAMPLE TYPE:		Water
		DATE SAMPLED:		1/25/2016
Parameter	Unit	G / S	RDL	7351485
Dichlorodifluoromethane	µg/L		0.20	<0.20
Vinyl Chloride	µg/L		0.17	<0.17
Bromomethane	µg/L		0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	<0.40
Acetone	µg/L		1.0	<1.0
1,1-Dichloroethylene	µg/L		0.30	<0.30
Methylene Chloride	µg/L		0.30	<0.30
trans- 1,2-Dichloroethylene	µg/L		0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20	<0.20
1,1-Dichloroethane	µg/L		0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20	<0.20
Chloroform	µg/L		0.20	<0.20
1,2-Dichloroethane	µg/L		0.20	<0.20
1,1,1-Trichloroethane	µg/L		0.30	<0.30
Carbon Tetrachloride	µg/L		0.20	<0.20
Benzene	µg/L		0.20	<0.20
1,2-Dichloropropane	µg/L		0.20	<0.20
Trichloroethylene	µg/L		0.20	0.28
Bromodichloromethane	µg/L		0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0	<1.0
1,1,2-Trichloroethane	µg/L		0.20	<0.20
Toluene	µg/L		0.20	0.39
Dibromochloromethane	µg/L		0.10	<0.10
Ethylene Dibromide	µg/L		0.10	<0.10
Tetrachloroethylene	µg/L		0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10	<0.10
Chlorobenzene	µg/L		0.10	<0.10
Ethylbenzene	µg/L		0.10	<0.10

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 16Z062589

PROJECT: 62739.10

CLIENT NAME: HOULE CHEVRIER

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:ML

O. Reg. 153(511) - VOCs (Water)

DATE RECEIVED: 2016-01-26

DATE REPORTED: 2016-02-02

				Well others A
		SAMPLE DESCRIPTION:		GW-101
		SAMPLE TYPE:		Water
		DATE SAMPLED:		1/25/2016
Parameter	Unit	G / S	RDL	7351485
m & p-Xylene	µg/L		0.20	<0.20
Bromoform	µg/L		0.10	<0.10
Styrene	µg/L		0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10	<0.10
o-Xylene	µg/L		0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.10	<0.10
1,3-Dichloropropene	µg/L		0.30	<0.30
Xylene Mixture	µg/L		0.20	<0.20
n-Hexane	µg/L		0.20	<0.20
Surrogate	Unit	Acceptable Limits		
Toluene-d8	% Recovery	50-140		88
4-Bromofluorobenzene	% Recovery	50-140		90

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Certified By:

AGAT Laboratories

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FAX (905)712-5122
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Quality Assurance

CLIENT NAME: HOULE CHEVRIER

PROJECT: 62739.10

SAMPLING SITE:

AGAT WORK ORDER: 16Z062589

ATTENTION TO: Katherine Rispoli

SAMPLED BY:ML

Trace Organics Analysis

RPT Date: Feb 02, 2016

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
O. Reg. 153(511) - PHCs F1 - F4 (Water)															
Benzene	7354382		< 0.20	< 0.20	NA	< 0.20	78%	50%	140%	84%	60%	130%	70%	50%	140%
Toluene	7354382		< 0.20	< 0.20	NA	< 0.20	81%	50%	140%	77%	60%	130%	111%	50%	140%
Ethylbenzene	7354382		< 0.10	< 0.10	NA	< 0.10	90%	50%	140%	83%	60%	130%	81%	50%	140%
Xylene Mixture	7354382		< 0.20	< 0.20	NA	< 0.20	91%	50%	140%	86%	60%	130%	110%	50%	140%
F1 (C6 to C10)	7354382		< 25	< 25	NA	< 25	87%	60%	140%	97%	60%	140%	97%	60%	140%
F2 (C10 to C16)	7351494	7351494	< 100	< 100	NA	< 100	103%	60%	140%	68%	60%	140%	88%	60%	140%
F3 (C16 to C34)	7351494	7351494	< 100	< 100	NA	< 100	108%	60%	140%	82%	60%	140%	110%	60%	140%
F4 (C34 to C50)	7351494	7351494	< 100	< 100	NA	< 100	106%	60%	140%	99%	60%	140%	98%	60%	140%
O. Reg. 153(511) - VOCs (Water)															
Dichlorodifluoromethane	7344370		< 0.20	< 0.20	NA	< 0.20	114%	50%	140%	105%	50%	140%	122%	50%	140%
Vinyl Chloride	7344370		< 0.17	< 0.17	NA	< 0.17	122%	50%	140%	114%	50%	140%	114%	50%	140%
Bromomethane	7344370		< 0.20	< 0.20	NA	< 0.20	106%	50%	140%	108%	50%	140%	104%	50%	140%
Trichlorofluoromethane	7344370		< 0.40	< 0.40	NA	< 0.40	93%	50%	140%	101%	50%	140%	104%	50%	140%
Acetone	7344370		< 1.0	< 1.0	NA	< 1.0	93%	50%	140%	109%	50%	140%	120%	50%	140%
1,1-Dichloroethylene	7344370		< 0.30	< 0.30	NA	< 0.30	127%	50%	140%	88%	60%	130%	114%	50%	140%
Methylene Chloride	7344370		< 0.30	< 0.30	NA	< 0.30	123%	50%	140%	97%	60%	130%	115%	50%	140%
trans- 1,2-Dichloroethylene	7344370		< 0.20	< 0.20	NA	< 0.20	119%	50%	140%	88%	60%	130%	112%	50%	140%
Methyl tert-butyl ether	7344370		< 0.20	< 0.20	NA	< 0.20	109%	50%	140%	74%	60%	130%	98%	50%	140%
1,1-Dichloroethane	7344370		< 0.30	< 0.30	NA	< 0.30	86%	50%	140%	87%	60%	130%	79%	50%	140%
Methyl Ethyl Ketone	7344370		< 1.0	< 1.0	NA	< 1.0	90%	50%	140%	91%	50%	140%	112%	50%	140%
cis- 1,2-Dichloroethylene	7344370		< 0.20	< 0.20	NA	< 0.20	104%	50%	140%	72%	60%	130%	111%	50%	140%
Chloroform	7344370		< 0.20	< 0.20	NA	< 0.20	115%	50%	140%	74%	60%	130%	116%	50%	140%
1,2-Dichloroethane	7344370		< 0.20	< 0.20	NA	< 0.20	117%	50%	140%	95%	60%	130%	122%	50%	140%
1,1,1-Trichloroethane	7344370		< 0.30	< 0.30	NA	< 0.30	95%	50%	140%	74%	60%	130%	90%	50%	140%
Carbon Tetrachloride	7344370		< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	81%	60%	130%	95%	50%	140%
Benzene	7344370		< 0.20	< 0.20	NA	< 0.20	110%	50%	140%	96%	60%	130%	104%	50%	140%
1,2-Dichloropropane	7344370		< 0.20	< 0.20	NA	< 0.20	97%	50%	140%	87%	60%	130%	102%	50%	140%
Trichloroethylene	7344370		< 0.20	< 0.20	NA	< 0.20	103%	50%	140%	92%	60%	130%	105%	50%	140%
Bromodichloromethane	7344370		< 0.20	< 0.20	NA	< 0.20	110%	50%	140%	92%	60%	130%	108%	50%	140%
Methyl Isobutyl Ketone	7344370		< 1.0	< 1.0	NA	< 1.0	86%	50%	140%	81%	50%	140%	96%	50%	140%
1,1,2-Trichloroethane	7344370		< 0.20	< 0.20	NA	< 0.20	97%	50%	140%	105%	60%	130%	109%	50%	140%
Toluene	7344370		< 0.20	< 0.20	NA	< 0.20	90%	50%	140%	99%	60%	130%	100%	50%	140%
Dibromochloromethane	7344370		< 0.10	< 0.10	NA	< 0.10	93%	50%	140%	96%	60%	130%	101%	50%	140%
Ethylene Dibromide	7344370		< 0.10	< 0.10	NA	< 0.10	91%	50%	140%	98%	60%	130%	106%	50%	140%
Tetrachloroethylene	7344370		< 0.20	< 0.20	NA	< 0.20	93%	50%	140%	101%	60%	130%	96%	50%	140%
1,1,1,2-Tetrachloroethane	7344370		< 0.10	< 0.10	NA	< 0.10	99%	50%	140%	88%	60%	130%	97%	50%	140%
Chlorobenzene	7344370		< 0.10	< 0.10	NA	< 0.10	100%	50%	140%	102%	60%	130%	102%	50%	140%
Ethylbenzene	7344370		< 0.10	< 0.10	NA	< 0.10	93%	50%	140%	93%	60%	130%	92%	50%	140%

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Quality Assurance

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16Z062589

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:ML

Trace Organics Analysis (Continued)

RPT Date: Feb 02, 2016			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
m & p-Xylene	7344370		< 0.20	< 0.20	NA	< 0.20	102%	50%	140%	102%	60%	130%	98%	50%	140%
Bromoform	7344370		< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	97%	60%	130%	105%	50%	140%
Styrene	7344370		< 0.10	< 0.10	NA	< 0.10	94%	50%	140%	93%	60%	130%	94%	50%	140%
1,1,2,2-Tetrachloroethane	7344370		< 0.10	< 0.10	NA	< 0.10	115%	50%	140%	109%	60%	130%	118%	50%	140%
o-Xylene	7344370		< 0.10	< 0.10	NA	< 0.10	106%	50%	140%	105%	60%	130%	104%	50%	140%
1,3-Dichlorobenzene	7344370		< 0.10	< 0.10	NA	< 0.10	100%	50%	140%	92%	60%	130%	94%	50%	140%
1,4-Dichlorobenzene	7344370		< 0.10	< 0.10	NA	< 0.10	112%	50%	140%	104%	60%	130%	103%	50%	140%
1,2-Dichlorobenzene	7344370		< 0.10	< 0.10	NA	< 0.10	106%	50%	140%	96%	60%	130%	97%	50%	140%
1,3-Dichloropropene	7344370		< 0.30	< 0.30	NA	< 0.30	79%	50%	140%	81%	60%	130%	76%	50%	140%
n-Hexane	7344370		< 0.20	< 0.20	NA	< 0.20	77%	50%	140%	84%	60%	130%	82%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16Z062589

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:ML

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
F1 (C6 to C10)	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC E3421	GC / FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC E3421	GC / FID
F4 (C34 to C50)	VOL-91-5010	MOE PHC E3421	GC / FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC E3421	BALANCE
Terphenyl	VOL-91-5010		GC/FID
Benzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Toluene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Ethylbenzene	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
Xylene Mixture	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10)	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F1 (C6 to C10) minus BTEX	VOL-91-5010	MOE PHC-E3421	(P&T)GC/FID
F2 (C10 to C16)	VOL-91-5010	MOE PHC-E3421	GC/FID
F3 (C16 to C34)	VOL-91-5010	MOE PHC-E3421	GC/FID
F4 (C34 to C50)	VOL -91- 5010	MOE PHC-E3421	GC/FID
Gravimetric Heavy Hydrocarbons	VOL-91-5010	MOE PHC-E3421	BALANCE
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS

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Method Summary

CLIENT NAME: HOULE CHEVRIER

AGAT WORK ORDER: 16Z062589

PROJECT: 62739.10

ATTENTION TO: Katherine Rispoli

SAMPLING SITE:

SAMPLED BY:ML

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS

AGAT Laboratories

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Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Laboratory Use Only

Work Order #: 167062589

Cooler Quantity: 1

Arrival Temperatures: 7.3 | 7.1 | 8.1 | 7 | 6.9 | 7.6

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Report Information:

Company: Hole Chevrier Eng.
Contact: Kathryn Rispoli
Address: 32 Steacie drive
Phone: 613 836 1422 Fax:
Reports to be sent to:
1. Email: krispoli@hceng.ca
2. Email:

Regulatory Requirements:

☐ No Regulatory Requirement

(Please check all applicable boxes)

☑ Regulation 153/04
Table ___ (Indicate One)
☐ Ind/Com
☐ Res/Park
☐ Agriculture

Soil Texture (Check One)
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region ___ (Indicate One)

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
___ (Indicate One)

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on Certificate of Analysis ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

Project Information:

Project: 62739.10
Site Location:
Sampled By: Mich L.
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

(Check Applicable)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐B-HWS ☐Cl ☐CN ☐Cr6+ ☐EC ☐FOC ☐NO3/NO2 ☐Total N ☐Hg ☐pH ☐SAR	Nutrients: ☐TP ☐NH3 ☐TKN ☐NO3 ☐NO2 ☐NO3/NO2	Volatiles: ☐VOC ☑BTEX ☐THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use	VOC's
BH108E GW-1	Jan 25	am	4	GW								✓	✓								
BH109 E GW-1	2016	am	4									✓	✓								
BH110 E GW-1		am	4									✓	✓								
BH111 E GW-1		am	4									✓	✓								
												~~✓~~	~~✓~~							~~✓~~	
Well others A GW1		pm	7									✓	✓							✓	
Well others A GW1A		pm	3										✓								
Field blank			9	~~GW~~																	
Trip blank			3																		

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	
Mich L.	Jan	4:18 pm	LBerthelot/	25-Jan-16	16h19	Page 1 of 1
Samples Relinquished By (Print Name and Sign):	Date 25 2016	Time	Samples Received By (Print Name and Sign): Simon	Date 26/1/16	Time 9:00	No: T 018428

APPENDIX G

Table G1 and G2

TABLE G1
SOIL ANALYTICAL RESULTS
PETROLEUM HYDROCARBONS

Parameter	Units	CCME [1,2]	Ontario Reg. 153/04	SSRO (within 30 m of a building)[4] Surface Soil (0 to 1.5 m)	SSRO (within 30 m of a building)[4] Subsurface Soil (>1.5 m)	Sample Location: / Sample ID: / Date Sampled:	BH105 / BH105 SA-2 / 12/23/2015	BH16-105 / BH16-105 SA-3B / 12/23/2015	BH106 / BH106 SA-2 / 12/23/2015	BH15-108 / BH15-108 SA-3 / 01/12/2016	BH109 / BH15-109 SA-2 / 01/13/2016	BH15-110 / BH15-110 SA-3 / 01/12/2016	BH15-111E / BH15-111E SA-3 / 01/08/2015
Benzene	µg/g	0.0	0.32				<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Toluene	µg/g	0.4	68				<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Ethylbenzene	µg/g	0.1	9.5				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Xylene Mixture	µg/g	11.0	26				<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
F1 (C6 to C10)	µg/g						<5	<5	<5	<5	<5	<5	<5
F1 (C6 to C10) minus BTEX	µg/g	320	55	320	7500		<5	<5	<5	<5	<5	<5	<5
F2 (C10 to C16)	µg/g	260	230	480	61000		<10	**2600**	<10	<10	<10	<10	<10
F3 (C16 to C34)	µg/g	1700	1700	NC	NC		<50	<50	<50	<50	<50	<50	<50
F4 (C34 to C50)	µg/g	3300	3300	NC	NC		<50	<50	<50	<50	<50	<50	<50
Gravimetric Heavy Hydrocarbons	µg/g						NA	NA	NA	NA	NA	NA	NA
Moisture Content	µg/g						8.8	16.4	19.5	8.2	19.5	28.5	30.8
Terphenyl	µg/g						103	130	61	98	104	82	107

Notes:

1 Canadian Council of Ministers of the Environment (CCME), Canada-Wide Standards (CWS) for petroleum hydrocarbons (PHC) in Soil, Tier 1 levels (commercial land use, non-potable groundwater, coarse testured soil, 2001, as updated 2008;
2 CCME Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health. Commercial Land-Use; coarse textured soil, 2004
3 Ontario Regulation 153 Standards: Table 3: Non-potable groundwater use, Industrial/Commercial/Community Property use and coarse-textured soils, 2011
4 Site specific remedial objectives calculated by Stantec (HHERA Task 1, 2012) for the contaminants of concern present in soil at the Site. Surface and Subsurface soil.
5 **BOLD** - Exceeds one or multiple of the above standards

TABLE G2
GROUNDWATER ANALYTICAL RESULTS
PETROLEUM HYDROCARBONS

Parameter	Units	Government of Canada [1]	Ontario Reg. 153/04	RDL	BH15-104E 01/06/2016	BH15-105E 01/05/2016	BH15-106E 01/05/2016	BH108E GW-1 01/25/2016	BH109E GW-1 01/25/2016	BH110E GW-1 01/25/2016	BH111E GW-1 01/25/2016	Field blank 01/25/2016	Trip blank 01/25/2016
Benzene	µg/L	690	0.5	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L	83	0.8	0.20	<0.20	<0.20	<0.20	0.49	<0.20	<0.20	0.27	<0.20	<0.20
Ethylbenzene	µg/L	3200	0.5	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Xylene Mixture	µg/L	13000	72	0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
F1 (C6 to C10)	µg/L			25	<25	<25	<25	<25	<25	<25	<25	<25	<25
F1 (C6 to C10) minus BTEX	µg/L	9100	420	25	<25	<25	<25	<25	<25	<25	<25	<25	<25
F2 (C10 to C16)	µg/L	1300	150	100	<100	**9500**	<100	<100	<100	<100	<100	<100	<100
F3 (C16 to C34)	µg/L		500	100	110	140	<100	<100	<100	<100	<100	<100	<100
F4 (C34 to C50)	µg/L		500	100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Gravimetric Heavy Hydrocarbons	µg/L			500	NA	NA	NA	NA	NA	NA	NA	NA	NA
Terphenyl	%				81	67	92	96	101	115	104	66	62

Notes:

1 Government of Canada, Guidance Document on Federal Interium Groundwater Quality Guidelines for Federal Contaminated Sites (Version 3), November 2015
2 Ontario Regulation 153 Standards: Table 3: Non-potable groundwater use, Industrial/Commercial/Community Property use and coarse-textured soils, 2011
3 **BOLD** - Exceeds one or multiple of the above standards
4 RDL - Reported Detection Limit

geotechnical

environmental

hydrogeology

materials testing & inspection

experience • knowledge • reliability

APPENDIX B

GEMTEC
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Supplemental Geotechnical Investigation
Proposed Sanitary and Storm Sewer - Phase 3
National Research Council Canada
Montreal Road Campus
Ottawa, Ontario

experience • knowledge • integrity expérience • connaissance • intégrité

GEMTEC
www.gemtec.ca

Submitted to:

National Research Council Canada
1200 Montreal Road
Ottawa, Ontario
K1A 0R6

Supplemental Geotechnical Investigation
Proposed Sanitary and Storm Sewer - Phase 3
National Research Council Canada
Montreal Road Campus
Ottawa, Ontario

February 6, 2018
Project: 62739.10

experience • knowledge • integrity

GEMTEC Consulting Engineers and Scientists Limited
32 Steacie Drive
Ottawa, ON, Canada
K2K 2A9

February 6, 2018 File: 62739.10

National Research Council Canada
1200 Montreal Road
Ottawa, Ontario
K1A 0R6

Attention: Mr. Bruno Vallières

Re: Supplemental Geotechnical Investigation
Proposed Sanitary and Storm Sewer – Phase 3
National Research Council Canada - Montreal Road Campus
Ottawa, Ontario

Enclosed is our geotechnical investigation report for the above noted project, in accordance with our proposal dated November 13, 2017. This report was prepared by Gregory Davidson, B.Eng., E.I.T. and Brent Wiebe, P.Eng.

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1.0 INTRODUCTION

This report presents the results of a supplemental subsurface investigation carried out for the on-going sewer separation project at the Montreal Road Campus of the National Research Council Canada (NRC) in Ottawa, Ontario (see Key Plan, Figure 1).

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC), formerly Houle Chevrier Engineering Ltd. previously conducted a geotechnical investigation for the proposed sewer work at this site. The results of that investigation are summarized in the report should be read in conjunction with that report titled: "Geotechnical Investigation, Proposed Sanitary and Storm Sewer, National Research Council Canada, Montreal Road Campus, Ottawa, Ontario", dated March 11, 2016, which should be read in conjunction with this report.

Isolated pockets of loose glacial till were encountered during the installation of sewers in Phase 2 of this project. This resulted in the requirement for subexcavation below proposed pipe invert level and subsequent delays at some locations. In order to identify the presence of these problematic soils in Phase 3, particularly in the vicinity of the City of Ottawa watermain, additional boreholes were requested by the NRC for a portion of Phase 3. The area that was identified to us for additional investigation is the section of the proposed sewer work along Howlett Street from Legget Avenue to a distance approximately 250 metres north of Legget Avenue.

Based on the results of the supplemental investigation, this report will provide guidelines on the geotechnical aspect of the sewer installation within problematic soils (if encountered). Also, comments on trenchless sewer installation, which may be considered where the sewers will cross below the City of Ottawa watermain will be provided.

This investigation was carried out in general accordance with our proposal dated November 13, 2017.

2.0 SITE AND PROJECT DESCRIPTION

2.1 Project Description

As indicated above additional boreholes have been requested due to the presence of loose glacial till soils encountered below the groundwater level in the excavations for some portions of the current sewer. In particular, concerns have been raised with the potential for excavation issues in proximity to the existing City of Ottawa watermain. Trenchless sewer installation is being considered for certain sections crossing this watermain.

GEMTEC was provided drawings 5097-C307-4 and 5097-C307-5 titled: "Phase 3 – Plan View and Profile Alignment E (90+000 to 90+150 and 90+150 to 90+300)", dated September 2017. Based on these drawings, the invert depths for the proposed services will be about 2 to 5 metres below surface grade.

2.2 Previous Investigation by GEMTEC (formerly Houle Chevrier Engineering Ltd.)

GEMTEC (formerly HCEL) advanced seven (7) boreholes in the area of the current sewer work in the Phase 3 project limits as part of our initial geotechnical investigation (boreholes 15-15, 15-16, 15-16A, 15-16B 15-17, 15-18, and 15-19). In general, the soil conditions encountered in this area consist of existing pavement structure and fill material overlying silty clay and/or glacial till. Auger refusal on inferred bedrock was encountered in one (1) of the boreholes (borehole 15-16) at a depth of about 1.0 metres below ground surface (elevation 97.8 metres, geodetic datum).

3.0 METHODOLOGY

3.1 Borehole Investigation

The field work for the current investigation was carried out between December 13 and 15, 2017. At that time, eight (8) boreholes, numbered 17-1 to 17-8 were advanced to depths ranging from about 1.4 to 11.1 metres below surface grade (elevations 87.9 to 97.4 metres, geodetic datum), using a track mounted drill rig supplied and operated George Downing Estate Drilling Ltd. of Grenville-sur-la-Rouge, Quebec.

Standard penetration tests (SPT) were carried out in the boreholes and samples of the soils encountered were recovered using a 50 millimetre diameter split barrel sampler.

The field work was observed throughout by a member of our engineering staff who directed the drilling operations and logged the samples and boreholes.

Standpipe piezometers were installed in three (3) boreholes numbered 17-1, 17-3 and 17-6 from which static groundwater measurements were obtained and hydraulic conductivity testing carried out.

The borehole locations are shown on the Borehole Location Plan, Figure 2, following the text of this report. The Record of Borehole sheets are provided in Appendix A.

Following completion of the drilling, the soil samples were returned to our laboratory for examination by a geotechnical engineer. Selected samples were submitted for moisture content, grain size distribution testing and Atterberg limits. One (1) sample of the recovered soil from borehole 17-3 was submitted to Paracel Laboratories for sulphate and chloride testing to assess the corrosive potential of the soil on exposed concrete.

The results of the boreholes are provided on the Record of Borehole sheets in Appendix A. The approximate locations and surface grade elevations of the boreholes are shown on the Borehole Location Plan, Figure 2. The results of the laboratory classification tests on the soil samples are provided on Figures B1 and B2 in Appendix B and on the Record of Borehole sheets. The results of the chemical analysis of a sample of soil relating to corrosion of buried concrete and steel are provided in Appendix C.

The borehole locations were selected by NRC and the consulting team and positioned in the field accordingly. The ground surface elevations were obtained using our Trimble R10 GPS survey instrument. The elevations in this report and on the Record of Borehole sheets are referenced to geodetic datum.

3.2 Hydraulic Testing

Hydraulic testing was carried out in the well screens installed as part of this investigation. The hydraulic testing was carried out in order to estimate the hydraulic conductivity of the overburden within the anticipated depth of possible excavations and, if possible, to provide an estimate of the potential quantity of water entering excavations for the remediation work.

The hydraulic testing included falling and rising head tests by introducing/removing a slug. Hydraulic testing could not be completed in boreholes 17-1 and 17-3 due to low groundwater levels within the well screens. It is noted that upon insertion and removal of the slug in borehole 17-3, a strong hydrocarbon odour was detected. A summary of the hydraulic testing carried out is provided in Table 3.1.

