The Regional Municipality of Peel

Contract Documents
Volume 2

CONTENTS

June 2010

OPS GENERAL CONDITIONS OF CONTRACT

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GC 1.01 Captions

.01 The captions appearing in these General Conditions have been inserted as a matter of convenience and for ease of reference only and in no way define, limit, or enlarge the scope or meaning of the General Conditions or any provision hereof.

GC 1.02 Abbreviations

.01 The abbreviations on the left below are commonly found in the Contract Documents and represent the organizations and phrases listed on the right:

"AASHTO"	-	American Association of State Highway Transportation Officials
“ACI”	-	American Concrete Institute
"ANSI"	-	American National Standards Institute
"ASTM"	-	American Society for Testing and Materials
"AWG"	-	American Wire Gauge
"AWWA"	-	American Water Works Association
“CCIL”	-	Canadian Council of Independent Laboratories
"CESA"	-	Canadian Engineering Standards Association
"CGSB"	-	Canadian General Standards Board
"CSA"	-	Canadian Standards Association
"CWB"	-	Canadian Welding Bureau
"GC"	-	General Conditions
“ISO”	-	International Organization for Standardization
"MOE"	-	Ontario Ministry of the Environment
"MTO"	-	Ontario Ministry of Transportation
"MUTCD"	-	Manual of Uniform Traffic Control Devices (Replaced by OTM)
"OPS"	-	Ontario Provincial Standard
"OPSD"	-	Ontario Provincial Standard Drawing
"OPSS"	-	Ontario Provincial Standard Specification
“OTM”	-	Ontario Traffic Manual
"PEO"	-	Professional Engineers Ontario
"SAE"	-	Society of Automotive Engineers
“SCC”	-	Standards Council of Canada
"SSPC"	-	Structural Steel Painting Council
"UL"	-	Underwriters Laboratories
"ULC"	-	Underwriters Laboratories Canada

GC 1.03 Gender and Singular References

.01 References to the masculine or singular throughout the Contract Documents shall be considered to include the feminine and the plural and vice versa, as the context requires.

GC 1.04 Definitions

.01 For the purposes of this Contract the following definitions apply:

Actual Measurement means the field measurement of that quantity within the approved limits of the Work.

Addendum means an addition or change in the tender documents issued by the Owner prior to tender closing.

Additional Work means work not provided for in the Contract and not considered by the Contract Administrator to be essential to the satisfactory completion of the Contract within its intended scope.

Agreement means the agreement between the Owner and the Contractor for the performance of the Work that is included in the Contract Documents.

Base means a layer of material of specified type and thickness placed immediately below the pavement wearing surface layers, curb and gutter, or sidewalk.

Business Day means any Day except Saturdays, Sundays, and statutory holidays.

Certificate of Subcontract Completion means the certificate issued by the Contract Administrator in accordance with clause GC 8.02.03.02, Certification of Subcontract Completion.

Certificate of Substantial Performance means the certificate issued by the Contract Administrator at Substantial Performance.

Change Directive means any written instruction signed by the Owner, or by the Contract Administrator where so authorized, directing that a Change in the Work or Extra Work be performed.

Change in the Work means the deletion, extension, increase, decrease, or alteration of lines; grades; dimensions; quantities; methods; drawings; substantial changes in geotechnical, subsurface, surface, or other conditions; changes in the character of the Work to be done; or materials of the Work or part thereof, within the intended scope of the Contract.

Change Order means a written amendment to the Contract signed by the Contractor and the Owner, or the Contract Administrator where so authorized, covering contingencies, a Change in the Work, Extra Work, Additional Work, and changed subsurface conditions; and establishing the basis for payment and the time allowed for the adjustment of the Contract Time.

Completion Certificate means the certificate issued by the Contract Administrator at completion.

Constructor means, for the purposes of, and within the meaning of the Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended and amendments thereto, the Contractor who executes the Contract.

Contract means the undertaking by the Owner and the Contractor to perform their respective duties, responsibilities, and obligations as prescribed in the Contract Documents.

Contract Administrator means the person, partnership, or corporation designated by the Owner to be the Owner's representative for the purposes of the Contract.

Contract Documents mean the executed Agreement between the Owner and the Contractor, Tender, General Conditions of Contract, Supplemental General Conditions of Contract, Standard Specifications, Special Provisions, Contract Drawings, addenda incorporated in a Contract Document before the execution of the Agreement, such other documents as may be listed in the Agreement, and subsequent amendments to the Contract Documents made pursuant to the provisions of the Agreement.