Table 3.1 – Summary of Hydraulic Testing

Borehole	Geological Material Monitored	Test Methodology	
		Falling Head Test by Introducing a Slug[1,3]	Rising Head Test by Removing a Slug[2,3]
17-6	Bedrock	✓	✓

Notes:

1. Falling head testing involved introducing an instantaneous pressure increase to the water column within the well screen (equal to the volume of the slug) and monitoring the dissipation of the water level over time using a groundwater data logging pressure transducer together with an electric water level tape. Falling head testing was carried out on December 21, 2017.
2. Rising head testing involved introducing an instantaneous pressure decrease to the water column within the well screen (equal to the volume of the slug) and monitoring the recovery of the water level over time using a groundwater data logging pressure transducer together with an electric water level tape. Rising head testing was carried out on December 21, 2017.
3. Slug used for rising and falling heads tests has a displacement volume of 0.60 metres. Observed displacement volumes greater than 0.60 metres can be attributed to water level fluctuations caused by the rapid insertion / removal of the plastic slug.

The well screens were installed within a surround of filter sand. Above the surround of filter sand, bentonite pellets were used to seal the monitoring well from the soil above. Details of the well screens are provided on the Record of Borehole sheets in Appendix A. The results of the hydraulic testing are provided in Appendix D.

4.0 SUBSURFACE CONDITIONS

4.1 General

As previously indicated, the soil and groundwater conditions identified in the boreholes are given on the Record of Borehole sheets in Appendix A. The logs indicate the subsurface conditions at the specific test locations only. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted. The precision with which subsurface conditions are indicated depends on the method of exploration, the frequency and recovery of samples, the method of sampling, and the uniformity of the subsurface conditions. Subsurface conditions at other than the borehole locations may vary from the conditions encountered in the boreholes. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties.

The groundwater conditions described in this report refer only to those observed at the place and time of observation noted in the report. These conditions may vary seasonally or as a consequence of construction activities in the area.

The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil involves judgement and GEMTEC does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice.

The following presents an overview of the subsurface conditions encountered in the boreholes advanced as part of this investigation.

4.2 Pavement Structure

Asphaltic concrete was encountered from surface at borehole locations 17-4 and 17-8 which were advanced through the existing road. The thickness of the asphaltic concrete is about 80 and 180 millimetres at borehole 17-4 and 17-8, respectively.

The asphaltic concrete is underlain by a roadway granular base/subbase layer at borehole locations 17-4 and 17-8. The thickness of the granular base/subbase material is about 0.7 metres and is composed of brown to grey sand and gravel.

4.3 Topsoil, Topsoil Fill

A surficial layer of topsoil or topsoil fill was encountered at borehole locations 17-1 to 17-3, inclusive and 17-5 to 17-7, inclusive. The material is composed of brown silty sand with organic material and has a thickness of about 100 millimetres.

4.4 Fill Material

Fill material was encountered below the pavement structure and topsoil material at borehole locations 17-3, 17-7 and 17-8 at depths ranging from about 0.1 and 0.9 metres below surface grade. The fill material can be described as brown to grey silty sand with varying amounts of gravel and trace amounts of clay and organic material, and brownish grey silty clay with trace amounts of sand and organic material. The thickness of the fill material ranges from about 0.7 to 2.2 metres, extending to depths ranging of about 1.5 to 2.3 metres below surface grade.

Penetration tests carried out within the fill material gave N values of 10 to greater than 50 blows per 0.3 metres of penetration, which reflects a loose to very dense relative density.

The moisture content of the fill material measures about 30 percent.

4.5 Silt /Clay

Native deposits of brown to grey silty clay and brown to grey silty clay with trace amounts of sand were encountered at borehole locations 17-1, 17-2, and 17-4 to 17-8, inclusive. The silty clay was encountered below the pavement structure and fill material at depths ranging from about 0.1 to 1.5 metres below surface grade. Where fully penetrated the silty clay has a thickness ranging from about 1.4 to 5.3 metres, extending to depths ranging from about 1.5 to 6.9 metres below surface grade (elevations 91.9 to 97.4 metres, geodetic datum).

A deeper layer of native grey silty clay was encountered below the silty sand layer in borehole 17-8 at a depth of about 9.9 metres below surface grade (elevation 89.1 metres, geodetic datum).

Penetration tests carried out in the silty clay layers measured from “weight of the hammer” to 23 blows per 0.3 metres of penetration. Based on our experience with native clays in the Ottawa region, the N values reflect a soft to very stiff consistency. In general the silty clay becomes softer with depth.

The results of Atterberg limit testing carried out on samples of the silty clay are provided on Figure B1 in Appendix B and summarized in Table 4.1.

Table 4.1 – Summary of Atterberg Limit Testing (Silty Clay)

Borehole	Sample Number	Sample Depth (metres)	Water Content (%)	LL (%)	PL (%)	PI (%)
17-7	4	3.1 – 3.7	49.0	55.6	25.7	29.9
17-8	6	4.6 – 5.2	61.0	60.6	26.4	34.2

The water content of the silty clay generally increases with depth, ranging from about 32 to 61 percent. It should be noted that the moisture content of a sample of silty clay from borehole 17-8 sample 6, of the silty clay is above the liquid limit value at the tested depth.

The results of the Atterberg limit tests indicate that the silty clay at the site has a high plasticity.

4.6 Sandy Silt

A native deposit of grey sandy silt with some clay and sea shells and trace amounts of gravel was encountered at borehole location 17-8 below the silty clay at a depth of about 6.9 metres below surface grade. The sandy silt layer has a thickness of about 3.0 metres, extending to a depth of about 9.9 metres below surface grade (elevation 89.1 metres, geodetic datum).

Penetration test carried out in the sandy silt measured from “weight of the hammer” to 3 blows per 0.3 metres of penetration, which reflects a very loose relative density.

4.7 Glacial Till

Native deposits of glacial till were encountered at borehole locations 17-1, 17-2, 17-3, 17-5, 17-6 and 17-7 at depths ranging from about 1.5 to 7.2 metres below surface grade. The thickness of the glacial till deposit ranges from about 2.1 to 7.8 metres. The thickness of the glacial till deposits in boreholes 17-1, 17-2 and 17-5 were estimated from auger refusal depths ranging from about 5.3 to 9.3 metres below surface grade (elevations 89.5 to 93.7 metres, geodetic datum). It should be noted that auger refusal can occur on boulders within glacial till. Boreholes 17-6 and 17-7 were terminated within the glacial till at depths of about 8.2 metres below surface grade (elevation 90.4 and 90.6 metres, geodetic datum, respectively).

Glacial till is a heterogeneous mixture of all grain sizes. At this site, the glacial till composition is generally described as grey to brown silts and sands with varying amounts of clay and gravel. The glacial till is generally similar in composition with the glacial till encountered in nearby boreholes 15-15, 15-16A, 15-16B, 17-17 and 17-18 as part of our original investigation.

Penetration tests carried out within the glacial till gave N values ranging from 4 to 55 blows per 0.3 metres of penetration, and greater than 50 blows per 75 to 150 millimetres, which reflects a very loose to very dense relative density. The relative density variability is likely due to the mixture of grain sizes within the glacial till encountered and the possible presence of boulders. **It should be noted that very loose to loose glacial till soils were encountered as part of this investigation at boreholes 17-1 to 17-3, inclusive, within the proposed excavation service depths.**

The results of a grain size distribution testing carried out on samples of the glacial till are provided on Figure B2 in Appendix B and summarized in Table 4.2.

Table 4.2 – Summary of Grain Size Distribution Testing (Glacial Till)

Borehole	Sample Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
17-1	3	2.3 – 2.9	9	54	28	9
17-1	7	5.3 – 5.9	13	53	28	6
17-1	11	8.1 – 8.5	23	60	12	5
17-3	4	3.1 – 3.7	5	58	29	8
17-6	5	3.8 – 4.4	3	30	34	32

The moisture content of the glacial till ranges from about 5 to 26 percent.

4.8 Auger Refusal

Auger refusal was encountered on possible bedrock at the location of boreholes 17-1, 17-2, 17-5 and 17-8 at depths ranging from about 5.3 to 11.1 metres below surface grade (elevations 87.9 to 93.7 metres, geodetic datum). It should be noted that auger refusal can also occur on cobbles and boulders found in glacial till.

Borehole 17-4 was terminated at about 1.4 metres below surface grade (elevation 97.4 metres, geodetic datum), due to auger refusal. Based on information provided to us, it is considered possible that this refusal occurred on an abandoned underground service. It is also, possible that this refusal depth corresponds to a high point in the bedrock surface.

4.9 Groundwater Conditions

Standpipe piezometers were installed in boreholes 17-1, 17-3 and 17-6 to measure the stabilized groundwater levels and conduct hydraulic conductivity testing. The groundwater levels were measured on December 21, 2017, and are summarized in Table 4.3.

Table 4.3 – Summary of Groundwater Levels in Piezometers on December 21, 2017

Location	Well Screen Formation	Depth Below Surface Grade (metres)	Geodetic Elevation (metres)
17-1	Silty Sand	5.6	93.1
17-3	Glacial Till	4.7	94.2
17-6	Glacial Till	3.6	95.1

It should be noted that the groundwater levels may be higher during wet periods of the year such as the early spring or following periods of precipitation.

4.10 Hydraulic Testing Results

The results of the hydraulic testing carried out in the well screens are provided in Appendix D. A summary of the recovery measurements made during the falling head test carried out by introducing a slug into the well screen at borehole 17-6 is provided in Table 4.4.

Table 4.4 – Summary of Falling Head Test Results

Borehole	Geological Material Tested	Static Groundwater Depth (metres)	Observed Initial Displacement (metres)	Recovery Time (minutes)	Recovery[1] (percent)
17-6	Glacial Till	3.6	1.3	55	93

1. Recovery calculated using displacement taken to be 0.60 metres (volume of the slug).

A summary of the recovery measurements made during the rising head test carried out by removing the slug from the well screen installed in borehole 17-6 is provided in Table 4.5.

Table 4.5 – Summary of Rising Head Test Results

Borehole	Geological Material Tested	Static Groundwater Depth (metres)	Observed Initial Displacement (metres)	Recovery Time (minutes)	Recovery[1] (percent)
17-6	Glacial Till	3.6	1.6	50	87

1. Recovery calculated using displacement taken to be 0.60 metres (volume of the slug).

Hydraulic conductivities calculated from the hydraulic test results are provided in Table 4.6.

Table 4.6 – Calculated Hydraulic Conductivities

Borehole	Geological Material Monitored	Calculated Hydraulic Conductivity, k (m/s)	
		Falling Head Test by Introducing a Slug	Rising Head Test by Removing a Slug
17-6	Glacial Till	5×10^{-7}	4×10^{-7}

1. The hydraulic conductivities were calculated using the Hvorslev Analysis.
2. Initial displacement taken to be 0.60 metres (volume of the slug).

4.11 Soil Chemistry Relating to Corrosion

Soil corrosivity testing (pH, sulphate, chloride, resistivity, and conductivity) was completed on borehole 17-3 sample 4. The results are provided in Appendix C and summarized below:

- pH 7.72
- Sulphate Content (µg/g) 21
- Chloride Content (µg/g) 54
- Resistivity (Ohm.m) 51.2
- Conductivity (µS/cm) 195

5.0 DISCUSSION

5.1 General

The subsurface conditions encountered as part of this supplemental investigation are generally consistent with the conditions encountered in the nearby boreholes drilled as part of our previous investigation. As such, the guidelines provided in our report dated March 11, 2016, are considered appropriate for this phase of the proposed sewer works. However, it is noted that, at the location of boreholes 17-1 to 17-3 inclusive, deposits of glacial till with a very loose to loose relative density were encountered. In order to reduce the potential for delays associated with the presence of these deposits, additional guidelines on excavation, bedding and subbedding

are provided below. Also, as requested, our comments are provided on the use of trenchless technologies, which are being considered for portions of the sewer installations, particularly in the vicinity of the City of Ottawa watermain.

5.2 Excavation in Loose Glacial Till

The excavations may encounter deposits of very loose to loose glacial till soils, particularly in the area of boreholes 17-1 to 17-3, inclusive.

The sides of the excavations should be sloped in accordance with the requirements in Ontario Regulation 213/91 under the Occupational Health and Safety Act. According to the Act, the loose glacial till encountered at this site can be classified as a Type 4 soil. Therefore, for design purposes, allowance should be made for 3 horizontal to 1 vertical, or flatter, excavation slopes within the very loose to loose glacial till deposits.

Where these deposits are encountered the excavations for flexible and rigid services should be in accordance with OPSD 802.010 and OPSD 802.032, respectively for Type 4 soil.

Since space constraints will likely not permit 3 horizontal to 1 vertical excavation side slopes, the installations could be carried out within a tightly fitting, braced steel trench box, which is specifically designed for this purpose. Steel plates advanced below the sides of the trench box to below the proposed pipe invert level may be required due to flowing glacial till below the groundwater level.

This material will likely become disturbed during excavation. As such, an allowance for subexcavation of disturbed material and replacement with imported granular material should be provided, particularly in the vicinity of boreholes 17-1 to 17-3. The subexcavations will have to extend to within denser glacial till soils or to the surface of the bedrock. Depending on the dewatering capacity of the contractor, some of the subexcavation work may have to be carried out below the water level ("in the wet"). Details on the placement of granular material following the subexcavation are provided in the following section.

5.3 Pipe Subbedding

The following comments are provided to supplement the pipe bedding recommendations provided in our report dated March 11, 2016, based on the very loose to loose glacial till soils encountered during this investigation.

The following sections provide comments on the placement of subbedding material above and below the groundwater level.

5.3.1 Placing Subbedding Material below the Groundwater Level

In areas where subexcavation is required below the groundwater level, it is recommended that the subexcavated material be replaced with well graded blast rock (up to about 300 millimetre

maximum diameter). The blast rock should be compacted using the bucket of the excavator in maximum 500 millimetre thick lifts.

5.3.2 Placing Subbedding Material above the Groundwater Level

Above the groundwater level, the subexcavated material could be replaced with granular material meeting Ontario Provincial Standard Specification (OPSS) requirements for Granular B Type II (50 or 100 millimetre minus). This material should be compacted in maximum 200 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value using suitable, vibratory compaction equipment.

To provide adequate support for the pipe in the long term, the subexcavations should be sized to allow a 1 horizontal to 2 vertical spread of granular material down and out from the bottom of the pipe.

5.4 Trenchless Sewer Installation

As indicated above, trenchless technology alternatives are being considered for the installation of sewers near the City of Ottawa watermain, and possibly near underground NRC infrastructure for this phase of the project.

It is recommended that a contractor familiar with this type of work be consulted to determine the most feasible and economical trenchless alternative based on the conditions encountered in this supplemental investigation. The following constraints should be considered as part of this evaluation:

- The very loose and loose glacial till soils at this site may cause excess sloughing in front of the pipe which could prevent pipe advancement.

- Boulders within the glacial till and/or the presence of bedrock within the proposed excavation depths.

- Excavation of entry and receiving pits within the very loose to loose glacial till soils will require vertical or near vertical shoring. Movement of soil behind the shoring could impact existing underground services or infrastructure.

- The drawings provided to us, show a bend in the storm sewer alignment from stations 90+000 to 90+030. Therefore, an additional entry pit will need to be constructed to have a straight alignment for the trenchless alternative selected. However, it is noted, that a possible straight realignment of the proposed storm sewer would eliminate the requirement of an additional entry pit.

Additional comments on trenchless technologies could be provided as the design progresses.

5.5 Groundwater Pumping and Management

Based on the results of this investigation the groundwater conditions are generally similar to those encountered in our previous investigation. It is anticipated that the groundwater inflow into the excavations could be handled by pumping from within the excavations. However, groundwater inflow will be more substantial for excavations extending into the fractured bedrock below the groundwater table. It is not expected that short term pumping during excavation will have a significant effect on nearby structures and services. In addition, a strong hydrocarbon odour was detected in borehole 17-3; groundwater quality testing is recommended to provide information on discharge options.

It is anticipated that the water takings for this project will be less than 400,000 litres per day assuming a single open trench (approximately 30 metres length by 4.5 metres width) and open entry/receiving pits during construction. As such, an Environmental Activity and Sector Registry (EASR) in accordance with Environmental Protection Act Part II.2 Section 20.21 should be sufficient for water takings for this project. However, should multiple open excavations be required simultaneously, an Ontario Ministry of the Environment and Climate Change Category 3 Permit To Take Water may be required.

Please note that, due to recent changes to the Ontario Regulations, the EASR replaces the Category 2 Permit to Take Water Application (PTTW) that would have been required for construction site dewatering of between 50,000 and 400,000 litres per day. An EASR can be obtained by completing an online registry and approval for the water takings can be obtained as soon as the registration is complete. It is noted that a Water Taking Report and Discharge Plan prepared by a Qualified Person are required to complete the EASR.

5.6 Corrosion of Buried Concrete and Steel

The measured sulphate concentration in the sample of soil recovered from borehole 17-3 was 21 micrograms per gram. According to Canadian Standards Association (CSA) “Concrete Materials and Methods of Concrete Construction”, the concentration of sulphate can be classified as low. Therefore any concrete in contact with the native soil could be batched with General Use (GU) cement. The effects of freeze thaw in the presence of de-icing chemical (sodium chloride) use on the roadway should be considered in selecting the air entrainment and the concrete mix proportions for any concrete.

Based on the resistivity and pH of the sample, the soil in this area can be classified as non-aggressive towards unprotected steel. It should be noted that the corrosivity of the soil/groundwater could vary throughout the year due to the application sodium chloride for de-icing.

6.0 ADDITIONAL CONSIDERATIONS

6.1 Excess Soil Management Plan, Potential Hydrocarbon Contamination

This report does not constitute an excess soil management plan. As indicated above a strong hydrocarbon odour was detected from the groundwater in the well screen installed at borehole 17-3. It is recommended that the well screen be purged and additional testing be carried out to assess the potential for hydrocarbon contamination at this location.

6.2 Monitoring Well Abandonment

The three (3) monitoring wells (standpipe piezometers) installed as part of this investigation should be decommissioned by a licensed well technician. The well abandonment could be carried out in advance or during the construction (following any additional hydrocarbon testing at the location of borehole 17-3).

6.3 Design Review and Construction Observations

The details for the proposed sewer installation were not available to us at the time of report preparation. It is recommended that the design drawings be reviewed by the geotechnical engineer as the design progresses to ensure that the guidelines provided in this report have been interpreted as intended.

The subgrade surfaces for the proposed services and roadways should be inspected by experienced geotechnical personnel to ensure that suitable materials have been reached and properly prepared. The placing and compaction of earth fill and imported granular materials should be inspected to ensure that the materials used conform to the grading and compaction specifications.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

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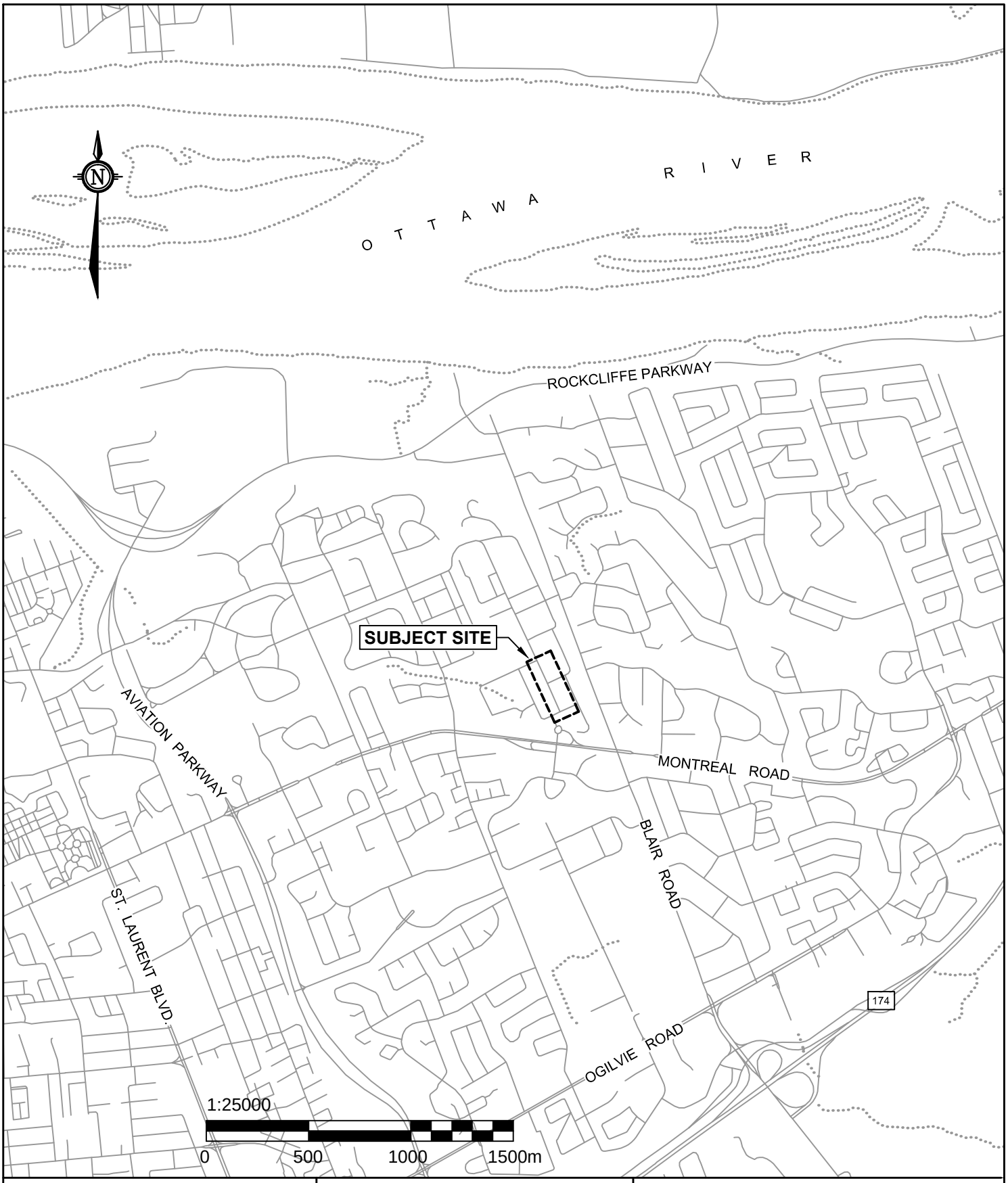
PROVINCE OF ONTARIO



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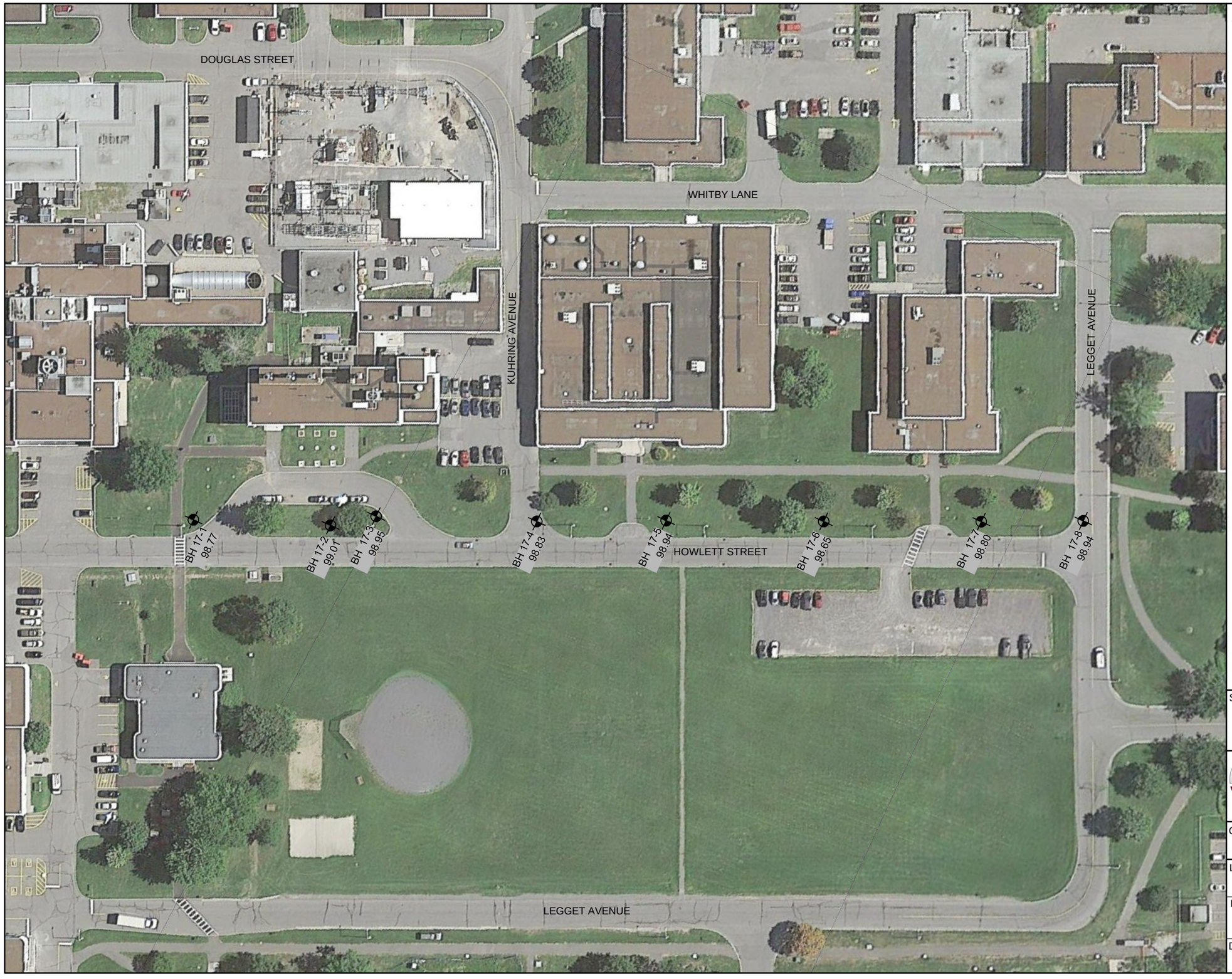
Project	Drawing
SUPPLEMENTAL GEOTECHNICAL INVESTIGATON 1200 MONTREAL ROAD OTTAWA, ONTARIO	KEY PLAN

Drwn By	Chkd By	Date	Project No.	Revision No.	
S.L.	G.D.	FEBRUARY 2018	62739.10	0	**FIGURE 1**



LEGEND

BH 17-1
98.77

BOREHOLE
(current investigation by Gemtec Limited)

GROUND SURFACE ELEVATION IN METRES
GEODETIC DATUM

Scale 1:1000

0 20 40 60m

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Client	Project
NATIONAL RESEARCH COUNCIL	62739.10

Location: 1200 MONTREAL ROAD CAMPUS
OTTAWA, ONTARIO

Drwn by	Chkd by	
S.L.	G.D.	BOREHOLE LOCATION PLAN

Date	Rev.	
FEBRUARY 2018	0	**FIGURE 2**

APPENDIX A

Record of Borehole Sheets
List of Abbreviations and Terminology

RECORD OF BOREHOLE 17-1

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 15, 2017

SPT HAMMER: 63.5 kg; drop 0.76 metres

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE – DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES – NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (20 40 60 80) nat. V - + Q - ● rem. V - ⊕ U - ○	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2}) WATER CONTENT, PERCENT (Wp ⊖ W WI 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		98.77								
		Brown silty sand with organics (TOPSOIL)		0.10								Soil cuttings
		Very stiff, brown SILTY CLAY										
1					1	50 D.O.	5					
				97.25 / 1.52								
		Loose to compact, brown sand, some silt, trace gravel and clay (GLACIAL TILL)			2	50 D.O.	7					
2					3	50 D.O.	11				See Fig. B2	
3					4	50 D.O.	13					
4					5	50 D.O.	10					Bentonite seal
				94.20 / 4.57								
		Very loose, brown sand, some silt and gravel, trace clay (GLACIAL TILL)			6	50 D.O.	4					Filter sand 52 mm Diameter, 1.52 metres long well screen
5					7	50 D.O.	4				See Fig. B2	
6					8	50 D.O.	2					
7				91.61 / 7.16	9	50 D.O.	2					
		Very dense, grey sand, some gravel and silt, trace clay (GLACIAL TILL)										
8					10	50 D.O.	> 50 for 125 mm					
					11	50 D.O.	> 50 for 125 mm				See Fig. B2	
9				89.47 / 9.30	12	50 D.O.	> 50 for 150 mm					
		End of Borehole Auger Refusal										Groundwater level observed at about 5.3 metres below surface grade on December 21, 2017.
10												
11												
12												

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
17/12/21	5.63 ∇	93.14

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V02_2017-12-19.GPJ _GDT 6/2/18

RECORD OF BOREHOLE 17-2

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 14, 2017

SPT HAMMER: 63.5 kg; drop 0.76 metres

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		99.01					Backfilled with auger cuttings
		Brown silty sand with organics (TOPSOIL)		0.10					
		Very stiff, grey brown SILTY CLAY			1	50 D.O.	9		
1					2	50 D.O.	8		
2				96.88					
		Compact, brown silty sand, trace gavel (GLACIAL TILL)		2.13	3	50 D.O.	17		
3				95.96					
		Loose to compact, brownish grey silt and sand, trace clay and gravel (GLACIAL TILL)		3.05	4	50 D.O.	7		
4					5	50 D.O.	5		
5					6	50 D.O.	11		
				93.67					
		End of Borehole Auger Refusal		5.34					
6									
7									
8									
9									
10									
11									
12									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ● ; rem. V - ⊕ U - ○ : 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI : 20 40 60 80

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V02_2017-12-19.GPJ .GDT 6/2/18

RECORD OF BOREHOLE 17-3

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 14, 2017

SPT HAMMER: 63.5 kg; drop 0.76 metres

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface		98.95					
		Brown silty sand with organics (TOPSOIL)		0.10					
		Brownish grey silty clay, trace sand and organic material (FILL MATERIAL)			1	50 D.O.	8		Soil cuttings
1									
					2	50 D.O.	11		
2				96.66					
		Loose to compact, brown silty sand, trace gravel and clay (GLACIAL TILL)		2.29	3	50 D.O.	16		
3	Power Auger 200 mm Diameter Hollow Stem				4	50 D.O.	12	See Fig. B2	Bentonite seal
4					5	50 D.O.	11		Filter sand 51 mm Diameter, 0.93 metres long well screen
5					6	50 D.O.	5		
					7	50 D.O.	4		
6					8	50 D.O.	6		
7					9	50 D.O.	24		
8					10	50 D.O.	> 50 for 0 mm		
				90.72					
		End of Borehole		8.23					
9									Groundwater level observed at about 4.7 metres below surface grade on December 21, 2017.
10									
11									
12									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20 40 60 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20 40 60 80

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
17/12/21	4.72 ∇	94.23

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V02_2017-12-19.GPJ .GDT 6/2/18

RECORD OF BOREHOLE 17-4

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 15, 2017

SPT HAMMER: 63.5 kg; drop 0.76 metres

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		98.83					
		Asphaltic concrete		0.08					Backfilled with auger cuttings
		Brown to grey sand and gravel (BASE/SUBBASE MATERIAL)		98.07 / 0.76					
1		Very stiff, grey SILTY CLAY		97.41 / 1.42	1	50 D.O.	10		
		End of Borehole Auger Refusal (Possible underground service or infrastructure)							
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ● rem. V - ⊕ U - ○ (20 40 60 80)

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI (20 40 60 80)

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V02_2017-12-19.GPJ .GDT 6/2/18

RECORD OF BOREHOLE 17-5

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 14, 2017

SPT HAMMER: 63.5 kg; drop 0.76 metres

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200 mm Diameter Hollow Stem	Ground Surface		98.94					Backfilled with auger cuttings
		Brown silty sand with organics (TOPSOIL)		0.10					
		Very stiff, grey brown SILTY CLAY, trace sand			1	50 DO	10		
1					2	50 DO	11		
2				96.81					
		Compact, brown silty sand, trace to some gravel, trace clay (GLACIAL TILL)		2.13	3	50 DO	24		
3					4	50 DO	16		
4					5	50 DO	19		
5					6	50 DO	21		
				93.60					
		Compact to very dense, grey silty sand, trace gravel and clay (GLACIAL TILL)		5.34	7	50 DO	15		
6					8	50 DO	> 50 for 75 mm		
				92.08					
7		End of Borehole Auger Refusal		6.86					
8									
9									
10									
11									
12									

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20 40 60 80

SHEAR STRENGTH Cu, kPa: 20 40 60 80 — nat. V - + Q - ● ; rem. V - ⊕ U - ○

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5} 10^{-4} 10^{-3} 10^{-2}

WATER CONTENT, PERCENT: Wp 20 — W 40 60 — Wl 80

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V02_2017-12-19.GPJ .GDT 6/2/18

RECORD OF BOREHOLE 17-6

PROJECT: 62739.10

LOCATION: See Borehole Location Plan, Figure 2

BORING DATE: December 13, 2017

SHEET 1 OF 1

DATUM: Geodetic

SPT HAMMER: 63.5 kg; drop 0.76 metres

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES NUMBER	TYPE	BLOWS/0.3m	ADDITIONAL LAB. TESTING
0		Ground Surface	98.65				
		Brown silty sand with organics (TOPSOIL FILL)	0.10				
		Brown silty clay, trace sand and organic material (FILL MATERIAL)		1	50 D.O.	11	
			97.13 / 1.52				
		Very stiff, grey brown SILTY CLAY		2	50 D.O.	12	
				3	50 D.O.	11	
	Power Auger 200 mm Diameter Hollow Stem			4	50 D.O.	9	
			94.84 / 3.81				
		Loose to very dense, brown to grey sandy clayey silt, trace gravel (GLACIAL TILL)		5	50 D.O.	4	See Fig. B2
				6	50 D.O.	59	
				7	50 D.O.	24	
				8	50 D.O.	> 50 for 125 mm	
				9	50 D.O.	20	
				10	50 D.O.	55	
			90.42 / 8.23				
		End of Borehole					

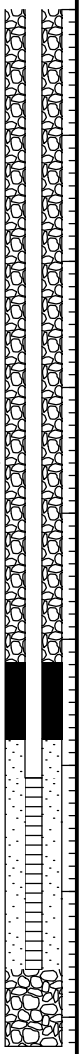
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat. V - + Q - ●; rem. V - ⊕ U - ○; 20, 40, 60, 80

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5}, 10^{-4}, 10^{-3}, 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI; 20, 40, 60, 80

PIEZOMETER OR STANDPIPE INSTALLATION



Groundwater level observed at about 3.6 metres below surface grade on December 21, 2017.

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
17/12/21	3.60 ▽	95.05

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

RECORD OF BOREHOLE 17-7

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 13, 2017

SPT HAMMER: 63.5 kg; drop 0.76 metres

BORING METHOD: Power Auger, 200 mm Diameter Hollow Stem

SOIL PROFILE: DESCRIPTION	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m
Ground Surface	98.80			
Brown silty sand with organics (TOPSOIL FILL)	0.10			
Grey SILTY SAND, some gravel, trace clay and organics (FILL MATERIAL)	97.28 / 1.52	1	50 D.O.	> 50 for 125 mm
Very stiff to firm, grey to brown SILTY CLAY		2	50 D.O.	14
		3	50 D.O.	11
		4	50 D.O.	9
		5	50 D.O.	23
		6	50 D.O.	4
		7	50 D.O.	WH for 300 mm
		8	50 D.O.	WH for 300 mm
	91.94 / 6.86			
Compact to dense, grey silty sand and gravel (GLACIAL TILL)		9	50 D.O.	36
		10	50 D.O.	16
	90.57 / 8.23			
End of Borehole				

DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m: 20, 40, 60, 80

SHEAR STRENGTH Cu, kPa: nat. V - + ; rem. V - ⊕ ; Q - ● ; U - ○ (20, 40, 60, 80)

HYDRAULIC CONDUCTIVITY, k, cm/s: 10^{-5}, 10^{-4}, 10^{-3}, 10^{-2}

WATER CONTENT, PERCENT: Wp ⊖ W WI (20, 40, 60, 80)

ADDITIONAL LAB. TESTING: See Fig. B1

PIEZOMETER OR STANDPIPE INSTALLATION: Backfilled with auger cuttings

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V02_2017-12-19.GPJ GDT 6/2/18

RECORD OF BOREHOLE 17-8

PROJECT: 62739.10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: December 13, 2017

SPT HAMMER: 63.5 kg; drop 0.76 metres

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat. V - + Q - ●; rem. V - ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-5} 10^{-4} 10^{-3} 10^{-2})	WATER CONTENT, PERCENT (Wp ⊖ W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0	Power Auger, 200 mm Diameter Hollow Stem	Ground Surface		98.95									
		Asphaltic concrete		98.77									
		Brown sand and gravel (BASE/SUBBASE MATERIAL)		0.18									Backfilled with auger cuttings
1		Brown silty sand and gravel, some silt (FILL MATERIAL)		98.09 / 0.86	1	50 D.O.	14						
		Very stiff to firm, brown to grey SILTY CLAY, trace sand		97.43 / 1.52	2	50 D.O.	8						
2					3	50 D.O.	8						
3					4	50 D.O.	7						
4					5	50 D.O.	4						
		Firm, grey SILTY CLAY		94.38 / 4.57	6	50 D.O.	3				○	See Fig. B1	
5					7	50 D.O.	1						
6					8	50 D.O.	WH for 300 mm						
		Grey SANDY SILT, some clay with sea shells, trace gravel		92.09 / 6.86	9	50 D.O.	WH for 300 mm						
7					10	50 D.O.	WH for 300 mm						
8					11	50 D.O.	WH for 300 mm						
9					12	50 D.O.	3						
		Grey SILTY CLAY		89.05 / 9.90	13	50 D.O.	WH for 300 mm						
10					14	50 D.O.	> 50 for 100 mm						
11		End of Borehole Auger Refusal		87.88 / 11.07									
12													

DEPTH SCALE

1 to 60

GEMTEC

LOGGED: M.L.

CHECKED:

BOREHOLE LOG 62739.10_GNT_V02_2017-12-19.GPJ .GDT 6/2/18

LIST OF ABBREVIATIONS AND TERMINOLOGY

SAMPLE TYPES

AS auger sample
CA casing sample
CS chunk sample
BS Borros piston sample
GS grab sample
DO drive open
MS manual sample
RC rock core
ST slotted tube
TO thin-walled open Shelby tube
TP thin-walled piston Shelby tube
WS wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance, N

The number of blows by a 63.5 kg hammer dropped 760 millimetre required to drive a 50 mm drive open sampler for a distance of 300 mm. For split spoon samples where less than 300 mm of penetration was achieved, the number of blows is reported over the sampler penetration in mm.

Dynamic Penetration Resistance

The number of blows by a 63.5 kg hammer dropped 760 mm to drive a 50 mm diameter, 60° cone attached to 'A' size drill rods for a distance of 300 mm.

WH

Sampler advanced by static weight of hammer and drill rods.

WR

Sampler advanced by static weight of drill rods.

PH

Sampler advanced by hydraulic pressure from drill rig.

PM

Sampler advanced by manual pressure.

SOIL TESTS

C consolidation test
H hydrometer analysis
M sieve analysis
MH sieve and hydrometer analysis
U unconfined compression test
Q undrained triaxial test
V field vane, undisturbed and remoulded shear strength

SOIL DESCRIPTIONS

Relative Density	'N' Value
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Consistency	Undrained Shear Strength (kPa)
Very soft	0 to 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very Stiff	over 100

LIST OF COMMON SYMBOLS

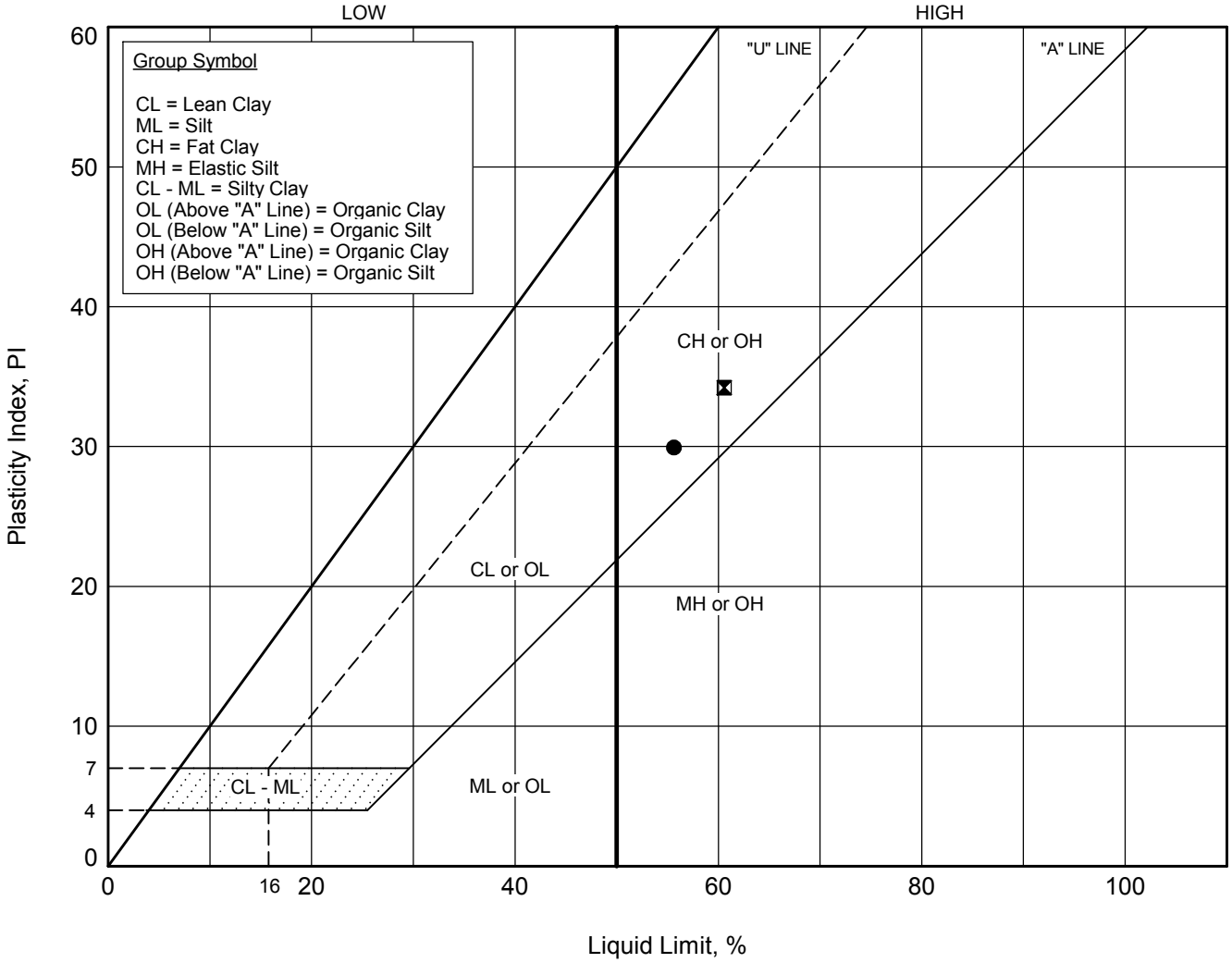
c_u undrained shear strength
e void ratio
C_c compression index
c_v coefficient of consolidation
k coefficient of permeability
I_p plasticity index
n porosity
u pore pressure
w moisture content
w_L liquid limit
w_P plastic limit
ϕ^1 effective angle of friction
γ unit weight of soil
γ^1 unit weight of submerged soil
σ normal stress

APPENDIX B

Laboratory Test Results
Figures B1 and B2

PLASTICITY CHART

FIGURE B1



Legend	Borehole	Sample	Depth (m)	Water Content %	LL %	PL %	PI %
●	17-7	4	3.1 - 3.7	49.0	55.6	25.7	29.9
⧗	17-8	6	4.6 - 5.2	61.0	60.6	26.4	34.2

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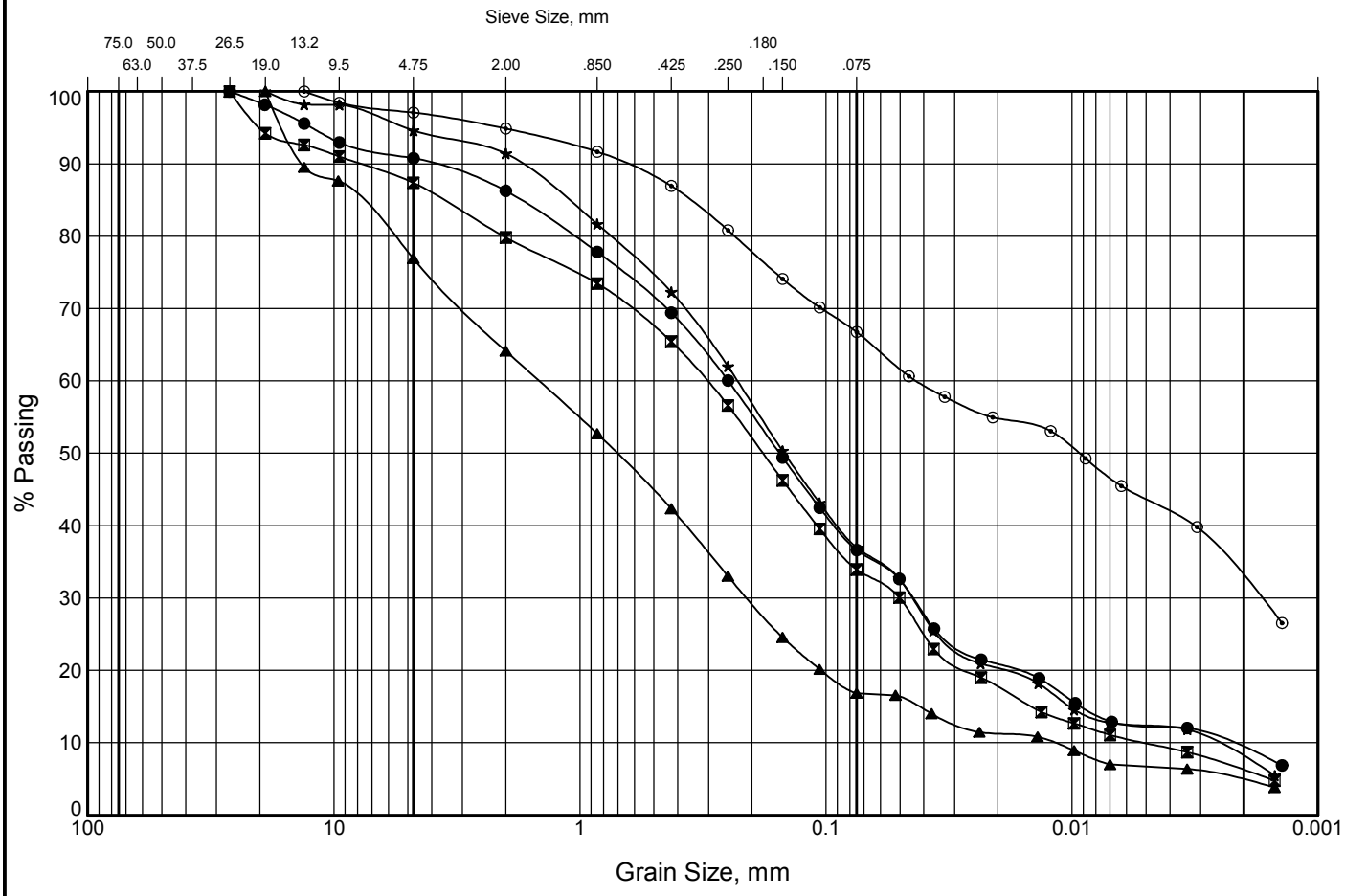
Consulting Engineers and Scientists

Date: February 2018

Project: 62739.10

GRAIN SIZE DISTRIBUTION

FIGURE B2



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY
	GRAVEL		SAND				

Legend	Borehole	Sample	Depth (m)	% Gravel	% Sand	% Silt	% Clay
●	17-1	3	2.3 - 2.9	9	54	28	9
⊠	17-1	7	5.3 - 5.9	13	53	28	6
▲	17-1	11	8.1 - 8.5	23	60	12	5
★	17-3	4	3.1 - 3.7	5	58	29	8
⊙	17-6	5	3.8 - 4.4	3	30	34	32

GEMTEC
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Date: February 2018

Project: 62739.10

APPENDIX C

Chemical Test Results on Soil Sample
Corrosion of Buried Concrete and Steel
Paracel Laboratories Ltd. Order No. 1802347

PARACEL LABORATORIES LTD.