Contract Drawings or Contract Plans mean drawings or plans, any Geotechnical Report, any Subsurface Report, and any other reports and information provided by the Owner for the Work, and without limiting the generality thereof, may include soil profiles, foundation investigation reports, reinforcing steel schedules, aggregate sources lists, Quantity Sheets, and cross-sections.

Contract Time means the time stipulated in the Contract Documents for Substantial Performance of the Work, including any extension of Contract Time made pursuant to the Contract Documents.

Contractor means the person, partnership, or corporation undertaking the Work as identified in the Agreement.

Controlling Operation means any component of the Work that, if delayed, may delay the completion of the Work.

Cost Plus has the same meaning as "Time and Material."

Cut-Off Date means the date up to which payment shall be made for work performed.

Daily Work Records mean daily Records detailing the number and categories of workers and hours worked or on standby, types and quantities of Equipment and number of hours in use or on standby, and description and quantities of Material utilized.

Day means a calendar day.

Drawings or Plans mean any Contract Drawings or Contract Plans, or any Working Drawings or Working Plans, or any reproductions of drawings or plans pertaining to the Work.

End Result Specification means specifications that require the Contractor to be responsible for supplying a product or part of the Work. The Owner accepts or rejects the final product or applies a price adjustment that is commensurate with the degree of compliance with the specification.

Equipment means all machinery and equipment used for preparing, fabricating, conveying or erecting the Work and normally referred to as construction machinery and equipment.

Estimate means a calculation of the quantity or cost of the Work or part of it depending on the context.

Extra Work means work not provided for in the Contract as awarded but considered by the Contract Administrator to be essential to the satisfactory completion of the Contract within its intended scope, including unanticipated work required to comply with legislation and regulations that affect the Work.

Final Acceptance Certificate means the certificate issued by the Contract Administrator at Final Acceptance of the Work.

Final Detailed Statement means a complete evaluation prepared by the Contract Administrator showing the quantities, unit prices, and final dollar amounts of all items of work completed under the Contract, including variations in tender items and Extra Work, all as set out in the same general form as the monthly estimates.

Force Account has the same meaning as “Time and Material.”

Geotechnical Report means a report or other information identifying soil, rock, and ground water conditions in the area of any proposed Work.

Grade means the required elevation of that part of the Work.

Hand Tools means tools that are commonly called tools or implements of the trade and include small power tools.

Highway means a common and public highway any part of that is intended for or used by the general public for the passage of vehicles and includes the area between the lateral property lines thereof.

Lot means a specific quantity of material or a specific amount of construction normally from a single source and produced by the same process.

Lump Sum Item means a tender item indicating a portion of the Work for which payment will be made at a single tendered price. Payment is not based on a measured quantity, although a quantity may be given in the Contract Documents.

Major Item means any tender item that has a value, calculated on the basis of its actual or estimated tender quantity, whichever is the larger, multiplied by its tender unit price, which is equal or greater than the lesser of,

a) $100,000, or

b) 5% of the total tender value calculated on the basis of the total of all the estimated tender quantities and the tender unit prices.

Material means material, machinery, equipment and fixtures forming part of the Work.

Owner means the party to the Contract for whom the Work is being performed, as identified in the Agreement, and includes, with the same meaning and import, "Authority."

Pavement means a wearing course or courses placed on the Roadway and consisting of asphaltic concrete, hydraulic cement concrete, Portland cement concrete, or plant or road mixed mulch.

Performance Bond means the type of security furnished to the Owner to guarantee completion of the Work in accordance with the Contract and to the extent provided in the bond.

Plan Quantity means that quantity as computed from within the boundary lines of the Work as shown in the Contract Documents.

Project means the construction of the Work as contemplated by this Contract.

Quantity Sheet means a list of the quantities of Work to be done.

Quarried Rock means material removed from an open excavation made in a solid mass of rock that, prior to removal, was integral with the parent mass.

Quarry means a place where Aggregate has been or is being removed from an open excavation made in a solid mass of igneous, sedimentary, or metamorphic rock or any combination of these that, prior to removal, was integral with the parent areas.

Rate of Interest means the rate of interest as determined under the Financial Administration Act by the Minister of Finance of Ontario and issued by, and available from, the Owner.

Records mean any books, payrolls, accounts, or other information that relate to the Work or any Change in the Work or claims arising therefrom.