Order #: 1802347

Certificate of Analysis

Report Date: 16-Jan-2018

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 11-Jan-2018

Client PO:

Project Description: 6273910

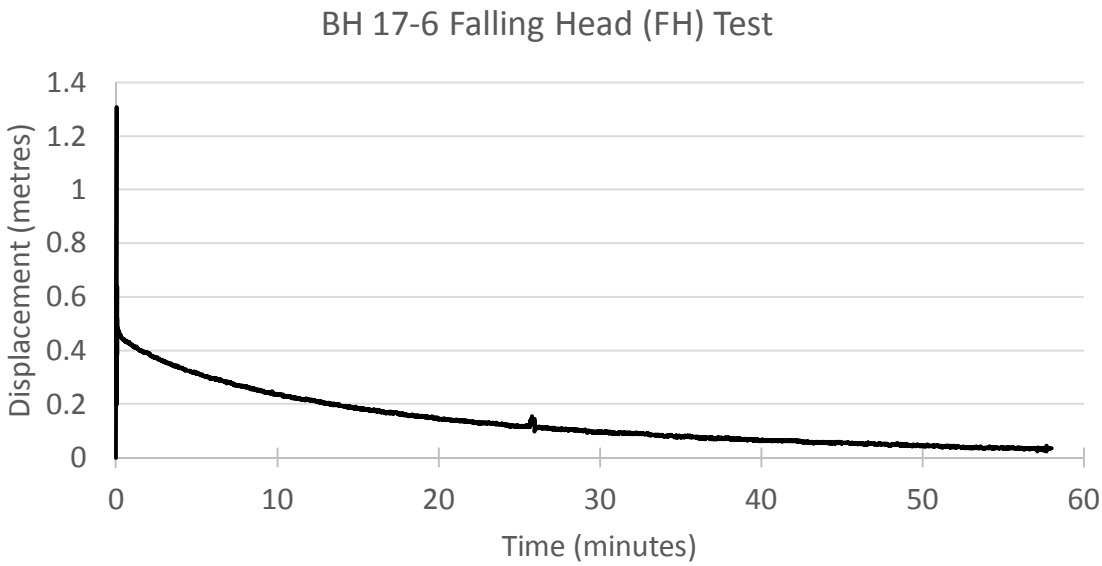
	Client ID:	17-3 SA4	-	-	-
	Sample Date:	14-Dec-17	-	-	-
	Sample ID:	1802347-01	-	-	-
	MDL/Units	Soil	-	-	-
Physical Characteristics					
% Solids	0.1 % by Wt.	86.1	-	-	-
General Inorganics					
Conductivity	5 uS/cm	195	-	-	-
pH	0.05 pH Units	7.72	-	-	-
Resistivity	0.10 Ohm.m	51.2	-	-	-
Anions					
Chloride	5 ug/g dry	54	-	-	-
Sulphate	5 ug/g dry	21	-	-	-

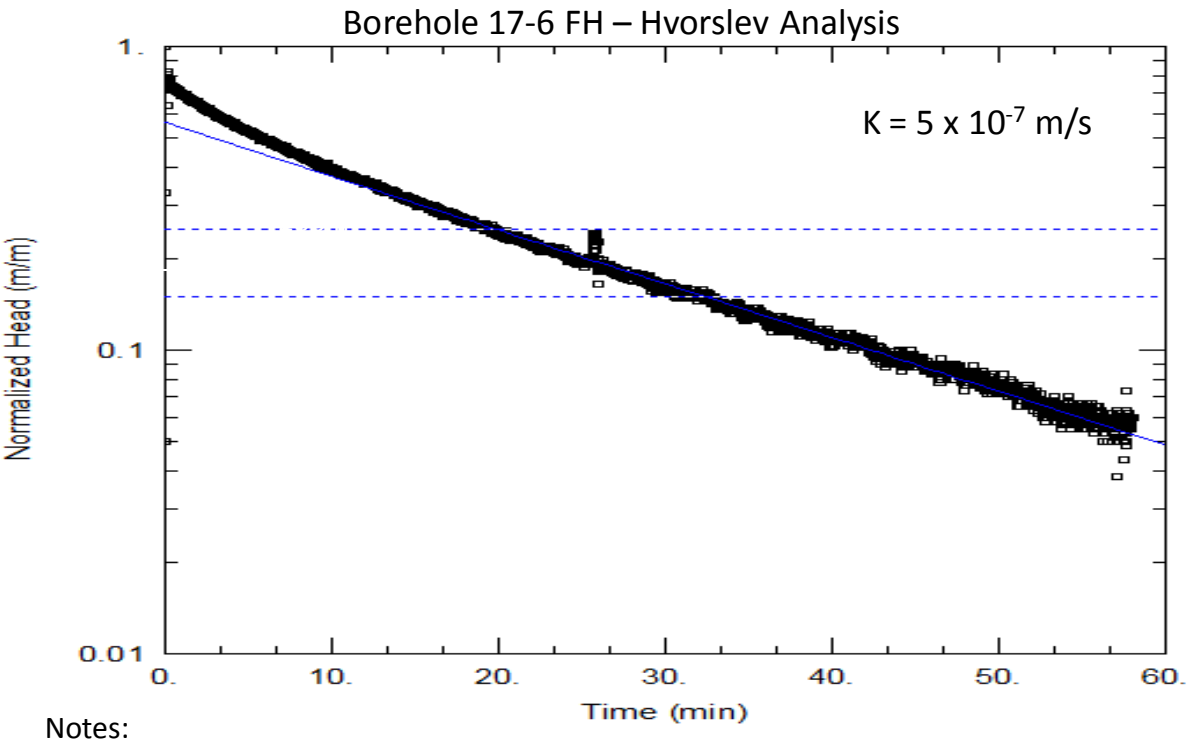
APPENDIX D

Hydraulic Conductivity Testing
Figures D1 and D2

Slug Test Data

FIGURE D1





Notes:

1. Initial displacement of 0.60 metres (based on slug size) used for analysis
2. Static water level = 3.60 metres below ground surface

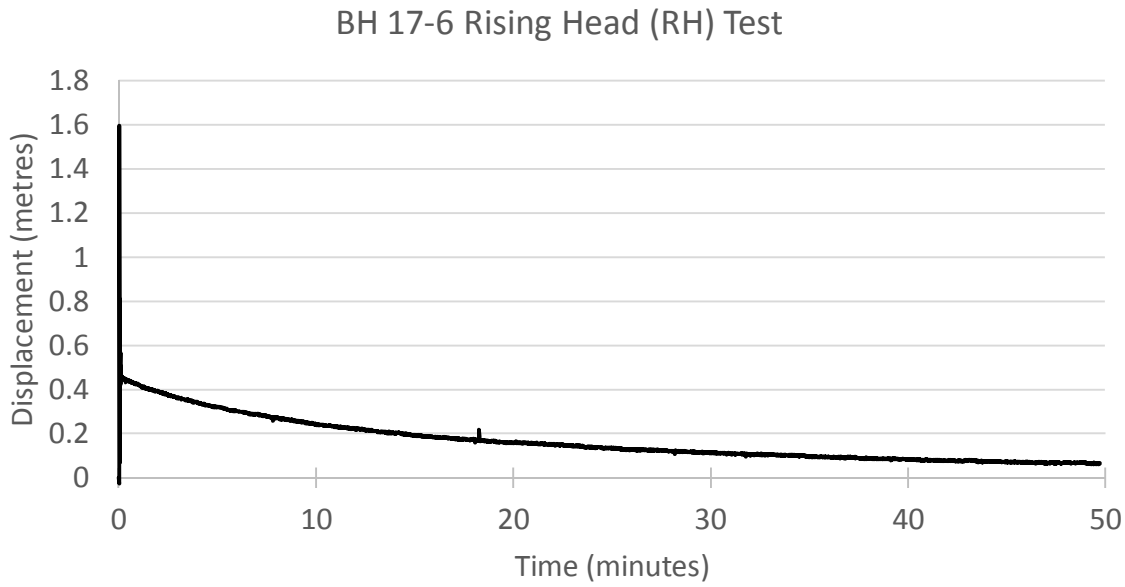
GEMTEC
Consulting Engineers and Scientists

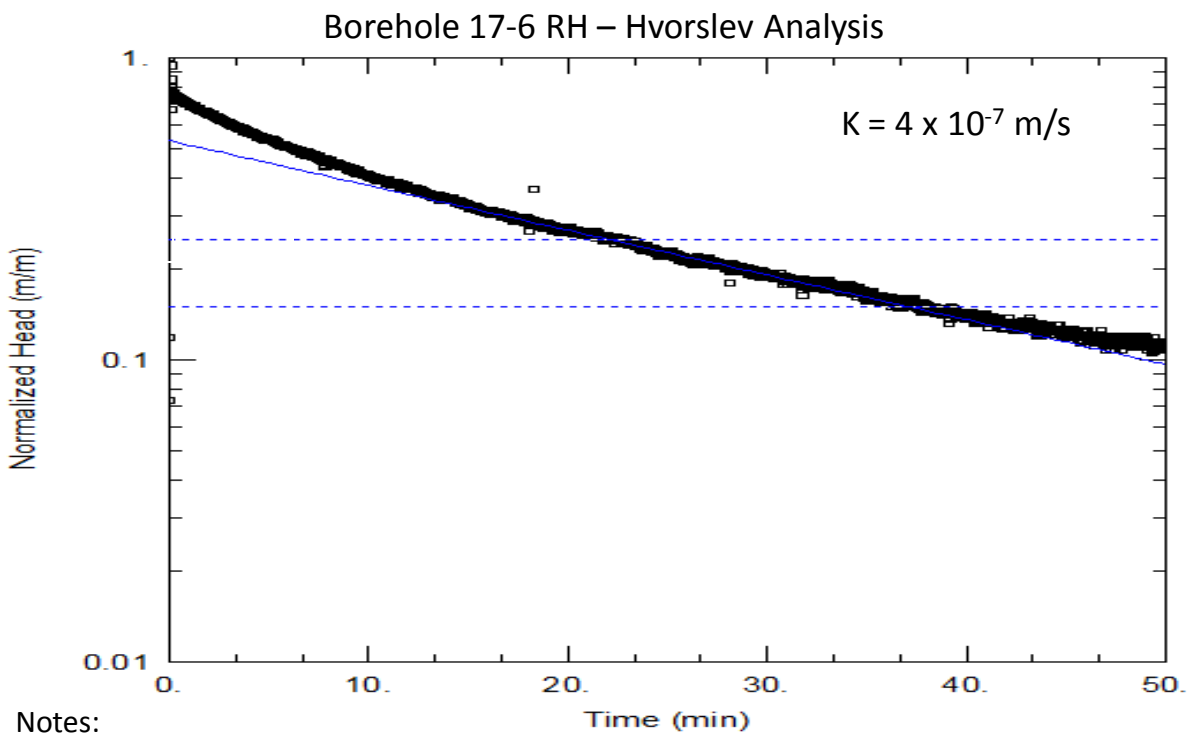
Date: February 2018

Project: 62739.10

Slug Test Data

FIGURE D2





Notes:

1. Initial displacement of 0.60 metres (based on slug size) used for analysis
2. Static water level = 3.60 metres below ground surface

GEMTEC
Consulting Engineers and Scientists

Date: February 2018

Project: 62739.10

experience • knowledge • integrity

civil	civil
geotechnical	géotechnique
environmental	environnementale
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

expérience • connaissance • intégrité

1. Measurement of Payment

All associated costs for work performed under this section will be incidental to work performed in other related phases of this project and included in the Lump Sum contract price. No measurement for payment will be made under this section.

2. General Requirements

The comprehensive Construction Photographic Documentation service and process for the Project will be comprised of the following basic functions:

- Digital photographic documentation of the construction process will be provided from the site survey stage and progressively throughout the construction period.
- All documentation access will be via a web-based Platform and provide real-time optimized password protected, online web-browser viewing of all documentation.
- Mobile application for Apple iOS and Android OS devices to provide direct mobile access to online documentation and mobile application-supported software features.
- The Construction Photo Documentation will be electronically indexed and have password protected web-based navigation and all storage/hosting of documentation will be cloud-based.
- The Construction Photo Documentation service will provide the NRC and the Contractor with all technical support, and ensure security of information related to the Project.

Photo Documentation Contractor for this Project:

a. Multivista Ottawa: 208-101 Innes Park Way, Ottawa, Ontario

b. Contact: Jeff Baird: 613-292-1328/j.baird@multivista.com

3. Photographic Documentation Platform Details

The Construction Photo Documentation service shall be applied to the construction of Phase 3 of sanitary and storm sewer separation project and be integrated with Phase 1 and Phase 2 of the Project Documentation currently in progress. The Photo Documentation will be carried out by Multivista Ottawa throughout the Project duration and be augmented with NRC and Contractor's Digital Photo Documentation to provide a complete as-built record package for the NRC.

The Photo Documentation can be accessed by authorized NRC/Contractor Project personnel with password protected login via a web-based Platform to provide optimized web-browser viewing of all online photo documentation during and after construction.

The Photo Documentation indexing and navigation system will utilize aerial Photo layouts and Satellite based mapping applications as the basis for an interactive online interface. The overall aerial Layout for Phase 3 may be separated into sub-layouts due to size and complexity of the Phase 3 Site area.

All Photo Documentation will be indexed and organized within the web-based Platform via time (date-stamped) and GPS location throughout the project. The web-based Platform interface will provide recent documentation activity summaries, as weekly photos are uploaded to the Project. The Photo Documentation interface will provide an aerial Site map view that pinpoints the physical location of all

photos of the Phase 3 Project. The Site map view will be interactive and can be used by the project team to view/collate/annotate all project photos.

The Photo Documentation will combine a detailed user friendly indexing and navigation system with inspection-grade high-resolution digital photography performed by Multivista Ottawa. The Photo Documentation is designed to capture actual construction conditions throughout the project duration and particularly at critical milestones of the construction process.

The web-based online interface will allow the project team to upload its own digital photographic images to the documentation indexing and navigation system. All authorized users will be able to link images to the project layout for customized location-based indexing.

The Photo Documentation online interface will provide inherent functions such as the ability to add comments and descriptive details to any of the Project Digital Photos. The online interface will allow project team users to mark-up any of the images using integrated annotation functionality.

The online interface will also allow users to upload files to the project documentation indexing and navigation system. The supported file formats will include, at minimum, PDF, Microsoft Word documents, and Microsoft Excel spreadsheets, Microsoft PowerPoint presentations, JPEG, PNG, GIF, MPEG and Folders. These files can be Contractor inspection and testing reports as an example, so the web-based Multivista System will become a "one stop" repository for all applicable project related documentation in addition to the base Photo Documentation.

The web-based Multivista Construction Photo Documentation System will adhere to industry standards for information security and protection of data.

4. Mobile Application for Photographic Documentation Platform Details

All project construction documentation that is accessible online through the web-based Internet connection will also be accessible via a native Multivista mobile application ("mobile app").

The operation of supported features on the mobile app may vary slightly from the online interface (standard/desktop web-browser interface) to accommodate the mobile application environment and improve the mobile experience. Mobile app will be supported for Apple iOS and Android OS devices, and will be available for download via the Apple App Store and Google Play Store.

Using the Mobile Application the Project team will be able to access all project photographic documentation by selecting photo sets (shoots and albums) or by navigating the project layout. The Project Team will be able to instantaneously and seamlessly capture/upload their own digital photographic images to the project site, without the need to save/load the photos onto the Mobile device such as a Tablet or Phone.

5. Photographic Documentation Scope of Work.

.1 Pre-Construction Site Survey (Phase 3)

Prior to construction mobilization by the Contractor, the existing conditions of the proposed work layout including all terrain, roadways, paths, landscaping and structures surrounding the proposed Project layout will be aerially photo documented using overlapping photographic techniques.

The initial Site Survey Project layout will be accomplished using Drone technology (125' to 130' height of flight path); all required flight credentials/licensing and flight authorization will be covered by this contractor.

The Drone generated Site Layout Digital Photos will be indexed into a photographic layout of the project construction path for all milestone/progression based construction photo documentation.

The site layout will be uploaded to the NRC/Multivista Project website and navigation through the site survey condition photo documentation can be accomplished through the web-based interactive Project webpage. The Photo documentation will allow for interactive commenting and annotation features directly onto the Site Photos. The photos will be used for indication and isolation of pre-construction site issues and log of existing site conditions for NRC records.

The Site Survey process and setup will be a one day scheduled event with the NRC Representative, the Design Engineers and the Contractor.

.2 Construction Progression and Record of Installation Detail (Phase 3)

Commencing at the start of the Construction, the Project Construction progress for all trades will be tracked via the above noted Photo Documentation platform, on a scheduled interval by Multivista Ottawa.

This scheduled site visit as coordinated with the General Contractor work schedule, will generate Construction Progression/as built Photo Documentation which will comprehensively track the overall project installation progress and record the underground installation prior to/after backfill.

The coordination of the Multivista Photo Documentation scheduled milestone work will be the responsibility of the Contractor in conjunction with the Multivista Ottawa Technical representative. All efforts will be made to schedule the Photo Documentation on a timely basis to avoid missing any critical installation details. Multivista will allow for flexibility in scheduling the work; ie during critical stages of the installation, multiple weekly visits may be required to properly capture the installation progress.

The Project Digital Photos will be indexed and navigation shall be accomplished through the web-based interactive site layout drawings. The Photo Documentation will be utilized by the NRC for "exact-built" project records of the installation.

Miscellaneous events/items that occur during the construction process can be captured and uploaded to the project website by the NRC or the Contractor independently. All uploaded photos will be dated, labeled and inserted into a NRC defined Project Album.

The Construction progress/as built Photo Documentation will occur as per the General Contractor schedule work activity for the duration of the Project.

6. Additional Information

Multivista Ottawa will furnish all technical support and Project Team training/orientation related to using the Multivista Photo Documentation System for this project.

Upon completion of this project, final copies of the Construction Documentation (the "Permanent Record") will be provided in a digital media format to the NRC. The project web-based on-line access terminates upon delivery of the permanent record or as agreed between Multivista Ottawa and the NRC.

All Intellectual property rights associated with the digital media prepared in direct service of the project shall transfer, along with the media itself, to the NRC. The project permanent record will be provided with the underlying housing software, indexing and navigation system, typically as a DVD or thumb drive. The multiple-user license for use of the underlying housing software, indexing and navigation is included for accessing the archived digital media specific to the project.

NRC - Montreal Road Campus - Sewer Rehabilitation Project - Phase 3

APPENDIX D - Existing Septic Tanks Information

Building	Number of tanks	Tank Volume(s) gallons	Usage
M-01, M-01B,	2	842, 703 (B)	Office Space, M-01B reffered to as Stone House.
M-02	2	1007 (south), 1804 (west)	50% Office/Administrative space, wind tunnel, machine shop.
M-03	2	652, 916 (south)	Office Space 50%. High Bay area.
M-04	1	1368	25% office space, central machine shop building (no floor drains), truck bay (floor drain).
M-06	1	578	Central heating plant. Domestic waste only.
M-20	1	7675	Office Space (40%), construction research test cells, storage, aggregates are stored and mixed onsite. Additional details needed about concrete mixing room
M-24	2	2512 (back), 2815 (front)	Office Space (80%), construction research and testing.

Information provided by NRC (2017-03-15)

MP1 Montant à payer – Généralités

1.1 Sous réserve de toutes autres dispositions du Contrat, Sa Majesté paie à l'Entrepreneur, aux dates et de la manière énoncées ci-après, le montant par lequel:

1.1.1 l'ensemble des montants prévus à l'article MP2 excède,

1.1.2 l'ensemble des montants prévus à l'article MP3

et l'Entrepreneur accepte le paiement comme paiement final de tout ce qu'il a fourni et fait relativement aux travaux auxquels le paiement se rapporte.

MP2 Montants payables à l'Entrepreneur

2.1 Les montants mentionnés à l'alinéa MP1.1.1 sont l'ensemble :

2.1.1 des montants prévus dans les Articles de convention; et

2.1.2 le montant, s'il en est, payable à l'Entrepreneur conformément aux Conditions générales.

MP3 Montants payables à Sa Majesté

3.1 Les montants mentionnés à l'alinéa MP1.1.2 sont l'ensemble des montants, s'il en est, que l'Entrepreneur est tenu de payer à Sa Majesté en vertu du Contrat.

3.2 Dans tout paiement fait à l'Entrepreneur, le fait pour Sa Majesté d'omettre de déduire d'un montant mentionné à l'article MP2 un montant mentionné au paragraphe MP3.1 ne peut constituer un abandon de son droit de faire une telle déduction, ni une reconnaissance de l'absence d'un tel droit lors de tout paiement ultérieur à l'Entrepreneur.

MP4 Date de paiement

4.1 Dans les présentes modalités de paiement :

4.1.1 «période de paiement» signifie un intervalle de 30 jours consécutifs ou tout autre intervalle plus long convenu entre l'Entrepreneur et le représentant ministériel;

4.1.2 un montant est «dû et payable» lorsqu'il doit être versé à l'Entrepreneur par Sa Majesté selon les paragraphes MP4.4, MP4.7 ou MP4.10;

4.1.3 un montant est en souffrance lorsqu'il demeure impayé le premier jour suivant le jour où il est dû et payable;

4.1.4 «date de paiement» signifie la date du titre négociable d'un montant dû et payable par le Receveur général du Canada et émis aux fins de paiement;

4.1.5 «taux d'escompte» signifie le taux d'intérêt, fixé par la Banque du Canada, en vigueurs à l'ouverture des bureaux à la date de paiement.

4.2 À l'expiration d'une période de paiement, l'Entrepreneur doit remettre au représentant ministériel

une demande d'acompte par écrit et y décrire toute partie achevée des travaux et tous les matériaux livres aux lieux des travaux, mais non incorporés aux travaux, durant la période de paiement faisant l'objet de la demande d'acompte.

4.3 Le représentant ministériel, dans les dix jours suivant réception d'une demande d'acompte mentionnée au paragraphe MP4.2 :

4.3.1 fait l'inspection de la partie des travaux et des matériaux qui y sont décrits, et

4.3.2 présente un rapport sur le progrès des travaux, dont le représentant ministériel envoie une copie à l'Entrepreneur, indiquant la valeur de la partie des travaux et des matériaux décrits dans la demande d'acompte que, selon le représentant ministériel :

4.3.2.1 sont conformes aux dispositions du Contrat, et

4.3.2.2 n'étaient visés par aucun autre rapport concernant des travaux du Contrat.

4.4 Sous réserve de l'article MP1 et du paragraphe MP4.5, Sa Majesté, au plus tard 30 heurs après la réception par le représentant ministériel de la demande d'acompte mentionnée au paragraphe MP4.2, paie à l'Entrepreneur :

4.4.1 une somme égale à 95% de la valeur indiquée dans le rapport sur le progrès des travaux mentionne à l'alinéa MP4.3.2, si l'Entrepreneur a fourni un cautionnement pour le paiement de la main-d'œuvre et des matériaux, ou

4.4.2 un montant égal à 90% de la valeur indiquée dans le rapport sur le progrès des travaux mentionné à l'alinéa 4.3.2, si l'Entrepreneur n'a pas fourni un cautionnement pour le paiement de la main-d'œuvre et des matériaux.

4.5 Il est essentiel, pour que Sa Majesté s'acquitte de son ablégation mentionnée au paragraphe MP4.4, que l'Entrepreneur fasse et remette au représentant ministériel,

4.5.1 une déclaration conforme à celle décrite au paragraphe MP4.6, pour les travaux et matériaux vises dans la demande d'acompte prévue au paragraphe MP4.2,

4.5.2 dans le cas de la première demande d'acompte de l'Entrepreneur, un calendrier d'exécution conformément aux parties pertinentes des Devis, et

4.5.3 si un calendrier est exigé, sa mise à jour aux moments précisés dans les parties pertinentes des Devis.

4.6 Dans la déclaration mentionnée au paragraphe MP4.5, l'Entrepreneur atteste :

4.6.1 qu'au jour de la demande d'acompte de l'Entrepreneur, l'Entrepreneur s'est acquitté de toutes ses obligations légales aux termes des Conditions de travail, et

4.6.2 qu'au jour de la précédente demande d'acompte, l'Entrepreneur s'est acquitté de toutes ses obligations légales envers ses sous-entrepreneurs et ses fournisseurs de matériaux en ce qui concerne les travaux visés par le Contrat.

4.7 Sous réserve de l'article MP1 et du paragraphe MP4.8, Sa Majesté verse à l'Entrepreneur, dans les 30 jours suivant la date de délivrance du Certificat provisoire d'achèvement mentionné au paragraphe CG44.2, la somme mentionnée à l'article MP1, moins l'ensemble :

4.7.1 de tous les paiements effectués conformément au paragraphe MP4.4;

4.7.2 du montant égal au coût pour Sa Majesté, estimé par le représentant ministériel de la correction de toutes défectuosités dans les travaux et décrites dans le Certificat provisoire d'achèvement; et

4.7.3 du montant égal au coût pour Sa Majesté, estimé par le représentant ministériel de l'achèvement de toute partie des travaux décrite dans le Certificat provisoire d'achèvement ne comportant pas la correction des défectuosités visées par l'alinéa MP4.7.2.

4.8 Il est essentiel, pour que Sa Majesté s'acquitte de son obligation mentionnée au paragraphe MP4.7, que l'Entrepreneur fasse et remette au représentant ministériel,

4.8.1 une déclaration conforme à celle décrite au paragraphe MP4.9 relativement au Certificat provisoire d'achèvement mentionné au paragraphe CG44.2, et

4.8.2 s'il est précisé dans les parties pertinentes des Devis, une mise à jour du calendrier d'exécution mentionné à l'alinéa MP4.5.2 qui, en plus des exigences énoncées, soit suffisamment détaillé concernant l'achèvement des travaux non-terminés et la correction de tous les défauts, le tout à la satisfaction du représentant ministériel.

4.9 Dans la déclaration mentionnée au paragraphe MP4.8, l'Entrepreneur atteste qu'au jour de l'émission du Certificat provisoire d'achèvement :

4.9.1 l'Entrepreneur s'est acquitté de toutes ses obligations légales aux termes des Conditions de travail;

4.9.2 l'Entrepreneur s'est acquitté de toutes ses obligations légales envers ses sous-entrepreneurs et ses fournisseurs de matériaux en ce que concerne les travaux visés par le Contrat; et

4.9.3 l'Entrepreneur s'est acquitté de toutes ses obligations mentionnées au paragraphe CG14.6.

4.10 Sous réserve de l'article MP1 et du paragraphe MP4.11, Sa Majesté verse à l'Entrepreneur, dans les 60 jours suivant la date de délivrance du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, la somme mentionnée à l'article MP1, moins l'ensemble :

4.10.1 de tous les paiements effectués conformément au paragraphe MP4.4, et

4.10.2 de tous les paiements effectués conformément au paragraphe MP4.7.

4.11 Il est essentiel, pour que Sa Majesté s'acquitte de son obligation mentionnée au paragraphe MP4.10, que l'Entrepreneur fasse et remette au représentant ministériel une déclaration conforme

à celle décrite au paragraphe MP4.12.

4.12 Dans la déclaration mentionnée au paragraphe MP4.11, l'Entrepreneur atteste, outre les mentions requises en vertu du paragraphe MP4.9, que l'Entrepreneur s'est acquitté de toutes ses obligations légales et qu'il a satisfait à toutes les réclamations légales formulées contre lui par suite de l'exécution des travaux.

MP5 Le rapport sur le progrès des travaux et le paiement y afférent ne lient pas Sa Majesté

5.1 Ni le rapport sur le progrès des travaux mentionné au paragraphe MP4.3, ni les paiements effectués par Sa Majesté en conformité des Modalités ne doivent être interprètes comme une admission que les travaux et les matériaux sont, en totalité ou en partie, complets, satisfaisants ou conformes au Contrat.

MP6 Retard du paiement

6.1 Nonobstant l'article CG7, le retard apporté par Sa Majesté à faire un paiement à sa date d'exigibilité en vertu du présent Contrat, ne constitue pas un bris du Contrat.

6.2 Sa Majesté versera, sans que l'Entrepreneur le demande, des intérêts simples au taux d'escompte plus 1 ¼ p. 100 sur les montants en souffrance en vertu de l'alinéa MP4.1.3, intérêts qui s'appliquent à compter du premier jour de retard jusqu'au four précédant la date de paiement, sauf que

6.2.1 les intérêts se seront ni exigibles ni verses à moins que le montant dont il est question au paragraphe MP6.2 ait été en souffrance pendant plus de 15 jours suivant :

6.2.1.1 la date à laquelle ladite somme est devenue due et payable, ou

6.2.1.2 la date de réception par le représentant ministériel de la déclaration conforme à celle décrite aux paragraphes MP4.5, MP4.8 ou MP4.11;

selon la plus avancée de ces deux dates, et

6.2.2 les intérêts ne seront ni exigibles ni verses sur les paiements anticipés en souffrance, le cas échéant.

MP7 Droit de compensation

7.1 Sans restreindre tout droit de compensation ou de retenue découlant explicitement ou implicitement de la loi ou d'une disposition quelconque du Contrat, Sa Majesté peut opérer compensation de toute somme due par l'Entrepreneur à Sa Majesté en vertu du Contrat ou de tout contrat en cours, à l'encontre des sommes dues par Sa Majesté à l'Entrepreneur en vertu du Contrat.

7.2 Pour les fins du paragraphe MP7.1, l'expression «contrat en cours» signifie un contrat entre Sa Majesté et l'Entrepreneur :

7.2.1 en vertu duquel l'Entrepreneur est légalement obligé d'exécuter ou de fournir du travail,

de la main-œuvre ou des matériaux; ou

7.2.2 à l'égard duquel Sa Majesté a, depuis la date à laquelle les présents Articles de convention sont intervenus, exercé le droit de retirer à l'Entrepreneur les travaux faisant l'objet du contrat.

MP8 Paiement en cas de résiliation

8.1 En cas de résiliation du Contrat conformément à l'article CG41, Sa Majesté paie à l'Entrepreneur le plus tôt possible eu égard aux circonstances, tout montant qui lui est légalement dû et payable.

MP9 Intérêts sur les réclamations réglées

9.1 Sa Majesté versera à l'Entrepreneur des intérêts simples sur le montant d'une réclamation réglée, au taux d'escompte moyen plus q ¼ p. 100 à compter du premier jour de retard jusqu'au jour précédant la date de paiement.

9.2 Aux fins du paragraphe MP9.1:

9.2.1 une réclamation est réputée être réglée lorsqu'une entente par écrit est signée par le représentant ministériel et l'Entrepreneur et fait état du montant de la réclamation à verser par Sa Majesté et des travaux pour lesquels ledit montant doit être versé;

9.2.2 le «taux d'escompte moyen» signifie le taux d'intérêt moyen, fixé par la Banque du Canada, en vigueur à la fin de chaque mois civil au cours de la période pendant laquelle la réclamation réglée était impayée;

9.2.3 une réclamation réglée est réputée être impayée à compter de la journée qui suit immédiatement la date à laquelle la réclamation était due et payable conformément au Contrat, s'il n'y avait pas eu contestation.

9.3 Aux fins de l'Article MP9, une réclamation signifie tout montant faisant l'objet d'un litige et assujetti à des négociations entre Sa Majesté et l'Entrepreneur en vertu du Contrat.

CG1 Interpretation

1.1 Dans le Contrat:

1.1.1 tout renvoi à une autre partie du Contrat désignée par des numéros précédés de lettres est censé renvoyer à la partie du Contrat qui est désignée par cette combinaison de lettres et de chiffres, de même qu'à toute autre partie du Contrat qui y est mentionnée ;

1.1.2 « Contrat » signifie les documents mentionnés dans les Articles de convention;

1.1.3 « garantie du contrat » signifie toute garantie fournie à Sa Majesté par l'Entrepreneur conformément au Contrat;

1.1.4 « le représentant ministériel » signifie l'officier ou l'employé de Sa Majesté désigné aux Articles deconvention et toute personne autorisée spécialement par le représentant ministériel à accomplir, en son nom, n'importe laquelle des fonctions qui lui sont confiées en vertu du Contrat, et signalée comme tel par écrit à l'Entrepreneur;

1.1.5 « matériaux » comprend toutes les marchandises, articles et choses à être fournies par ou pour l'Entrepreneur en vertu du Contrat, pour être incorporés dans les travaux;

1.1.6 « Ministre » comprend une personne agissant pour ou, si la charge est sans titulaire, à la place du Ministre ou des personnes lui succédant, de même que son ou leurs adjoints ou représentants dûment nommes aux fins du Contrat;

1.1.7 « personne » comprend, sauf lorsque le contexte exige une interprétation différente, une société, une entreprise, une firme, une co-entreprise, un consortium et une corporation;

1.1.8 « outillage' comprend les animaux, outils, instruments, machines, véhicules, bâtiments, ouvrages, équipements et marchandises, articles et choses autres que les matériaux, qui sont nécessaires à l'exécution des travaux;

1.1.9 « sous-entrepreneur » signifie une personne à qui l'Entrepreneur a, conformément à l'article CG4, confié l'exécution des travaux en tout ou en partie;

1.1.10 « surintendant » signifie l'employé de l'Entrepreneur désigné par ce dernier pour remplir les fonctions décrites à l'article CG19;

1.1.11 « travaux » comprend, sous réserve de toute stipulation expressément contraire dans le Contrat, tout ce que l'Entrepreneur doit faire, fournir, livrer ou accomplir pour l'exécution du Contrat.

1.2 Sauf quant à ceux apparaissant aux Plans et devis, les en-têtes apparaissent dans le Contrat, ne font pas partie du Contrat, mais y sont uniquement pour fin d'utilité pratique.

1.3 Aux fins de l'interprétation du Contrat, en cas de contradiction ou de divergence entre les Plans et devis et les Conditions générales, les Conditions générales prévalent.

1.4 Dans l'interprétation des Plans et devis, en cas de contradiction ou de divergence entre :

1.4.1 les Plans et les devis, les devis prévalent;

1.4.2 les plans, les plans tracés à l'échelle la plus grande prévalent; et

1.4.3 les dimensions exprimées en chiffres et les dimensions à l'échelle, les dimensions exprimées en chiffres prévalent.

CG2 Successeurs et ayants droit

2.1 Le Contrat est au bénéfice des parties au Contrat, de même que de leurs héritiers légaux, exécuteurs, administrateurs, successeurs et ayants droit, qui sont tous par ailleurs liés par ses dispositions.

CG3 Cession du Contrat

3.1 L'Entrepreneur ne peut céder le Contrat, en tout ou en partie, sans le consentement écrit du Ministre.

CG4 Sous-traitance par l'Entrepreneur

4.1 Sous réserve des Conditions générales, l'Entrepreneur peut sous-traiter une partie quelconque des travaux.

4.2 L'Entrepreneur doit aviser le représentant ministériel par écrit de son intention de sous-traiter.

4.3 L'avis mentionne au paragraphe CG4.2 doit identifier le sous-entrepreneur de même que la partie des travaux qu'il entend lui confier.

4.4 Le représentant ministériel peut s'objecter à la sous-traitance projetée en avisant par écrit l'Entrepreneur dans les six jours suivant la réception par le représentant ministériel de l'avis mentionné au paragraphe CG4.2.

4.5 Si le représentant ministériel s'oppose à une sous-traitance en vertu du paragraphe CG4.4, l'Entrepreneur ne peut procéder à la sous-traitance envisagée.

4.6 L'Entrepreneur ne peut, sans la permission écrite du représentant ministériel, remplacer un sous-entrepreneur dont il a retenu les services conformément aux Conditions générales.

4.7 Tout contrat entre l'Entrepreneur et un sous-entrepreneur doit comporter tous les termes et conditions du Contrat qui sont d'application générale.

4.8 Nul contrat entre l'Entrepreneur et un sous-entrepreneur ou nul consentement de le représentant ministériel à tel contrat sera interprété comme relevant l'Entrepreneur de quelqu'obligation en vertu du Contrat ou comme imposant quelque responsabilité à Sa Majesté.

CG5 Modifications

5.1 Nulle modification ou changement à quelque disposition du Contrat aura d'effet avant que d'avoir été consignée par écrit.

CG6 Nulle obligation implicite

6.1 Il ne découlera du Contrat aucune disposition ou obligation implicite de la part de Sa Majesté; seules les dispositions expresses du Contrat, stipulées par Sa Majesté, doivent servir de fondement à tout droit contre Sa Majesté.

6.2 Le présent Contrat remplace toutes communications, négociations et ententes, écrites ou verbales, concernant les travaux et qui auraient en lieu avant la date du Contrat.

CG7 Caractère essentiel des délais et échéances

7.1 Le temps est l'essence même du Contrat.

CG8 Indemnisation par l'Entrepreneur

8.1 L'Entrepreneur doit tenir Sa Majesté indemne et à couvert de toutes réclamations, demandes, pertes, frais, dommages, actions, poursuites ou procédures de la part de quiconque, fondés, découlant, reliés, occasionnés ou attribuables aux activités de l'Entrepreneur, de ses employés, agents, sous-entrepreneurs et sous-entrepreneurs de ces derniers dans l'exécution des travaux faisant l'objet du Contrat, incluant toute contrefaçon ou prétendue contrefaçon d'un brevet d'invention ou de toute autre forme de propriété intellectuelle.

8.2 Aux fins du paragraphe CG8.1, le terme « activités » comprend tout acte ou omission, de même que tout retard à accomplir un acte.

CG9 Indemnisation par Sa Majesté

9.1 Sa Majesté, sous réserve des dispositions de la Loi sur la responsabilité de la Couronne, de la Loi sur les brevets et de toute autre loi affectant les droits, pouvoirs, privilèges ou obligations de Sa Majesté, doit tenir l'Entrepreneur indemne et à couvert de toutes réclamations, demandes, pertes, frais, dommages, actions, poursuites ou procédures découlant de ses activités en vertu du Contrat et directement attribuables à :

9.1.1 une absence ou un vice, actuel ou allégué, dans le titre de Sa Majesté concernant l'emplacement des travaux, ou

9.1.2 une contrefaçon ou prétendue contrefaçon par l'Entrepreneur de tout brevet d'invention ou de toute autre forme de propriété intellectuelle, dans l'exécution de tout acte aux fins de Contrat, comportant l'utilisation d'un modèle, d'un plan, d'un dessin ou de toute autre chose fournis par Sa Majesté à l'Entrepreneur aux fins des travaux.

CG10 Interdiction aux députés de la Chambre des communes de tirer profit d'un contrat

10.1 Conformément à la Loi sur le Parlement du Canada, il est expressément interdit à tout membre de la Chambre des communes de posséder quelque part ou intérêt dans le Contrat, ou d'en tirer quelque bénéfice ou profit.

CG11 Avis

11.1 Tout avis, consentement, ordre, décision, directive ou communication autre qu'un avis suivant le paragraphe CG11.4, qui peut être donné à l'Entrepreneur conformément au Contrat, peut être donne de quelque manière que ce soit.

11.2 Tout avis, consentement, ordre, décision, directive ou autre communication devant être donné par écrit à une partie ou une autre conformément au Contrat, sera, sous réserve du paragraphe CG11.4, réputé avoir été effectivement donné :

11.2.1 à l'Entrepreneur, s'il a été livré personnellement à l'Entrepreneur ou au surintendant de l'Entrepreneur, ou s'il a été envoyé par la poste, par télex ou par télécopieur à l'Entrepreneur, à l'adresse indiquée au paragraphe A4.1; ou

11.2.2 à Sa Majesté, s'il a été livré personnellement au représentant ministériel, ou s'il a été envoyé par la poste, par télex ou par télécopieur au représentant ministériel, à l'adresse indiquée à l'alinéa A1.2.1.

11.3 Tout avis, consentement, ordre, décision, directive ou autre communication donné conformément au paragraphe CG11.2 sera réputé avoir été reçu par l'une ou l'autre des parties :

11.3.1 le jour où il a été livre, s'il lui a été livré personnellement; ou

11.3.2 le jour de sa réception ou le sixième jour après son envoi par la poste, selon la première de ces deux dates, s'il lui a été envoyé par la poste, et

11.3.3 dans les 24 heures suivant sa transmission, s'il lui a été envoyé par télex ou par télécopieur.

11.4 S'il est livré personnellement, un avis donné en vertu de l'alinéa CG38.1.1 et des articles CG40 et CG41 sera remis à l'Entrepreneur ou, si l'Entrepreneur est une société, une firme, une co-entreprise ou une corporation, à un agent de l'administration ou à un cadre supérieur.

CG12 Matériaux, outillage et biens immobiliers fournis par Sa Majesté

12.1 Sous réserve du paragraphe CG12.2, l'Entrepreneur est responsable envers Sa Majesté de toute perte ou dommage, aux matériaux, à l'outillage ou aux biens immobiliers que Sa Majesté a fournis ou placés sous la garde et le contrôle de l'Entrepreneur aux fins du Contrat, que la perte ou le dommage soit attribuable ou non à des causes indépendantes de la volonté de l'Entrepreneur.

12.2 L'Entrepreneur n'est pas responsable envers Sa Majesté de toute perte ou dommage aux matériaux, à l'outillage ou aux biens immobiliers dont il est question au paragraphe CG12.1, si

cette perte ou ce dommage est imputable et directement attribuable à l'usure causée par un usage raisonnable.

12.3 L'Entrepreneur doit utiliser les matériaux, l'outillage ou les biens immobiliers dont il est question au paragraphe CG12.1, uniquement pour l'exécution du Contrat et pour aucune autre fin.

12.4 Lorsqu'après avoir été requis de le faire par le représentant ministériel, l'Entrepreneur n'a pas, dans un délai raisonnable, indemnisé Sa Majesté pour une perte ou un dommage dont il est responsable en vertu du paragraphe CG12.1, le représentant ministériel peut y pouvoir aux frais de l'Entrepreneur, et ce dernier est dès lors responsable envers Sa Majesté des frais en l'occurrence qu'il devra sur demande payer à Sa Majesté.

12.5 L'Entrepreneur doit tenir des registres que le représentant ministériel peut de temps à autre exiger des matériaux, de l'outillage et des biens immobiliers visés par le paragraphe CG12.1 et doit, lorsque le représentant ministériel e l'exige, établir à la satisfaction de ce dernier que les matériaux, l'outillage et les biens immobiliers sont à l'endroit et dans l'état dans lequel ils devraient être.

CG13 Matériaux, outillage et biens immobiliers devenus propriété de Sa Majesté

13.1 Sous réserve du paragraphe CG14.7, tous les matériaux et l'outillage, de même que tout droit de l'Entrepreneur sur tous les biens immobiliers, permis, pouvoirs et privilèges achetés, ou utilisés par l'Entrepreneur pour les travaux deviennent, à compter de l'époque où ils ont été achetés ou utilisés, la propriété de Sa Majesté aux fins des travaux et continuent de l'être :

13.1.1 dans le cas des matériaux, jusqu'à ce que le représentant ministériel déclare qu'ils ne sont plus requis pour les travaux; et

13.1.2 dans le cas de l'outillage, des biens immobiliers, des permis, des pouvoirs et des privilèges, jusqu'à ce que le représentant ministériel déclare que le droit dévolu à Sa Majesté en l'espèce n'est plus requis pour les travaux.

13.2 Les matériaux ou l'outillage appartenant à Sa Majesté en vertu du paragraphe CG13.1 ne doivent pas être enlevés des lieux des travaux, utilisés ou aliénés, sauf pour les travaux, sans le consentement écrit du représentant ministériel.

13.3 Sa Majesté n'est pas responsable de toute perte ou de tout dommage aux matériaux ou à l'outillage visés par le paragraphe CG13.1 quelle qu'en soit la cause et l'Entrepreneur est responsable de toute perte ou de tout dommage bien que ces matériaux ou outillage appartiennent à Sa Majesté.

CG14 Permis et taxes payables

14.1 L'Entrepreneur doit, dans les 30 jours de la date du Contrat, offrir à l'administration municipale, un montant égal à tous les droits et frais qui seraient payables à l'administration municipale pour les permis de construction, si les travaux étaient exécutés pour une personne autre que Sa Majesté.

14.2 Dans les dix jours qui suivent l'offre mentionnée au paragraphe CG14.1, l'Entrepreneur avise le représentant ministériel de sa démanche et du montant de cette offre et lui fait savoir si elle a été acceptée ou non par l'administration municipale.

14.3 Si l'administration municipale n'a pas accepte la somme offerte aux termes du paragraphe CG14.1, l'Entrepreneur remet ce montant à Sa Majesté dans les six jours suivant l'expiration du délai fixe au paragraphe CG14.2.

14.4 Aux fins des paragraphes CG14.1 et CG14.3, l'expression « administration municipale » signifie une administration qui aurait compétence pour autoriser la construction de l'ouvrage si le propriétaire n'en était pas Sa Majesté.

14.5 Nonobstant le lieu de résidence de l'Entrepreneur, l'Entrepreneur versera toute taxe applicable découlant de l'exécution des travaux visés par le Contrat.

14.6 Conformément à la déclaration mentionnée au paragraphe MP4.9, l'Entrepreneur dont ni le lieu de résidence ni la place d'affaires n'est dans la province où sont effectués les travaux visés par le Contrat, fournira à Sa Majesté une preuve d'enregistrement auprès des autorités provinciales responsables de la taxe de vente dans ladite province.

14.7 Aux fins du paiement de la taxe applicable ou de la fourniture d'une garantie de paiement de la taxe applicable découlant de l'exécution des travaux vises par le Contrat, l'Entrepreneur doit, malgré le fait que tous les matériaux et outillage, de même que des droits de l'Entrepreneur sur tous les biens immobiliers, permis, pouvoirs et privilèges, sont devenus la propriété de Sa Majesté après la date d'achat, payer, en tant qu'utilisateur ou consommateur, toute taxe applicable payable au moment de l'utilisation desdits matériaux, outillage ou droits de l'Entrepreneur à titre d'utilisateur, conformément aux lois pertinentes, ou fournir une garantie de paiement à cet égard.

CG15 Exécution des travaux sous la direction du représentant ministériel

15.1 L'Entrepreneur doit :

15.1.1 permettre au représentant ministériel d'avoir accès aux travaux et au chantier en tout temps au cours de l'exécution du Contrat;

15.1.2 communiquer au représentant ministériel tous renseignements qu'il demande concernant l'exécution du Contrat; et

15.1.3 fournir au représentant ministériel toute l'assistance possible dans l'accomplissement de son devoir de veiller à ce que les travaux soient exécutés conformément aux Contrat, de même que dans l'accomplissement de tout autre devoir et dans l'exercice de tout pouvoir qui lui incombe ou qui lui est conféré par le Contrat.

CG16 Coopération avec d'autres Entrepreneurs

16.1 Lorsque, de l'avis du représentant ministériel, il est nécessaire d'affecter aux travaux ou au chantier d'autres entrepreneurs ou ouvriers, avec ou sans outillage et matériaux, l'Entrepreneur doit, à la satisfaction du représentant ministériel, leur donner accès aux travaux et coopérer avec

eux dans l'accomplissement de leurs fonctions et obligations.

16.2 Si :

16.2.1 l'affectation aux travaux d'autres entrepreneurs ou ouvriers en vertu du paragraphe CG16.1 ne pouvait être raisonnablement prévue par l'Entrepreneur au moment de la conclusion du Contrat; et

16.2.2 de l'avis du représentant ministériel, l'Entrepreneur a encouru des dépense additionnelles afin de se conformer au paragraphe CG16.1; et

16.2.3 l'Entrepreneur a donne au représentant ministériel un avis écrit de sa réclamation avant l'expiration d'un délai de 30 jours à compter de l'affectation d'autres entrepreneurs ou ouvriers aux travaux ou au chantier;

Sa Majesté rembourse à l'Entrepreneur les frais encourus, calculés conformément aux articles CG48 a CG50, pour le travail, de l'outillage et des matériaux additionnels requis.

CG17 Vérification des travaux

17.1 Si, à un moment quelconque après le début des travaux mais avant l'expiration de la période de garantie, le représentant ministériel a des motifs de croire que les travaux on partie de ceux-ci n'ont pas été exécutés conformément au Contrat, il peut demander qu'une vérification de ces travaux soit effectuée par un expert qu'il désigne.

17.2 Si, par suite d'une vérification conformément au paragraphe CG17.1, il est établi que les travaux n'ont pas été exécutés suivant le Contrat, l'Entrepreneur doit, su demande, payer à Sa Majesté tous les coûts et toutes les dépenses raisonnables que cette vérification lui aura occasionnés, en plus et sans préjudice aux droits et recours de Sa Majesté sous le Contrat, en droit ou en équité.

CG18 Déblaiement de l'emplacement

18.1 L'Entrepreneur garde les travaux et leur emplacement propres, sans rebuts, ni débris, et respecte à cet égard toute directive du représentant ministériel.

18.2 Avant l'émission du Certificat provisoire mentionné au paragraphe CG44.2, l'Entrepreneur enlève tout l'outillage et tous les matériaux non requis à l'exécution du reste des travaux. Il enlève également tous rebuts et débris et fait en sorte que les travaux et leur emplacement soient propres et convenables pour leur occupation par les employés de Sa Majesté, sauf indication contraire dans le Contrat.

18.3 Avant l'émission du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, l'Entrepreneur retire des travaux et leur emplacement, l'excédant de l'outillage et des matériaux, de même que tous les rebus et débris.

18.4 Les obligations qu'imposent à l'Entrepreneur les paragraphes CG18.1 à CG18.3 ne s'appliquent pas aux rebuts et aux débris laissés par les employés de Sa Majesté, ou par les autres entrepreneurs et leurs employés visés au paragraphe CG16.1.

CG19 Surintendant de l'Entrepreneur

19.1 L'Entrepreneur désigne sans délai un surintendant après l'adjudication du Contrat.

19.2 L'Entrepreneur communique sans délai au représentant ministériel le nom, l'adresse et le numéro de téléphone du surintendant désigné en vertu du paragraphe CG19.1.

19.3 Le surintendant désigné en vertu du paragraphe CG19.1 à l'entière responsabilité des opérations de l'Entrepreneur dans l'exécution des travaux et il est en outre autorisé à recevoir au nom de l'Entrepreneur, tous avis, consentement, ordre, directive, décision ou toute autre communication qui peut lui être donné en vertu du Contrat.

19.4 Pendant les heures de travail et jusqu'à l'achèvement des travaux, l'Entrepreneur doit garder sur les lieux des travaux un surintendant compétent.

19.5 À la demande du représentant ministériel, l'Entrepreneur retire tout surintendant qui, de l'avis du représentant ministériel, est incompétent ou s'est conduit de façon malséante, et il remplace sans délai le surintendant ainsi retiré par un autre surintendant que le représentant ministériel estime acceptable.

19.6 Sous réserve du paragraphe CG19.5, l'Entrepreneur ne peut remplacer le surintendant sans le consentement écrit du représentant ministériel.

19.7 En cas de contravention par l'Entrepreneur au paragraphe CG19.6, le représentant ministériel peut refuser l'émission de tout Certificat mentionné à l'article CG44 jusqu'à ce que le surintendant ait été réintégré dans ses fonctions ou qu'un autre surintendant acceptable au représentant ministériel l'ait remplacé.

CG20 Sécurité nationale

20.1 Si le Ministre estime que la sécurité nationale le requiert, il peut ordonner à l'Entrepreneur :

20.1.1 de lui fournir tout renseignement sur des personnes engagées ou devant l'être aux fins du Contrat, et

20.1.2 de retirer des travaux et de leur emplacement toute personne dont l'emploi peut en l'occurrence, de l'avis du Ministre, comporter un risque pour la sécurité nationale.

20.2 Les contrats que l'Entrepreneur pourra conclure avec les personnes qui seront affectées à l'exécution des travaux, doivent contenir des dispositions qui lui permettront de s'acquitter de toute obligation qui lui incombent en vertu des articles CG19, CG20 et CG21.

20.3 L'Entrepreneur doit obéir à tout ordre donné par le Ministre suivant le paragraphe CG20.1.

CG21 Ouvriers inaptes

21.1 À la demande du représentant ministériel, l'Entrepreneur retire des travaux toute personne engagée par l'Entrepreneur aux fins des travaux qui, de l'avis du représentant ministériel, est incompétente ou s'est conduite de façon malséante et l'Entrepreneur refuse l'accès à l'emplacement des travaux à une personne ainsi retirée.

CG22 Augmentation ou diminution des coûts

22.1 Le montant établi dans les Articles de convention doit être ni augmenté, ni diminué en raison d'une augmentation ou d'une diminution du coût des travaux résultant d'une augmentation ou d'une diminution du coût du travail, de l'outillage, des matériaux ou des rajustements salariaux énoncés ou prescrits dans les Conditions de travail.

22.2 Nonobstant le paragraphe CG22.1 et l'article CG35, le montant énonce dans les Articles de convention doit faire l'objet d'un redressement de la manière prévue au paragraphe CG22.3, en cas de modification à une taxe imposée en vertu de la Loi sur l'accise, de la Loi sur la taxe d'accise, de la Loi sur la sécurité de la vieillesse, de la Loi sur les douanes, du Tarif des douanes ou de toute loi provinciale sur la taxe de vente imposant une taxe de vente au détail sur l'achat de biens personnels corporels incorporés dans les biens immobiliers :

22.2.1 survenant après la date à laquelle l'Entrepreneur a présenté une soumission pour le Contrat,

22.2.2 s'appliquant aux matériaux; et

22.2.3 influant sur le coût de ces matériaux pour l'Entrepreneur.

22.3 En cas de changement fiscal suivant le paragraphe CG22.2, tout montant pertinent indiqué dans les Articles de convention sera augmenté ou diminué d'un montant égal qui, sur examen des registres mentionnés à l'article CG51, représente l'augmentation ou la diminution, selon le cas, des coûts directement attribuables à ce changement.

22.4 Aux fins du paragraphe CG22.2, lorsqu'une taxe fait l'objet d'un changement après la date à laquelle l'Entrepreneur a présenté une soumission mais alors que le ministre des Finances en avait donné avis public avant la date de présentation de la soumission, le changement fiscal est censé être survenu avant la date a laquelle la soumission a été présentée.

CG23 Main-d'œuvre et matériaux canadiens

23.1 L'Entrepreneur emploi pour l'exécution des travaux, de la main-d'œuvre et des matériaux canadiens dans toute la mesure où ils sont disponibles, compte tenu des exigences économiques et de la nécessité de poursuivre une exécution diligente des travaux.

23.2 Sous réserve du paragraphe CG23.1, l'Entrepreneur emploie, dans la mesure où elle est disponible, la main-d'œuvre de la localité où les travaux sont exécutés, et il recourt aux bureaux des Centres d'emploi du Canada pour recruter les ouvriers, là où la chose est réalisable.

23.3 Sous réserve des paragraphes CG23.1 et CG23.2, l'Entrepreneur emploie une proportion raisonnable d'ouvriers qui ont été en service actif dans les Forces armées canadiennes et qui en

ont reçu une libération honorable.

CG24 Protection des travaux et des documents

24.1 L'Entrepreneur garde et protège les travaux, l'emplacement des travaux, le Contrat, les devis, les plans, les dessins, les renseignements, les matériaux, l'outillage et les biens immobiliers, fournis ou non par Sa Majesté à l'Entrepreneur, contre toute perte ou dommage de quelque nature et ne peut les utiliser, donner, démolir ou en disposer sans le consentement écrit du Ministre, sauf si cela est indispensable à l'exécution des travaux.

24.2 Si une cote de sécurité est attribuée aux documents ou renseignements donnés ou dévoilés à l'Entrepreneur, l'Entreteneur prend toutes les mesures que lui enjoint le représentant ministériel pour assurer le degré de sécurité conforme à cette cote.

24.3 L'Entrepreneur fournit tous dispositifs de sécurité et aide toute personne à laquelle le Ministre a donne l'autorisation d'inspecter ou de prendre les mesures de sécurité qui s'imposent à l'égard des travaux et de l'emplacement des travaux.

24.4 Le représentant ministériel peut ordonner à l'Entrepreneur de faire telles choses et d'effectuer tels travaux additionnels qui, de l'avis du représentant ministériel, sont raisonnables et nécessaires pour assurer l'observation des paragraphes CG24.1 à CG24.3, ou pour rectifier une violation de ces paragraphes.

CG25 Cérémonies publiques et enseignes

25.1 L'Entrepreneur ne permit pas de cérémonie publique relativement aux travaux, sans la permission du Ministre.

25.2 L'Entrepreneur n'érige pas ou ne permet pas l'érection d'enseignes ou de panneaux publicitaires sur les travaux ou l'emplacement des travaux sans l'approbation du représentant ministériel.

CG26 Précautions contre les dommages, la transgression des droits, les incendies, et les autres dangers

26.1 L'Entrepreneur doit, à ses propres frais, faire le nécessaire pour s'assurer

26.1.1 que nulle personne n'est blessée, nul bien endommagé et nul droit, servitude ou privilège enfreint en raison de l'activité de l'Entrepreneur en vertu du Contrat;

26.1.2 que la circulation à pied ou autrement sur les chemins ou cours d'eau publics ou privés n'est pas indûment entravée, interrompue ou rendue dangereuse par les travaux ou l'outillage;

26.1.3 que les dangers d'incendie sur le chantier ou l'emplacement des travaux sont éliminés et que, sous réserve de tout ordre qui peut être donné par le représentant ministériel, tout incendie est promptement maîtrisé;

26.1.4 que la santé et sécurité des personnes occupées aux travaux ne sont pas menacées par les méthodes ou les moyens mis en œuvre;

26.1.5 que des services médicaux suffisants sont offerts en tout temps pendant les heures de travail, à toutes personnes occupées aux travaux;

26.1.6 que des mesures sanitaires suffisantes sont prises à l'égard des travaux et l'emplacement des travaux; et

26.1.7 que tous les jalons, bouées et repères placés sur les travaux ou l'emplacement des travaux par le représentant ministériel ou sur son ordre sont protégés et ne sont pas enlevés, abimés, changés ou détruits.

26.2 Le représentant ministériel peut ordonner à l'Entrepreneur de faire toute chose et de construire tout ouvrage additionnel qui, de l'avis dureprésentant ministériel, est raisonnable ou nécessaire pour assurer l'observation du paragraphe CG26.1 ou pour rectifier une infraction audit paragraphe.

26.3 L'Entrepreneur se conforme, à ses propres frais, à tout ordre que le représentant ministériel émet conformément au paragraphe CG26.2.

CG27 Assurances

27.1 L'Entrepreneur souscrit et maintient, à ses propres frais, des polices d'assurance relativement aux travaux et en fournit la preuve au représentant ministériel conformément aux exigences des Conditions d'assurance « E ».

27.2 Les polices d'assurance mentionnées au paragraphe CG27.1 doivent être :

27.2.1 en la forme et nature, au montant, pour la durée et suivant les termes et conditions prévus aux Conditions d'assurance « E »; et

27.2.2 prévoir le remboursement des demandes de règlement, conformément à l'article CG28.

CG28 Indemnité d'assurance

28.1 Dans le cas d'une demande de règlement en vertu d'une police d'assurance tous risques chantier (y compris les installations) que maintient l'Entrepreneur conformément à l'article CG27, les sommes dues à l'égard d'un sinistre seront remboursées directement à Sa Majesté, et :

28.1.1 les sommes ainsi versées seront retenues par Sa Majesté aux fins du contrat; ou

28.1.2 si Sa Majesté en décide ainsi, seront conservées par Sa Majesté, et le cas échéant, deviendront sa propriété de façon absolue.

28.2 Dans le cas d'une demande de règlement en vertu d'une police responsabilité civile générale que maintient l'Entrepreneur conformément à l'article CG27, l'assureur remboursera directement au

demandeur les sommes dues à l'égard d'un sinistre.

28.3 Si le Ministre choisit conformément au paragraphe CG28.1 de conserver l'indemnité d'assurance, il peut faire effectuer une vérification de la comptabilité de l'Entrepreneur et de Sa Majesté relativement à la partie des travaux perdue, endommagée ou détruite, afin d'établir la différence, s'il en est, entre

28.3.1 l'ensemble du montant des pertes ou dommages subis par Sa Majesté, incluant tous frais encourus pour le déblaiement et le nettoyage des travaux et l'emplacement des travaux et de toute autre somme payable par l'Entrepreneur à Sa Majesté en vertu du Contrat, moins toute somme retenue conformément à l'alinéa CG28.1.2; et

28.3.2 l'ensemble des sommes payables par Sa Majesté à l'Entrepreneur en vertu du Contrat à la date où la perte ou les dommages ont été subis.

28.4 Toute différence établie conformément au paragraphe CG28.3 doit être payée sans délai par la partie débitrice à la partie créancière.

28.5 Suite au paiement prévu au paragraphe CG28.4, Sa Majesté et l'Entrepreneur sont réputés libérés de tous droits et obligations en vertu du Contrat, à l'égard seulement de la partie des travaux qui a fait l'objet d'une vérification mentionnée au paragraphe CG28.3.

28.6 S'il n'est pas exercé de choix en vertu du paragraphe CG28.1.2, l'Entrepreneur, sous réserve du paragraphe CG28.7, déblaie et nettoie les travaux et l'emplacement des travaux et il restaure et remplace à ses frais la partie des travaux qui a été perdue ou endommagée, comme si ces travaux n'avaient pas encore été exécutés.

28.7 Lorsque l'Entrepreneur exécute les obligations prévues au paragraphe CG28.6, Sa Majesté lui rembourse, jusqu'à concurrence des sommes mentionnées au paragraphe CG28.1, les frais de déblaiement, nettoyage, restauration et remplacement en question.

28.8 Sous réserve du paragraphe CG28.7, tout paiement par Sa Majesté en exécution des obligations prévues au paragraphe CG28.7 est effectué conformément aux dispositions du Contrat, mais chaque paiement doit représenter 100% du montant réclamé, nonobstant les alinéas MP4.4.1 et MP4.4.2.

CG29 Garantie du contrat

29.1 L'Entrepreneur obtient et dépose auprès du représentant ministériel une ou des garanties conformément aux conditions de garantie du contrat.

29.2 S'il est déposé une garantie auprès du représentant ministériel en vertu du paragraphe CG29.1 constituant en tout ou en partie en un dépôt de garantie, ce dépôt sera traité conformément aux articles CG43 et CG45 des Conditions générales.

29.3 Si la garantie en vertu du paragraphe CG29.1 consiste, en partie, en un cautionnement (bond) pour le paiement de la main-d'œuvre et des matériaux, l'Entrepreneur affiche une copie de ce cautionnement sur l'emplacement des travaux.

CG30 Modifications aux travaux

30.1 Sous réserve de l'article CG5, le représentant ministériel peut, à tout moment avant de délivrer son Certificat définitif d'achèvement :

30.1.1 exiger des travaux ou des matériaux en sus de ceux qui ont été prévus dans les Plans et devis; et

30.1.2 supprimer ou modifier les dimensions, le caractère, la quantité, la qualité, la description, la situation ou la position de la totalité ou d'une partie des travaux ou matériaux prévus dans les Plans et devis ou exigés en conformité de l'alinéa CG30.1.1.

à condition que ces travaux ou matériaux supplémentaires, ou que ces suppressions ou modifications soient, selon lui compatibles avec l'intention du Contrat.

30.2 L'Entrepreneur exécute les travaux conformément aux ordres, suppressions et modifications émis de temps à autre par le représentant ministériel en vert du paragraphe CG30.1, comme s'ils faisaient partie des Plans et devis.

30.3 Le représentant ministériel décide si ce que l'Entrepreneur a fait ou omis de faire conformément à un ordre, une suppression ou une modification en vertu du paragraphe CG30.1 a augmenté ou diminué le coût des travaux pour l'Entrepreneur.

30.4 Si le représentant ministériel décide, conformément au paragraphe CG30.3, qu'il y a eu augmentation du coût pour l'Entrepreneur, Sa Majesté paie à l'Entrepreneur le coût accru que l'Entrepreneur a nécessairement encouru pour les travaux supplémentaires, calculé conformément aux articles CG49 ou GB50.

30.5 Si le représentant ministériel décide, conformément au paragraphe CG30.3, qu'il y a eu réduction du coût pour l'Entrepreneur, Sa Majesté réduit le montant payable à l'Entrepreneur en vertu du Contrat d'un montant égal à la réduction du coût occasionné par toute suppression ou modification ordonnée conformément au paragraphe CG30.1.2, calculé conformément à l'article CG49.

30.6 Les paragraphes CG30.3 à CG30.5 s'appliquent seulement à un contrat ou partie d'un contrat comportant, suivant le Contrat, une Entente à prix fixe.

30.7 Tout ordre, suppression ou modification mentionné au paragraphe CG30.1 doit être par écrit, porter la signature du représentant ministériel et être communiqué à l'Entrepreneur conformément au paragraphe CG11.

CG31 Interprétation du Contrat par le représentant ministériel

31.1 Avant la délivrance par le représentant ministériel du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, le représentant ministériel tranche tout question concernant l'exécution des travaux ou les obligations de l'Entreteneur en vertu du Contrat et en particulier, mais sans limiter la portée générale de ce qui précède, concernant :

31.1.1 la signification de quoi que ce soit dans les Plans et devis;

31.1.2 l'Interprétation des Plans et devis au cas d'erreur, omission, obscurité ou divergence dans leur texte ou intention;

31.1.3 le respect des exigences du Contrat quant à la quantité ou la qualité des matériaux ou du travail que l'Entrepreneur fournit ou se propose de fournir;

31.1.4 la suffisance de la main-d'œuvre, de l'outillage ou des matériaux que l'Entrepreneur fournit pour la réalisation des travaux et du Contrat, pour assurer l'exécution des travaux suivant le Contrat et l'exécution du Contrat conformément à ses dispositions;

31.1.5 la qualité de tout genre de travail effectué par l'Entrepreneur; ou

31.1.6 l'échéancier et la programmation des diverses phases de l'exécution des travaux;

et la décision du représentant ministériel est sans appel, pour ce qui est des travaux.

31.2 L'Entrepreneur exécute les travaux conformément aux décisions et directives du représentant ministériel en vertu du paragraphe CG31.1 et conformément à toute décision et directive du représentant ministériel que en découlent.

CG32 Garantie et rectification des défectuosités des travaux

32.1 Sans restreindre les garanties implicites ou explicites de la loi ou du Contrat, l'Entrepreneur doit, à ses propres frais

32.1.1 rectifier toute défectuosité et corriger tout vice qui se manifeste dans les travaux ou qui est signalé au Ministre quant aux parties du travail acceptées relativement au Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 dans les 12 mois qui suivront la date d'émission du Certificat provisoire d'achèvement.

32.1.2 rectifier toute défectuosité et corriger tout vice qui se manifeste dans les travaux ou qui est signalé au Ministre relativement aux parties des travaux décrites dans le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 dans les 12 mois qui suivent la date d'émission du Certificat définitif d'achèvement mentionné au paragraphe CG44.1.

32.2 Le représentant ministériel peut ordonner à l'Entrepreneur de rectifier ou corriger toute défectuosité ou tout vice mentionné au paragraphe CG32.1 ou couvert par toute autre garantie implicite ou explicite.

32.3 L'ordre mentionné au paragraphe CG32.2.1 doit être par écrit; il peut préciser le délai dans lequel l'Entrepreneur doit rectifier ou corriger la défectuosité ou le vice et il doit être donné à l'Entrepreneur conformément à l'article CG11.

32.4 L'Entrepreneur doit rectifier la défectuosité ou corriger le vice mentionné dans l'ordre donné en conformité du paragraphe CG32.2 dans le délai qui y est stipulé.

CG33 Défaut de l'Entrepreneur

33.1 Si l'Entrepreneur omet de se conformer à une décision ou directive rendue ou émise par le représentant ministériel en vertu des articles CG18, CG24, CG26, CG31 ou CG32, le représentant ministériel peut recouvrir aux méthodes qui lui semblent opportunes pour exécuter ce que l'Entrepreneur a omis d'exécuter.

33.2 L'Entrepreneur paie à Sa Majesté, sur demande, la totalité de tous les frais, dépenses et dommages encourus par Sa Majesté en raison du défaut de l'Entrepreneur de se conformer à toute décision ou directive stipulée au paragraphe CG31.1 et en raison de toute méthode utilisée en l'occurrence par le représentant ministériel conformément au paragraphe CG33.1.

CG34 Protestations des décisions du représentant ministériel

34.1 L'Entrepreneur peut contester, dans les dix jours de sa réception, une décision ou directive mentionnée aux paragraphes CG30.3 ou CG33.1.

34.2 Toute contestation mentionnée au paragraphe CG34.1 doit être par écrit, indiquer tous les motifs de la contestation, être signée par l'Entrepreneur et communiquée à Sa Majesté par l'entremise du représentant ministériel.

34.3 Si l'Entrepreneur proteste conformément au paragraphe CG34.2, le fait pour lui de se conformer à la décision ou à la directive qu'il conteste ne sera pas interprété comme une reconnaissance du bienfondé de cette décision ou de cette directive et ne pourra constituer une fin de non-recevoir quant à toute poursuite qu'il estimera appropriée dans les circonstances.

34.4 Tout protêt de l'Entrepreneur en vertu du paragraphe CG34.2 ne le dispense de se conformer à la décision ou directive en question.

34.5 Sous réserve du paragraphe CG34.6, l'Entrepreneur doit, sous peine de déchéance, intenter toute poursuite judiciaire mentionnée au paragraphe CG34.3 dans les trois mois suivant la date d'émission du Certificat définitif d'achèvement mentionné au paragraphe CG44.1.

34.6 L'Entrepreneur doit, sous peine de déchéance, intenter dans les trois mois suivant la fin d'une période de garantie, toute poursuite judicaire mentionnée au paragraphe CG34.3 et découlant d'un ordre donné en vertu de l'article CG32.

34.7 Sous réserve du paragraphe CG34.8, si Sa Majesté tient la contestation de l'Entrepreneur comme bien fondée, elle doit lui rembourser le coût des travaux, de l'outillage et des matériaux additionnels nécessaires à l'exécution de l'ordre ou de la directive ayant fait l'objet du protêt.

34.8 Les couts mentionnés au paragraphe CG34.7 doivent être calculés conformément aux dispositions des articles CG48 à CG50.

CG35 Changement des conditions du sol – Négligence ou retard de la part de Sa Majesté

35.1 Sous réserve du paragraphe CG35.2, nul paiement autre qu'un paiement expressément stipulé au Contrat n'est fait par Sa Majesté à l'Entrepreneur en raison de quelque dépense supplémentaire

encourue ou pour quelque perte ou dommage subi par l'Entrepreneur.

35.2 Si l'Entrepreneur encourt des frais supplémentaires ou subit des pertes ou dommages directement attribuables :

35.2.1 à un écart substantiel entre les renseignements sur les conditions du sol à l'emplacement des travaux, dans les Plans et devis ou d'autre documents fournis à l'Entrepreneur pour l'établissement de sa soumission, ou à un écart substantiel entre un présomption raisonnable de l'Entrepreneur fondée sur lesdits renseignements et les conditions réelles rencontrées par l'Entrepreneur à l'emplacement des travaux lors de leur exécution; ou

35.2.2 à la négligence ou à un retard de la part de Sa Majesté après la date du Contrat, à fournir tout renseignement ou à tout acte auquel Sa Majesté est expressément obligée par le Contrat ou que les usages de l'industrie dicteraient ordinairement à tout propriétaire;

il doit dans les dix jours qui suivent la date de la constatation des conditions du sol décrites à l'alinéa CG35.2.1 ou la date de la négligence ou du retard décrit au paragraphe CG35.2.2, en donner avis par écrit au représentant ministériel et lui signifier son intention d'exiger le remboursement des frais supplémentaires encourus ou le coût de toutes pertes ou dommages subis.

35.3 Lorsque l'Entrepreneur a donne au représentant ministériel l'avis mentionné au paragraphe CG35.3, il doit sous peine de déchéance dans les 30 jours suivant la date de l'émission du Certificat définitif mentionné au paragraphe CG44.1, remettre au représentant ministériel une demande écrite de remboursement des frais supplémentaires ou du coût de toutes pertes ou dommages subis.

35.4 La demande de remboursement mentionnée au paragraphe CG35.3 devra contenir une description suffisante des faits et circonstances qui motivent la demande afin que le représentant ministériel puisse déterminer si cette demande est justifiée ou non, et l'Entrepreneur doit, à cette fin, fournir tout autre renseignement que le représentant ministériel peut exiger.

35.5 Si, de l'avis du représentant ministériel, la demande de remboursement mentionnée au paragraphe CG35.3 est bien fondée, Sa Majesté doit verser à l'Entrepreneur un supplément calculé en conformité des articles CG47 à CG49.

35.6 Si, de l'avis du représentant ministériel, le cas décrit à l'alinéa CG35.2.1 se traduit pour l'Entrepreneur par une économie dans l'exécution du Contrat, le montant établi dans les Articles de convention est, sous réserve du paragraphe CG35.7, réduit d'un montant égal à l'économie réalisée.

35.7 Le montant à être déduit en vertu du paragraphe CG35.6 doit être déterminé selon les dispositions des articles CG47 à CG49.

35.8 Si l'Entrepreneur néglige de donner l'avis mentionné au paragraphe CG35.2 et de présenter la demande de remboursement mentionnée au paragraphe CG35.3 dans le délai prescrit, aucun supplément ne doit lui être verse en l'occurrence.

CG36 Prolongation de délai

36.1 Sous réserve du paragraphe CG36.2, le représentant ministériel peut, s'il estime que l'achèvement en retard des travaux est attribuable à des causes indépendantes de la volonté de l'Entrepreneur et sur demande présentée par l'Entrepreneur avant le jour fixe par les Articles de convention pour l'achèvement des travaux ou avant toute autre date fixée auparavant conformément au présent article, prolonger le délai d'achèvement des travaux.

36.2 Toute demande mentionnée au paragraphe CG36.1 doit être accompagnée du consentement écrit de la compagnie dont le cautionnement constitue une partie de la garantie du contrat.

CG37 Dédommagement pour retard d'exécution

37.1 Aux fins du présent article :

37.1.1 les travaux sont censés être achèves le jour ou le représentant ministériel délivre le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2; et

37.1.2 « période de retard » signifie la période commençant le jour fixé par les Articles de convention pour l'achèvement des travaux et se terminant le jour précédant immédiatement le jour de l'achèvement, à l'exclusion cependant de tout jour faisant partie d'une période de prolongation accordée en vertu du paragraphe CG36.1 et de tout autre jour où, de l'avis du représentant ministériel, l'achèvement des travaux a été retardé par des causes indépendantes de la volonté de l'Entrepreneur.

37.2 Si l'Entrepreneur n'achève pas les travaux au jour fixé par les Articles de convention mais achève ces travaux par la suite, l'Entrepreneur paie à Sa Majesté un montant égal à l'ensemble :

37.2.1 de tous les salaires, gages et frais de déplacement versés par Sa Majesté aux personnes surveillant les travaux pendant la période de retard;

37.2.2 des coûts encourus par Sa Majesté en conséquence de l'impossibilité pour Sa Majesté de faire usage des travaux achevés pendant la période de retard; et

37.2.3 de tous les autres frais et dommages encourus ou subis par Sa Majesté pendant la période de retard par suite de l'inachèvement des travaux a la date prévue.

37.3 S'il estime que l'intérêt public le commande, le Ministre peut renoncer au droit de Sa Majesté à la totalité ou partie d'un paiement exigible en conformité du paragraphe CG37.2.

CG38 Travaux retirés à l'Entrepreneur

38.1 Le Ministre peut dans les cas suivants et à son entière discrétion, en donnant un avis par écrite à l'Entrepreneur conformément à l'article CG11, retirer à l'Entreteneur la totalité ou une partie des travaux et recourir aux moyens qui lui semblent appropriés pour achever les travaux si l'Entrepreneur :

38.1.1 fait défaut ou retarde à commencer les travaux ou à exécuter les travaux avec diligence et à la satisfaction du représentant ministériel, dans les six jours suivant la réception par

l'Entrepreneur d'un avis par écrite du Ministre ou du représentant ministériel, conformément à l'article CG11 :

38.1.2 a néglige d'achever quelque partie des travaux dans le délai imparti par le Contrat;

38.1.3 est devenu insolvable :

31.1.4 a commis un acte de faillite;

31.1.5 a abandonné les travaux;

31.1.6 a fait cession du Contrat sans le consentement requis au paragraphe CG3.1; ou

31.1.7 a de quelque autre façon fait défaut d'observer ou d'accomplir l'une quelconque des dispositions du Contrat.

38.2 Si la totalité ou une partie quelconque des travaux a été retirée à l'Entrepreneur en vertu de paragraphe CG38.1.

38.2.1 l'Entrepreneur n'a droit, sauf dispositions du paragraphe CG38.4, à aucun autre paiement dû et exigible.

38.2.2 l'Entrepreneur est tenu de payer à Sa Majesté, sur demande, un montant égal à la totalité des pertes et dommages que Sa Majesté aura subis en raison de défaut de l'Entrepreneur d'achever les travaux.

38.3 Si la totalité ou partie des travaux retirés à l'Entrepreneur en vertu du paragraphe CG38.1 est achevée par Sa Majesté, le représentant ministériel établit le montant, s'il y en a , de toute retenue ou demande d'acompte de l'Entreteneur existant au moment où les travaux lui ont été retirés et dont, selon le représentant ministériel, on n'a pas besoin pour assurer exécution des travaux ou pour rembourser à Sa Majesté les pertes ou dommages subis en raison du défaut de l'Entrepreneur.

38.4 Sa Majesté peut verser à l'Entrepreneur le montant qu'on jugera non requis suivant le paragraphe CG38.3.

CG39 Effet du retrait des travaux à l'Entrepreneur

39.1 La retrait de la totalité ou d'une partie des travaux à l'Entrepreneur en conformité de l'article CG38, n'a pas pour effet de libérer l'Entrepreneur d'une obligation quelconque découlant pour lui du Contrat ou de la loi, sauf quant à l'obligation pour lui de continuer l'exécution de la partie des travaux qui lui fut ainsi retirée.

39.2 Si la totalité ou partie des travaux est retirée à l'Entrepreneur en conformité de l'article CG38, tous les matériaux et outillage, ainsi que l'intérêt de l'Entrepreneur dans tous les biens immobiliers, permis, pouvoirs et privilèges acquis, utilisés ou fournis par l'Entrepreneur pour les travaux, continuent d'être la propriété de Sa Majesté sans indemnisation de l'Entrepreneur.

39.3 Si le représentant ministériel certifie que tout matériau, outillage ou un intérêt quelconque

mentionné au paragraphe CG39.2 n'est plus requis pour les travaux et qu'il n'est plus dans l'intérêt de Sa Majesté de retenir lesdits matériaux, outillage ou intérêt, ils sont remis à l'Entrepreneur.

CG40 Suspension des travaux par le Ministre

40.1 Le Ministre peut, lorsqu'il estime que l'intérêt public le commande, sommer l'Entrepreneur de suspendre l'exécution des travaux pour une durée déterminée ou indéterminée, en lui communiquant par écrit un avis à cet effet, conformément à l'article CG11.

40.2 Sur réception suivant l'article CG11 de la sommation mentionnée au paragraphe CG40.1, l'Entrepreneur suspend toutes les opérations sauf celles qui, de l'avis du représentant ministériel, sont nécessaires à la garde et à la préservation des travaux, de l'outillage et des matériaux.

40.3 Pendant la période de suspension, l'Entrepreneur ne peut enlever de l'emplacement, sans le consentement du représentant ministériel, quelque partie des travaux, de l'outillage et des matériaux.

40.4 Si la période de suspension est de 30 jours ou moins, l'Entrepreneur reprend l'exécution des travaux dès l'expiration de la période de suspension et il a droit au paiement des frais, calculés en conformité des articles CG48 à CG50, du travail, de l'outillage et des matériaux nécessairement encourus en conséquence de la suspension des travaux.

40.5 Si, à l'expiration d'une période de suspension de plus de 30 jours, le Ministre et l'Entrepreneur conviennent que l'exécution des travaux sera continuée par l'Entrepreneure, ce dernier reprend les opérations sous réserve des termes et conditions convenus entre lui et le Ministre.

40.6 Si, à l'expiration d'une période de suspension de plus de 30 jours, le Ministre et l'Entrepreneur ne conviennent pas que les travaux seront continués par l'Entrepreneur ou ne s'entendent pas sur les termes et conditions suivant lesquels l'Entrepreneur poursuivra l'exécution des travaux, l'avis de suspension est censé être un avis de résiliation et conformité de l'article CG41.

CG41 Résiliation du Contrat

41.1 Le Ministre peut, à n'importe quel moment, résilier le Contrat en donnant avis par écrit à cet effet à l'Entrepreneur conformément à l'article CG11.

41.2 Sur réception suivant l'article CG11 de l'avis mentionné au paragraphe CG41.1, l'Entreteneur cesse toutes opérations dans l'exécution du Contrat, sous réserve de toutes conditions énoncées dans l'avis.

41.3 Si le Contrat est résilier conformément au paragraphe CG41.1, Sa Majesté paie à l'Entrepreneur, sous réserve du paragraphe CG41.4, un montant égal :

41.3.1 au coût de tout le travail, l'outillage et les matériaux qu'aura fournis l'Entrepreneur en vertu du Contrat à la date de résiliation, en exécution d'un contrat ou d'une partie de contrat relativement auquel une Entente à prix unitaire est précisée dans le Contrat; ou

41.3.2 au moindre :

41.3.2.1 du montant, calculé conformément aux Modalités de paiement, qui aurait été payable à l'Entrepreneur s'il avait achevé les travaux; et

41.3.2.2 du montant que l'on reconnait devoir à l'Entreteneur en vertu de l'article CG49, concernant un contrat ou une partie de contrat pour lequel le Contrat prévoit une Entente à prix fixe;

moins l'ensemble de tous les montants qui furent payés à l'Entrepreneur par Sa Majesté et de tous les montants dont l'Entrepreneur est redevable envers Sa Majesté en vertu du Contrat.

41.4 Si Sa Majesté et l'Entrepreneur ne peuvent convenir du montant mentionné au paragraphe CG41.3, ce montant sera déterminé suivant la méthode indiquée à l'article CG50.

CG42 Réclamations contre et obligations de la part de l'Entrepreneur ou d'un sous-entrepreneur

42.1 Afin d'acquitter toutes obligations légales de l'Entrepreneur ou d'un sous-entrepreneur ou de satisfaire à toutes réclamations légales contre eux résultant de l'exécution du Contrat, Sa Majesté peut payer tout montant qui est dû et payable à l'Entrepreneur en vertu du Contrat, directement aux créanciers de l'Entrepreneur ou du sous-entrepreneur, ou aux réclamants en l'occurrence. Toutefois, ce montant que paie Sa Majesté, le cas échéant, ne doit pas excéder le montant que l'Entrepreneur aurait été tenu de verse au réclamant si les dispositions des lois relatives aux privilèges dans les provinces et territoires ou , dans le cas de la province de Québec, de la loi à cet effet dans le Code civil, avaient été applicables aux travaux. Le réclamant n'a pas à respecter les dispositions des lois relatives aux privilèges qui établissent les démarches à suivre au moyen d'avis, d'enregistrements ou d'autre façon, comme il aurait pu être nécessaire de le faire pour conserver ou valider toute réclamation à l'égard de liens émanant du réclamant.

42.2 Sa Majesté n'effectue pas de paiement tel qu'il est décrit au paragraphe CG42.1 à moins que le réclamant lui remette :

42.2.1 un jugement ou une ordonnance exécutoire d'un tribunal compétent établissant le montant qu'aurait eu à verser l'Entrepreneur au réclamant en vertu des dispositions de la loi provinciale ou territoriale relative aux privilèges pertinente ou, dans le cas de la province de Québec, de la loi à cet effet dans le Code civil, si ces lois s'appliquaient aux travaux, ou

42.2.2 une sentence arbitrale définitive et exécutoire établissant le montant qu'aurait eu à verser l'Entrepreneur au réclamant en vertu des dispositions de la loi provinciale ou territoriale relative aux privilèges pertinente ou, dans le cas de la province de Québec, de la loi à cet effet dans le Code civil, si ces lois s'appliquaient aux travaux; ou

42.2.3 le consentement de l'Entrepreneur autorisant le paiement.

Pour déterminer les droits du réclamant en vertu des alinéas CG42.2.1 et CG42.2.2, l'avis exigé au paragraphe CG42.8 sera réputé remplacer l'enregistrement ou la prestation d'un avis après l'achèvement des travaux exigé par les lois applicables, et aucune réclamation ne sera réputée être

expirée, annulée ou non exécutoire parce que le réclamant n'a pas intenté de poursuites dans les délais prescrits par la loi applicable.

42.3 Lorsqu'il accepte d'exécuter un Contrat, l'Entrepreneur est réputée avoir consenti de soumettre à l'arbitrage obligatoire, à la demande d'un réclamant, toutes les questions auxquelles il faut répondre pour déterminer si le réclamant à droit au paiement conformément aux dispositions du paragraphe CG42.1. Les parties à l'arbitrage seront, entre autres, le sous-traitant à qui le réclamant à fourni des matériaux ou de l'équipement ou pour qui il à effectué du travail, si le sous-traitant le désire. L'État ne constitue pas une partie à l'arbitrage et, à moins d'une entente contraire entre l'Entrepreneur et le réclamant, l'arbitrage se déroulera conformément à la loi provinciale ou territoriale régissant l'arbitrage applicable dans la province ou le territoire où les travaux sont exécutés.

42.4 Une paiement effectue en conformité du paragraphe CG42.1 comporte quittance de l'obligation de Sa Majesté envers l'Entrepreneur sous le contrat, jusqu'à concurrence du montant payé et peut être déduit d'un montant dû à l'Entrepreneur en vertu du Contrat.

42.5 Dans la mesure où les circonstances entourant l'exécution des travaux pour le compte de Sa Majesté le permettent, l'Entrepreneur se conforme à toutes les lois en vigueur dans la province ou le territoire où les travaux sont exécutés quant aux périodes de paiement, aux retenus obligatoires, à la création et à la mise en vigueur de lois concernant les privilèges des fournisseurs ou des constructeurs ou de lois semblables ou, s'il s'agit de la province de Québec, aux dispositions de la loi qui concerne les privilèges.

42.6 L'Entrepreneur acquitte toutes ses obligations légales et fait droit à toutes les réclamations légales qui lui sont adressées en conséquence de l'exécution des travaux, au moins aussi souvent que le Contrat oblige Sa Majesté à acquitter ses obligations envers l'Entrepreneur.

42.7 Sur demande du représentant ministériel, l'Entrepreneur fait une déclaration attestant de l'existence et de l'état de toutes les obligations et réclamations mentionnées au paragraphe CG42.6.

42.8 Le paragraphe CG42.1 ne s'applique qu'aux réclamations et aux obligations :

42.8.1 pour lesquelles le représentant ministériel a reçu un avis par écrit avant qu'un paiement n'ait été effectué à l'Entrepreneur conformément au paragraphe MP4.10 et dans les 120 jours suivant la date à laquelle le réclamant :

42.8.1.1 aurait dû être paye en totalité conformément au contrat qui le lie à l'Entrepreneur ou à un sous-traitant, s'il s'agit d'une réclamation pour des deruers dont il est légalement requis qu'ils soient retenus du réclamant; ou

42.8.1.2 s'est acquitté des derniers services ou travaux ou à fourni les derniers matériaux exigés par le contrat qui le lie à l'Entrepreneur ou à un sous-traitant, s'il ne s'agit pas d'une réclamation mentionnée au sous-alinéa CG42.8.1.1; et

42.8.2 pour lesquelles les procédures visant à établir les droits à un paiement, conformément au paragraphe CG42.2, ont commencé dans l'année suivant la date à laquelle l'avis mentionné à l'alinéa CG42.8.1 à été reçu par le représentant ministériel; et

l'avis exige à l'alinéa CG42.8.1 doit faire état du montant réclamé et du principal responsable selon le Contrat.

42.9 Sur réception d'un avis de réclamation en vertu de l'alinéa CG42.8.1, Sa Majesté peut retenir de tout montant dû et payable à l'Entrepreneur en vertu du Contrat un partie ou la totalité du montant de la réclamation.

42.10 Le représentant ministériel doit aviser l'Entrepreneur par écrit de la réception de toute réclamation mentionné à l'alinéa CG42.8.1 et de l'intention de Sa Majesté de retenir des fonds conformément au paragraphe CG42.9, et l'Entrepreneur peut, à tout moment par la suite et jusqu'à ce que le paiement soit effectué au réclamant, déposer, auprès de Sa Majesté, une garantie acceptable par Sa Majesté dont le montant est équivalent à la valeur de la réclamation. L'avis d'un tel dépôt doit être reçu par le représentant ministériel et, sur réception d'une telle garantie, Sa Majesté doit dégager à l'intention de l'Entrepreneur tous les fonds qui auraient été payables autrement à l'Entrepreneur et qui ont été retenus conformément aux dispositions du paragraphe CG42.9 à l'égard de la réclamation d'un réclamant pour laquelle la garantie a été déposée.

CG43 Dépôt de garantie – Confiscation ou remise

43.1 Si :

43.1.1 les travaux sont retirés à l'Entrepreneur conformément à l'article CG38;

43.1.2 le Contrat est résilié en vertu de l'article CG41; ou

43.1.3 l'Entrepreneur à violé ou n'a pas rempli ses engagements en vertu du Contrat;

Sa Majesté peut s'approprier le dépôt de garantie, s'il en est.

43.2 Si Sa Majesté s'approprie le dépôt de garantie conformément au paragraphe CG43.1, le montant obtenu en l'occurrence est censé être une dette payable à l'Entrepreneur par Sa Majesté en vertu du Contrat.

43.3 Tout solde du montant mentionné au paragraphe CG43.2, s'il en est, après paiement de toutes pertes dommages ou réclamations de Sa Majesté ou quelqu'un autre, sera paye par Sa Majesté à l'Entrepreneur si, dans l'opinion du représentant ministériel, il n'est pas requis pour les fins du Contrat.

CG44 Certificats du représentant ministériel

44.1 Le jour :

44.1.1 où les travaux sont achevés; et

44.1.2 où l'Entrepreneur s'est conformé au Contrat et à tous les ordres et directives donnés conformément au Contrat;

à la satisfaction du représentant ministériel, le représentant ministériel délivre à l'Entrepreneur un Certificat définitif d'achèvement.

44.2 Si le représentant ministériel est convaincu que les travaux sont suffisamment achevés, il peut, à tout moment avant la délivrance d'un Certificat définitif d'achèvement mentionné au paragraphe CG44.1 délivrer à l'Entrepreneur un Certificat provisoire d'achèvement, et :

44.2.1 aux fins du paragraphe CG44.2, les travaux seront jugés suffisamment achevés

44.2.1.1 lorsqu'une partie considérable ou la totalité des travaux visés par le Contrat sont, de l'avis du représentant ministériel, prêts à être utilisés par Sa Majesté ou sont utilisés aux fins prévues; et

44.2.1.2 lorsque les travaux qui restent à effectuer en vertu du Contrat peuvent, de l'avis du représentant ministériel, être achevés ou rectifiés à un coût n'excédant pas

44.2.1.2.1 -3 p. 100 des premiers 500 000 $; et

44.2.1.2.2 -2 p 100 des prochains 500 000 $; et

44.2.1.2.3 -1 p. 100 du reste

de la valeur du Contrat au moment du calcul de ce coût.

44.3 Aux fins uniquement du sous-alinéa 44.2.1.2, lorsque les travaux ou une partie considérable des travaux sont prêts à être utilisés ou sont utilisés aux fins prévues et que le reste ou une partie des travaux ne peut être achevé pour des raisons indépendantes de la volonté de l'Entrepreneur ou, lorsque le représentant ministériel et l'Entrepreneur conviennent de ne pas achever les travaux dans les délais prescrits, le coût de la partie des travaux que l'Entrepreneur n'a pu terminer pour des raisons indépendantes de sa volonté ou que le représentant ministériel et l'Entrepreneur ont convenu de ne pas terminer dans les délais précisés sera déduit de la valeur du contrat mentionnée au sous-alinéa CG44.2.1.2 et ledit coût ne fera pas partie du coût des travaux qui restent à effectuer aux fins de la détermination de l'achèvement réel.

44.4 Le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 doit décrire les parties des travaux qui n'ont pas été achevées à la satisfaction du représentant ministériel et préciser tout ce que l'Entrepreneur doit faire :

44.4.1 avant que le Certificat définitif d'achèvement mentionné au paragraphe CG44.1 puisse être délivre; et

44.4.2 avant le début de la période de 12 mois mentionnée au paragraphe CG32.1.2 pour lesdites parties et toutes autres choses.

44.5 Le représentant ministériel peut, en plus des points indiqués dans le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2, obliger l'Entrepreneur à rectifier toutes autres parties des travaux qui n'ont pas été achevées à sa satisfaction et faire effectuer toutes autres choses nécessaires pour l'achèvement satisfaisant des travaux.

44.6 Si le Contrat ou l'une de ses parties a fait l'objet d'une Entente à prix unitaire, le représentant ministériel mesure et consigne dans un registre les quantités de travail exécuté d'outillage fourni par l'Entrepreneur et de matériaux utilisés pour l'exécution des travaux, et informe, sur demande, l'Entrepreneur au sujet de ces mesurages.

44.7 L'Entrepreneur aide le représentant ministériel et coopère avec lui dans l'exécution des taches précisées au paragraphe CG44.6 et a le droit de prendre connaissance de tout registre tenu par le représentant ministériel suivant le paragraphe CG44.6.

44.8 Une fois que le représentant ministériel a délivré le Certificat définitif d'achèvement mentionné au paragraphe CG44.1, il doit, si le paragraphe CG44.6 s'applique, délivrer un Certificat définitif de mesurage.

44.9 Le Certificat définitif de mesurage mentionné au paragraphe CG44.8 :

44.9.1 indique le total des mesurages des quantités mentionnées au paragraphe CG44.6, et

44.9.2 lie de façon péremptoire Sa Majesté et l'Entrepreneur quant aux mesurages des quantités qui y sont consignées.

CG45 Remise du dépôt de garantie

45.1 Après la délivrance du Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 et à condition que l'Entrepreneur n'ait pas violé ses engagements en vertu du Contrat ou omis de les remplir, Sa Majesté retourne à l'Entrepreneur la totalité ou partie du dépôt de garantie, s'il en est, qui de l'avis du représentant ministériel, n'est pas requise aux fins du Contrat.

45.2 Au moment de la délivrance du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, Sa Majesté retourne à l'Entrepreneur tout le solde du dépôt de sécurité, sauf stipulation contraire du Contrat.

45.3 Si le dépôt de garantie a été versé au Trésor, Sa Majesté doit payer à l'Entrepreneur l'intérêt sur ledit dépôt à un taux établi de temps à autre en vertu du paragraphe 21(2) de la Loi sur la gestion des finances publiques.

CG46 Précision du sens des expressions figurant aux articles CG47 à CG50

46.1 Dans les articles CG47 à CG50 :

46.1.1 l'expression « Tableau des prix unitaires » signifie le tableau figurant dans les Articles de convention, et

46.1.2 l'expression « outillage » ne comprend pas les outils habituellement fournis par les hommes de métier dans l'exercice de leurs fonctions.

CG47 Additions ou modifications au Tableau des prix unitaires

47.1 Le représentant ministériel et l'Entrepreneur peuvent convenir par écrit, lorsqu'une Entente à prix unitaire s'applique au Contrat ou à l'une de ses parties :

47.1.1 d'ajouter au Tableau des prix unitaires des catégories de travail, d'outillage ou de matériaux, des unités de mesurage, de prix par unité et des estimations de quantités lorsque certains travaux, outillage et matériaux devant apparaitre dans le Certificat définitif de mesurage mentionné au paragraphe CG44.8 ne figurent dans aucune des catégories de travail, d'outillage ou de matériaux établies au Tableau des prix unitaires; ou

47.1.2 sous réserve des paragraphes CG47.2 et CG47.3, de modifier le prix par unité établi au Tableau des prix unitaires à l'égard d'une quelconque catégorie de travail, d'outillage ou de matériaux y figurant, lorsqu'une quantité a été estimée a l'égard de cette catégorie de travail, d'outillage ou de matériaux, et que le Certificat définitif de mesurage mentionné au paragraphe CG44.8 indique ou est susceptible d'indiquer que la quantité totale de cette catégorie de travail exécuté, d'outillage fourni ou de matériaux utilisés par l'Entrepreneur, pour l'exécution des travaux, est :

47.1.2.1 inferieur à 85% de la quantité estimée; ou

47.1.2.2 supérieure à 115% de la quantité estimée.

47.2 Le coût total d'un article figurant au Tableau des prix unitaires qui a été modifié conformément au sous-alinéa 47.1.2.1 ne doit, en aucun cas, excéder le montant qui aurait été payable à l'Entrepreneur si la quantité totale estimative de travail avait été exécutée, la quantité totale estimative d'outillage avait été fournie ou la quantité totale estimative de matériaux, utilisée.

47.3 Toute modification rendue nécessaire par le sous-alinéa CG47.1.2.2 ne s'appliquera qu'aux quantités supérieures à 115%.

47.4 Si le représentant ministériel et l'Entrepreneur ne s'entendent pas suivant le paragraphe CG47.1, le représentant ministériel détermine la catégorie et l'unité de mesurage du travail, de l'outillage et des matériaux et, sous réserve des paragraphes CG47.2 et CG47.3, le prix par unité est déterminé conformément à l'article CG50.

CG48 Établissement du coût – Tableau des prix unitaires

48.1 Chaque fois qu'il est nécessaire, aux fins du Contrat, d'établir le coût du travail, de l'outillage et des matériaux, on multiplie la quantité de ce travail de cet outillage ou de ces matériaux, exprimée par l'unité énoncée à la colonne 3 du Tableau des prix unitaires, par le prix énonce en regard de cette unité à la colonne 5 du Tableau des prix unitaires.

CG49 Établissement du coût – Négociation

49.1 Si le mode d'établissement du coût prévu à l'article CG48 ne peut être utilisé parce que le genre ou la catégorie de travail, d'outillage et de matériaux en cause ne figurent pas au Tableau des prix unitaires, le coût du travail, de l'outillage ou des matériaux, aux fins du Contrat est le montant

convenu de temps à autre entre l'Entrepreneur et le représentant ministériel.

49.2 Aux fins du paragraphe CG49.1, l'Entrepreneur remet au représentant ministériel lorsque ce dernier le requiert, tout renseignement nécessaire sur ce qu'il lui en coûte en travail, outillage et matériaux mentionnés au paragraphe CG49.1.

CG50 Établissement du coût en cas d'échec des négociations

50.1 Si l'on ne parvient pas à établir le coût du travail, de l'outillage et des matériaux conformément aux méthodes prévues aux articles CG47, CG48 ou CG49, pour les fins mentionnées dans ceux-ci, le coût sera égal à l'ensemble de :

50.1.1 tous les montants justes et raisonnable effectivement dépenses ou légalement payables par l'Entrepreneur pour le travail, l'outillage et les matériaux couverts par une des catégories de dépenses prévues au paragraphe CG50.2, qui sont directement attribuables à l'exécution du Contrat;

50.1.2 une somme égale à 10% du total des dépenses de l'Entrepreneur mentionnées à l'alinéa CG50.1.1, représentant une indemnité pour profit et pour tous les autres coûts et dépenses, incluant les frais de financement et les intérêts, les frais généraux, dépenses du siège social, et tous autres frais ou dépenses, mais non les coûts et dépenses mentionnés à l'alinéa CG50.1.1 ou CG50.1.3 ou pour une catégorie mentionnée au paragraphe CG50.2;

50.1.3 l'intérêt sur les coûts déterminés en vertu des alinéas CG50.1.1 et CG50.1.2, intérêt qui sera calculé conformément à l'article MP9,

pourvu que le coût total d'un article figurant au Tableau des prix unitaires, auquel s'appliquent les dispositions de l'alinéa CG47.1.2.1, n'est pas supérieur au montant qui aurait été payable à l'Entrepreneur si la quantité total dudit article aurait été effectivement produite, utilisée ou fournie.

50.2 Aux fins de l'alinéa CG50.1.1, les catégories de dépenses admissibles dans l'établissement du coût du travail, de l'outillage et des matériaux, sont :

50.2.1 les paiements faits aux sous-entrepreneurs;

50.2.2 les traitements, salaires et frais de voyage versés aux employés de l'Entrepreneur affectés, proprement dit, à l'exécution des travaux, à l'exception des traitements, salaires, gratifications, frais de subsistance et de voyage des employés de l'Entrepreneur travaillant généralement au siège social ou à un bureau général de l'Entrepreneur, à moins que lesdits employés ne soient affectés à l'emplacement des travaux avec la approbation du représentant ministériel;

50.2.3 les cotisations exigibles en vertu d'un texte statutaire relativement aux indemnisations des accidents du travail, à l'assurance-chômage, au régime de retraite et aux congés rémunérés;

50.2.4 les frais de location d'outillage ou un montant équivalent aux frais de location si l'outillage appartient à l'Entrepreneur qui était nécessaire et qui a été utilisé pour

l'exécution des travaux, à condition que lesdits frais ou la somme équivalente soient raisonnables et que l'utilisation dudit outillage ait été approuvée par le représentant ministériel;

50.2.5 les frais d'entretien et de fonctionnement de l'outillage nécessaire a l'exécution des travaux et des frais de réparation à tel outillage qui, de l'avis du représentant ministériel, sont nécessaires à la bonne exécution du Contrat, à l'exclusion de toutes réparations provenant de défauts existant avant l'affectation de l'outillage aux travaux;

50.2.6 les paiements relatifs aux matériaux nécessaires et incorporés aux travaux, ou nécessaires à l'exécution du Contrat et utilisés à cette fin; et

50.2.7 les paiements relatifs à la présentation, à la livraison, à l'utilisation, à l'érection, à l'installation, à l'inspection, à la protection et à l'enlèvement de l'outillage et des matériaux nécessaires à l'exécution du Contrat et utilisés à cette fin; et

50.2.8 tout autre paiement fait par l'Entrepreneur avec l'approbation du représentant ministériel et nécessaire à l'exécution du Contrat.

CG51 Registres à tenir par l'Entrepreneur

51.1 L'Entrepreneur :

51.1.1 tient des registres complets du coût estimatif et réel des travaux, des appels d'offres, des prix cotés, des contrats, de la correspondance, des factures, des reçus et des pièces justificative s'y rapportant;

51.1.2 met à la disposition du Ministre et du sous-receveur général du Canada ou des personnes qu'ils délèguent pour vérification et inspection tous les documents mentionnés à l'alinéa CG51.1.1;

51.1.3 permet à toutes personnes mentionnées à l'alinéa 51.1.2 de faire des copies ou extraits de tous registres et documents mentionnés à l'alinéa CG51.1.1; et

51.1.4 fournit aux personnes mentionnées à l'alinéa CG51.1.2 tous les renseignements qu'elles peuvent exiger de temps à autre au sujet de ces registres et documents.

51.2 Les registres tenus par l'Entrepreneur conformément à l'alinéa CG51.1.1, sont conservés intact pendant deux ans à compter de la date de la délivrance du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, ou jusqu'à l'expiration de toute autre période que le Ministre peut fixer.

51.3 L'Entrepreneur oblige tous sous-entrepreneurs, et toutes autres personnes qu'il contrôle directement ou indirectement ou qui lui sont affiliés, de même que toutes personnes qui contrôlent l'Entrepreneur directement ou indirectement, à se conformer aux paragraphes CG51.1 et CG51.2 comme s'ils étaient l'Entrepreneur.

CG52 Conflits d'intérêts

52.1 Le présent Contrat stipule qu'aucun ancien titulaire de change publique qui ne se conforme pas au Code régissant la conduite des titulaires de charge publique en ce qui concerne les conflits d'intérêts et l'après-mandat ne peut retirer des avantages directs du présent Contrat.

CG53 Situation de l'Entrepreneur

53.1 L'Entrepreneur sera retenu et vertu du Contrat à titre d'entrepreneur indépendant.

53.2 l'Entrepreneur et tout employé dudit entrepreneur n'est pas retenu en vertu du Contrat à titre d'employé, d'agent ou de mandataire de Sa Majesté.

53.3 Aux fins des paragraphes CG53.1 et CG53.2, l'Entrepreneur sera à lui seul responsable de tous les paiements et de toutes les retenues exigées par la loi, y compris ceux exigés par le Régime de pensions du Canada, le Régime des rentes du Québec, l'assurance-chômage, les accidents du travail ou l'impôt sur le revenu.

CONDITIONS GÉNÉRALES

EXIGENCES DE GARANTIES D'ASSURANCE

ASSURANCE DE LA RESPONSABILITÉ CIVILE DES ENTREPRISES

ASSURANCE DES CHANTIERS – RISQUES D'INSTALLATION – TOUS RISQUES

ATTESTATION D'ASSURANCE DE L'ASSUREUR

CONDITIONS GÉNÉRALES

CA 1 Preuve du contrat d'assurance (02/12/03)

Dans un délai de trente (30) jours après l'acceptation de la soumission de l'entrepreneur, ce dernier, à moins d'avis contraire par écrit de l'agent d'approvisionnement, doit remettre à l'agent d'approvisionnement, l'Attestation d'assurance d'un assureur dans la forme apparaissant dans le présent document et, si demandé par l'agent d'approvisionnement, remettre à ce dernier les originaux ou les copies certifiées conformes de tous les contrats d'assurance auxquels l'entrepreneur a souscrit conformément aux Exigences des garanties d'assurance décrites ci-après.

CA 2 Gestion des risques (01/10/94)

Les dispositions des Exigences des garanties d'assurance des présentes n'ont pas pour but de couvrir toutes les obligations de l'entrepreneur en vertu de l'article CG8 des Conditions générales « C » du marché. L'entrepreneur est libre, à condition d'en assumer le coût, de prendre des mesures additionnelles de gestion des risques ou des garanties d'assurance complémentaires qu'il juge nécessaire pour remplir ses obligations conformément à l'article CG8.

CA 3 Paiement de franchise (01/10/94)

L'entrepreneur doit assumer le paiement de toutes sommes d'argent en règlement d'un sinistre, jusqu'à concurrence de la franchise.

CA 4 Assurance d'assurance (02/12/03)

L'entrepreneur a déclaré qu'il détient une assurance de responsabilité civile appropriée et habituelle qui est en vigueur conformément aux présentes Conditions d'assurance et il a garanti qu'il obtiendra, en temps opportune et avant le commencement des travaux, l'assurance de biens appropriée et habituelle conformément aux présentes Conditions d'assurance et qu'en outre il maintiendra en vigueur toutes les polices d'assurance requises conformément aux présentes Conditions d'assurance.

EXIGENCES DE GARANTIES D'ASSURANCE

PARTIE I
EXIGENCES GÉNÉRALES D'ASSURANCE (EGA)

EGA 1 Assuré (02/12/03)

Chaque contrat d'assurance doit assurer l'entrepreneur et doit inclure à titre d'Assuré dénommé additionnel, Sa Majesté la Reine du chef du Canada, représentée par le Conseil national de recherches Canada.

EGA 2 Période d'assurance
(02/12/03)

Moins d'avis contraire par écrit de l'agent d'approvisionnement ou d'indication contraire ailleurs dans les présentes Conditions d'assurance, les contrats d'assurance exigés dans les présentes doivent prendre effet le jour de l'attribution du marche et demeurer en vigueur jusqu'au jour de la délivrance du Certificat définitif d'achèvement du représentant ministériel.

EGA 3 Preuve du contrat d'assurance
(01/10/94)

Dans un délai de vingt-cinq (25) jours après l'acceptation de la soumission de l'entrepreneur, l'assureur, à moins d'avis contraire écrit de l'entrepreneur, doit remettre à l'entrepreneur l'Attestation d'assurance d'un assureur dans la forme apparaissant dans le présent document et, si demandé, les originaux ou les copies certifiées conformes de tous les contrats d'assurance auxquels l'entrepreneur a souscrit conformément aux présentes Exigences de présentes garanties d'assurance.

EGA 4 Avis
(01/10/94)

Chaque contrat d'assurance doit renfermer une disposition selon laquelle trente (30) jours avant de procéder à toute modification importante visant la garantie d'assurance, ou à l'annulation de ladite garantie d'assurance, un avis par écrit doit être envoyé par l'assureur à Sa Majesté. Tout avis de cette nature que reçoit l'entrepreneur doit être transmis sans délai à Sa Majesté.

PARTIE II
ASSURANCE DE LA RESPONSABILITÉ CIVILE DES ENTREPRISES

ARC 1 Portée de l'assurance
(01/10/94)

Le contrat d'assurance doit être établi sur un formulaire similaire à celui connu et désigné dans l'industrie de l'assurance sous l'appellation Assurance de la responsabilité civile des entreprises (base d'événement) – BAC 2100, et doit accorder un montant de garantie d'au moins 2 000 000 $ (tous dommages confondus) pour des dommages corporels et matériels imputables au même événement ou à une série d'événements ayant la même origine. Les frais de justice ou autres déboursés de défense par suite de sinistre ou de réclamation ne viendront pas en déduction du montant de garantie.

ARC 2 Garanties/Dispositions
(01/10/94)

Le contrat d'assurance doit inclure les garanties/dispositions suivantes sans toutefois nécessairement s'y limiter :

2.1 La responsabilité découlant de la propriété, de l'existence de l'entretien ou de l'utilisation de lieux par l'entrepreneur et les activités nécessaires ou connexes à l'exécution du présent contrat.

2.2 L'extension de la garantie « Dommages matériels et/ou privation de jouissance ».

2.3 L'enlèvement ou l'affaiblissement d'un support soutenant des bâtiments ou terrains, que ce support soit naturel ou non.

2.4 La responsabilité découlant des appareils de levage et des monte-charge (y compris les escaliers roulants).

2.5 La responsabilité civile indirecte des entrepreneurs.

2.6 Les responsabilités contractuelles et assumées en vertu du présent contrat.

2.7 La responsabilité civile découlant des risques après travaux. En regard de la présente garantie, ainsi qui toutes les autres garanties de cette Partie II des présentes Conditions d'assurance, l'assurance doit demeurer en vigueur pendant au moins un (1) an à partir de la date de délivrance du Certificat d'achèvement du représentant ministériel.

2.8 Responsabilité réciproque – La clause doit être rédigée comme suit :

Responsabilité réciproque – L'assurance telle que garantie par le présent contrat s'applique à toute demande d'indemnité fait à ou à toute action intentée contre n'importe quel assuré par n'importe quel autre assuré. La garantie d'assurance s'applique de la même façon et dans la même mesure que si un contrat distinct avait été établi à chacun d'eux. L'inclusion de plus d'un assuré n'augmente pas le montant de garantie de l'assureur.

2.9 Individualité des intérêts – La clause doit rédigée comme suit :

Individualité des intérêts – La pressente assurance, sous réserve des montants de garantie, s'applique séparément à chaque assuré de la même façon et dans la même mesure que si un contrat distinct avait été établi à chacun d'eux. L'inclusion de plus d'un assuré n'augmente pas le montant de garantie de l'assureur.

ARC 3 Risques additionnels
(02/12/03)

Le contrat d'assurance doit couvrir ou être amendé pour couvrir les risques suivants, si l'entreprise y est soumis :

3.1 Dynamitage;

3.2 Battage de pieux et travail par caisson;

3.3 Reprise en sous-œuvre;

3.4 Risques associés aux activités de l'entrepreneur dans un aéroport en service;

3.5 Contamination par radioactivité par suite de l'utilisation d'isotopes commerciaux;

3.6 Endommagement à la partie d'un bâtiment existant hors de la portée directe d'un marché de rénovation, d'addition ou d'installation;

3.7 Risques maritimes reliés à la construction de jetés, quais et docks.

ARC 4 Indemnités d'assurance
(01/10/94)

Toute indemnité en vertu de la présente assurance est habituellement versée à un tiers réclamant.

ARC 5 Franchise
(02/12/03)

Le contrat d'assurance doit être établie avec une franchise d'au plus 10 000 $ événement quant aux sinistres causés par dommages matériels.

PART III
ASSURANCE DES CHANTIERS – RISQUES D'INSTALLATION – TOUS RISQUES

AC 1 Portée de l'assurance
(01/10/94)

Le contrat d'assurance doit être établi pour assurer l'entreprise sur un base « Tous risques » donnant un couverture d'assurance identique à celle qui est fournie par les formulaires connues et désignées dans l'industrie des assurances sous les noms de l' « Assurances des Chantiers – Formule globale » ou « Risques d'installation – Tous Risques ».

AC 2 Biens assurés
(01/10/94)

Les biens assurés doivent comprendre :

2.1 les travaux, ainsi que tous les biens, équipement et matériaux devant être incorporés à l'entreprise achevée à l'endroit du projet, avant, durant et après leur installation, érection ou construction, y compris les essais;

2.2 les frais de déblaiement du chantier occasionnés par un sinistre couvert y ayant laissé des débris provenant de biens couverts par la présente assurance, y compris la démolition des biens endommagés, l'enlèvement de la glace et l'assèchement.

AC 3 Indemnité d'assurance
(01/10/94)

3.1 Toutes indemnités en vertu du contrat d'assurance doit être payées conformément à l'article CG28 des Conditions générales « C » du contrat.

3.2 Le contrat d'assurance doit stipuler que toute indemnité en vertu d'icelle doit être payé à Sa Majesté ou selon les directives du Ministre.

3.3 L'entrepreneur doit faire toutes choses et exécuter tous documents requis pour le paiement de l'indemnité d'assurance.

AC 4 Montant d'assurance

(01/10/94)

Le montant de l'assurance doit égaler au moins la somme de la valeur du contrat plus la valeur déclarée (s'il y a lieu) dans les documents du marché de tout le matériel et équipement fourni par Sa Majesté sur le chantier pour être incorporé à l'entreprise achevée et en faire partie.

AC 5 Franchise
(02/12/94)

La police doit être établie avec une franchise d'au plus 10 000 $.

AC 6 Subrogation
(01/10/94)

La clause suivante doit être incluse dans le contrat d'assurance :

« Tous droits de subrogation ou transfert de droits sont par les présentes abandonnées contre toutes les personnes physiques ou morales ayant droit au bénéfice de la présente assurance. »

AC 7 Exclusion
(01/10/94)

Le contrat d'assurance peut comporter les exclusions normales sous réserve des exceptions suivantes :

7.1 Peuvent être exclus les frais inhérents à la bonne exécution des travaux, et rendus nécessaires par des défauts dans les matériaux, la main d'œuvre ou la conception, l'assurance produisant néanmoins ses effets en ce qui concerne les sinistres entraînés par voie de conséquence.

7.2 La perte ou les dommages causés par la contamination de matériaux radioactifs, sauf la perte ou les dommages résultant de l'utilisation d'isotopes commerciaux pour la mesure, l'inspection, le contrôle de la qualité, la radiographie ou la photographie industriels.

7.3 La mise en service et l'occupation de l'entreprise, en totalité ou en partie, doivent être permis pour les fins auxquels l'entreprise est destiné à son achèvement.

ATTESTATION D'ASSURANCE DE L'ASSUREUR
(À ÊTRE COMPLÈTE PAR L'ASSUREUR (NON PAR LE COURTIER) ET LIVRÉE AU CONSEIL NATIONAL DE RECHERCHES CANADA DANS LES TRENTE JOURS SUIVANT L'ACCEPTATION DE LA SOUMISSION)

MARCHÉ

DESCRIPTION DES TRAVAUX	NUMÉRO DE MARCHÉ	DATE D'ADJUDICATION
ENDROIT		

ASSUREUR

NOM
ADRESSE

COURTIER

NOM
ADRESSE

ASSURÉ

NOM DE L'ENTREPRENEUR
ADRESSE

ASSURÉ ADDITIONNEL

SA MAJESTÉ LA REINE DU CHEF DU CANADA REPRÉSENTÉE PAR LE CONSEIL NATIONAL DE RECHERCHES CANADA

LE PRÉSENT DOCUMENT ATTESTE QUE LES POLICES D'ASSURANCE SUIVANTES SONT PRÉSENTEMENT EN VIGUEUR ET COUVRENT TOUTES LES ACTIVITÉS DE L'ASSURÉ, EN FONCTION DU MARCHÉ DU CONSEIL NATIONAL DE RECHERCHES CANADA CONCLU ENTRE L'ASSURÉ DÉNOMMÉ ET LE CONSEIL NATIONAL DE RECHERCHES CANADA SELON LES CONDITIONS D'ASSURANCE « E ».

POLICE					
GENDRE	NUMÉRO	DATE D'EFFET	DATE D'EXPIRATION	LIMITES DE GARANTIE	FRANCHISE
RESPONSABILITÉ CIVILE DES ENTREPRISES					
ASSURANCE DES CHANTIERS « TOUS RISQUES »					
RISQUES D'INSTALLATION « TOUS RISQUES »					

L'ASSUREUR CONVIENT DE DONNER UN PRÉAVIS DE TRENTE JOURS AU CONSEIL NATIONAL DE RECHERCHES CANADA EN CAS DE TOUTE MODIFICATION VISANT LA GARANTIE D'ASSURANCE OU LES CONDITIONS OU DE L'ANNULATION DE N'IMPORTE QUELLE POLICE OU GARANTIE QUI FONT PARTIE INTÉGRANTE DU CONTRAT.

NOM DU CADRE OU DE LA PERSONNE AUTORISÉE	SIGNATURE	DATE :
		NUMÉRO DE TÉLÉPHONE :

CGC1 Obligation de fournir une garantie de contrat

1.1 L'Entrepreneur doit, à ses propres frais, fournir une ou plusieurs des garanties de contrat mentionnées à l'article CGC2.

1.2 L'Entrepreneur doit fournir au représentant ministériel la garantie de contrat mentionnée au paragraphe CGC1.1 dans les 14 jours suivant la date à laquelle l'Entrepreneur reçoit un avis lui signifiant l'acceptation de sa soumission par Sa Majesté.

CGC2 Types et montants acceptables de garanties de contrat

2.1 L'Entrepreneur fournit au représentant ministériel conformément à l'article CGC1 :

2.1.1 un cautionnement d'exécution et un cautionnement pour le paiement de la main-d'œuvre et des matériaux, représentant chacun au moins 50% du montant payable indiqué dans les Articles de convention; ou

2.1.2 un cautionnement pour le paiement de la main-d'œuvre et des matériaux, représentant au moins 50% du montant payable indiqué dans les Articles de convention, et un dépôt de garantie représentant :

2.1.2.1 au moins 10% du montant indiqué dans les Articles de convention, si ce montant n'excède pas 250 000 $; ou

2.1.2.2 25 000 $, plus 5% de la partie du montant du Contrat indiqué dans les Articles de convention qui excède 250 000 $; ou

2.1.3 un dépôt de garantie représentant le montant prescrit à l'alinéa CGC2.1.2, majoré d'un supplément représentant 10% du montant du Contrat indiqué dans les Articles de convention.

2.2 Le cautionnement d'exécution et le cautionnement pour le paiement de la main-d'œuvre et des matériaux mentionnés au paragraphe CGC2.1 doivent être dans une forme approuvée et provenir d'une compagnie dont les cautionnements sont acceptés par Sa Majesté.

2.3 Le montant maximum du dépôt de garantie requis en vertu de l'alinéa CGC2.12 ne doit pas excéder 250 000 $, quel que soit le montant du Contrat indiqué dans les Articles de convention.

2.4 Le dépôt de garantie mentionné aux alinéas CGC2.1.2 et CGC2.1.3 consiste en :

2.4.1 une lettre de change payable à l'ordre du receveur général du Canada et certifiée par une institution financière approuvée ou tirée par une institution financière approuvée sur son propre compte; ou

2.4.2 des obligations du gouvernement du Canada ou des obligations garanties inconditionnellement quant au capital et aux intérêts par le gouvernement du Canada.

2.5 Aux fins du paragraphe CGC2.4 :

2.5.1 une lettre de change est un ordre inconditionnel donne par écrit par l'Entrepreneur à une institution financière agréée et obligeant ladite institution à verse, sur demande et à une certaine date, une certaine somme au receveur général du Canada ou à l'ordre de ce dernier; et

2.5.2 si une lettre de change est certifiée par une institution financière autre qu'une banque à charte, elle doit être accompagnée d'une lettre ou d'une attestation estampillée confirmant que l'institution financière appartient à au moins l'une des catégories mentionnées à l'alinéa CGC2.5.3 ;

2.5.3 une institution financière agréée est :

2.5.3.1 une société ou institution qui est membre de l'Association canadienne des paiements,

2.5.3.2 une société qui accepte des dépôts qui sont garantis par la Société d'assurance-dépôts du Canada ou la Régie de l'assurance-dépôts du Québec jusqu'au maximum permis par la loi,

2.5.3.3 une caisse de crédit au sens de l'alinéa 137(6)(b) de la *Loi de l'impôt sur le revenu*,

2.5.3.4 une société qui accepte du public des dépôts dont le remboursement est garanti par Sa Majesté du chef d'une province, ou

2.5.3.5 la Société canadienne des postes.

2.5.4 les obligations mentionnées à l'alinéa CGC2.4.2 doivent être :

2.5.4.1 payables au porteur ;

2.5.4.2 accompagnées d'un document de transfert dûment exécuté à l'ordre du receveur général du Canada, dûment exécuté et dans la forme prescrite par le Règlement concernant les obligations intérieures du Canada; ou

2.5.4.3 enregistrées quant au capital ou quant au capital et aux intérêts au nom du receveur général du Canada, conformément au Règlement concernant les obligations intérieures du Canada; et

2.5.4.4 fournies à leur valeur courante sur le marché à la date du Contrat.

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat
Top. Tender
Security Classification / Classification de sécurité
Unclassified

SECURITY REQUIREMENTS CHECK LIST (SRCL)
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine: National Research Council

2. Branch or Directorate / Direction générale ou Direction: ASPM/SAGI

3. a) Subcontract Number / Numéro du contrat de sous-traitance:

3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant:

4. Brief Description of Work / Brève description du travail

Montreal Road Campus - North Side Sewer Separation Project – Phase 3

5. a) Will the supplier require access to Controlled Goods?
Le fournisseur aura-t-il accès à des marchandises contrôlées? ☒ No Non ☐ Yes Oui

5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations?
Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques? ☒ No Non ☐ Yes Oui

6. Indicate the type of access required / Indiquer le type d'accès requis

6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets?
Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS?
(Specify the level of access using the chart in Question 7. c)
(Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c) ☒ No Non ☐ Yes Oui

6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted.
Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé. ☐ No Non ☒ Yes Oui

6. c) Is this a commercial courier or delivery requirement with no overnight storage?
S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit? ☒ No Non ☐ Yes Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada ☒	NATO / OTAN ☐	Foreign / Étranger ☐

7. b) Release restrictions / Restrictions relatives à la diffusion

Canada	NATO / OTAN	Foreign / Étranger
No release restrictions Aucune restriction relative à la diffusion ☒	All NATO countries Tous les pays de l'OTAN ☐	No release restrictions Aucune restriction relative à la diffusion ☐
Not releasable À ne pas diffuser ☐		
Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐

7. c) Level of information / Niveau d'information

Canada	NATO / OTAN	Foreign / Étranger
PROTECTED A PROTÉGÉ A ☐	NATO UNCLASSIFIED NATO NON CLASSIFIÉ ☐	PROTECTED A PROTÉGÉ A ☐
PROTECTED B PROTÉGÉ B ☐	NATO RESTRICTED NATO DIFFUSION RESTREINTE ☐	PROTECTED B PROTÉGÉ B ☐
PROTECTED C PROTÉGÉ C ☐	NATO CONFIDENTIAL NATO CONFIDENTIEL ☐	PROTECTED C PROTÉGÉ C ☐
CONFIDENTIAL CONFIDENTIEL ☐	NATO SECRET NATO SECRET ☐	CONFIDENTIAL CONFIDENTIEL ☐
SECRET SECRET ☐	COSMIC TOP SECRET COSMIC TRÈS SECRET ☐	SECRET SECRET ☐
TOP SECRET TRÈS SECRET ☐		TOP SECRET TRÈS SECRET ☐
TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) ☐		TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) ☐

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

PART A (continued) / PARTIE A (suite)

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?
If Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?

Short Title(s) of material / Titre(s) abrégé(s) du matériel :
Document Number / Numéro du document :

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

☒ RELIABILITY STATUS / COTE DE FIABILITÉ	☐ CONFIDENTIAL / CONFIDENTIEL	☐ SECRET / SECRET	☐ TOP SECRET / TRÈS SECRET
☐ TOP SECRET– SIGINT / TRÈS SECRET – SIGINT	☐ NATO CONFIDENTIAL / NATO CONFIDENTIEL	☐ NATO SECRET / NATO SECRET	☐ COSMIC TOP SECRET / COSMIC TRÈS SECRET
☐ SITE ACCESS / ACCÈS AUX EMPLACEMENTS			

Special comments:
Commentaires spéciaux : _____

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.
REMARQUE : Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work? ☐ No / Non ☒ Yes / Oui
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?
If Yes, will unscreened personnel be escorted? ☐ No / Non ☒ Yes / Oui
Dans l'affirmative, le personnel en question sera-t-il escorté?

PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?

11. b) Will the supplier be required to safeguard COMSEC information or assets? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?

PRODUCTION

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises? ☒ No / Non ☐ Yes / Oui
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?

INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data? ☒ No / Non ☐ Yes / Oui
Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS?

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency? ☒ No / Non ☐ Yes / Oui
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale?

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

PART C - *(continued)* / PARTIE C - *(suite)*

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.
Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.
Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category Catégorie	PROTECTED PROTÉGÉ			CLASSIFIED CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL CONFIDENTIEL	SECRET	TOP SECRET TRÈS SECRET	NATO RESTRICTED NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET COSMIC TRÈS SECRET	PROTECTED PROTÉGÉ A	PROTECTED PROTÉGÉ B	PROTECTED PROTÉGÉ C	CONFIDENTIAL CONFIDENTIEL	SECRET	TOP SECRET TRES SECRET
Information / Assets Renseignements / Biens																
Production	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Media / Support TI	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
IT Link / Lien électronique	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

☒ No / Non ☐ Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).
Dans l'affirmative, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquer qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

Government of Canada / Gouvernement du Canada

Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Doug Sanftenberg	*Construction Project Manager*	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613-993-9628		Doug.Sanftenberg@nrc-cnrc.gc.ca	April 2018

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Richard Bramucci	Analyst, Security in Contracting Analyste, sécurité dans les marchés	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
(613) 991-1093	(613) 990-0946	Richard.Bramucci@nrc-cnrc.gc.ca	24 APR 2018

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?

☒ No / Non ☐ Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Collin Long	*Senior Contracting Officer*	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
(613) 993-0431	613-991-3297	Collin.long@nrc-cnrc.gc.ca	May 10, 2018

17. Contracting Security Authority / Autorité contractante en matière de sécurité

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date