Roadway means that part of the Highway designed or intended for use by vehicular traffic and includes the Shoulders.

Shoulder means that portion of the Roadway between the edge of the travelled portion of the wearing surface and the top inside edge of the ditch or fill slope.

Special Provisions mean directions containing requirements specific to the Work.

Standard Drawing or Standard Specification means a standard practice required and stipulated by the Owner for performance of the Work.

Subbase means a layer of material of specified type and thickness between the Subgrade and the Base.

Subcontractor means a person, partnership or corporation undertaking the execution of a part of the Work by virtue of an agreement with the Contractor.

Subgrade means the earth or rock surface, whether in cut or fill, as prepared to support the pavement structure, consisting of Base, Subbase, and Pavement.

Subsurface Report means a report or other information identifying the location of Utilities, concealed and adjacent structures, and physical obstructions that fall within the influence of the Work.

Superintendent means the Contractor's authorized representative in responsible charge of the Work.

Surety means the person, partnership or corporation, other than the Contractor, licensed in Ontario to transact business under the Insurance Act, R.S.O. 1990, c.I.8, as amended, executing a bond provided by the Contractor.

Tender means an offer in writing from the Contractor, submitted in the format prescribed by the Owner, to complete the Work.

Time and Material means costs calculated according to clause GC 8.02.04, Payment on a Time and Material Basis. Where "Cost Plus" and "Force Account" are used they shall have the same meaning.

Utility means an aboveground or underground facility maintained by a municipality, public utility authority or regulated authority and includes services such as sanitary sewer, storm sewer, water, electric, gas, oil, steam, data transmission, telephone, and cable television.

Warranty Period means the period of 12 months from the date of Substantial Performance or such longer period as may be specified in the Contract Documents for certain Materials or some or all of the Work. Where a date of Substantial Performance is not established, the Warranty Period shall commence on the date of Completion.

Work means the total construction and related services required by the Contract Documents.

Working Area means all the lands and easements owned or acquired by the Owner for the construction of the Work.

Working Day means any Day,

a) except Saturdays, Sundays and statutory holidays;

b) except a Day as determined by the Contract Administrator, on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom, from proceeding with a Controlling Operation. For the purposes of this definition, this shall be a Day during which the Contractor cannot proceed with at least 60% of the normal labour and Equipment force effectively engaged on the Controlling Operation for at least 5 hours;

c) except a Day on which the Contractor is prevented from proceeding with a Controlling Operation, as determined by the Contract Administrator by reason of,

   i. any breach of the Contract by the Owner or if such prevention is due to the Owner, another contractor hired by the Owner, or an employee of any one of them, or by anyone else acting on behalf of the Owner.
   ii. non-delivery of Owner supplied Materials.
   iii. any cause beyond the reasonable control of the Contractor that can be substantiated by the Contractor to the satisfaction of the Contract Administrator.

Working Drawings or Working Plans means any Drawings or Plans prepared by the Contractor for the execution of the Work and may, without limiting the generality thereof, include formwork, falsework, and shoring plans; Roadway protection plans; shop drawings; shop plans; or erection diagrams.

GC 1.05 Substantial Performance

.01 The Work is substantially performed,

a) when the Work to be performed under the Contract or a substantial part thereof is ready for use or is being used for the purpose intended; and

b) when the Work to be performed under the Contract is capable of completion or, where there is a known defect, the cost of correction, is not more than

i. 3% of the first $500,000 of the Contract price,
ii. 2% of the next $500,000 of the Contract price, and
iii. 1% of the balance of the Contract price.

.02 For the purposes of this Contract, where the Work or a substantial part thereof is ready for use or is being used for the purposes intended and the remainder of the Work cannot be completed expeditiously for reasons beyond the control of the Contractor or, where the Owner and the Contractor agree not to complete the Work expeditiously, the price of the services or materials remaining to be supplied and required to complete the Work shall be deducted from the Contract price in determining Substantial Performance.

GC 1.06 Completion

.01 The Work shall be deemed to be completed and services or Materials shall be deemed to be last supplied to the Work when the price of completion, correction of a known defect, or last supply is not more than the lesser of,

a) 1% of the Contract price; or

b) $1,000.

GC 1.07 Final Acceptance

.01 Final Acceptance shall be deemed to occur when the Contract Administrator is satisfied that, to the best of the Contract Administrator's knowledge at that time, the Contractor has rectified all imperfect work and has discharged all of the Contractor's obligations under the Contract.

GC 1.08 Interpretation of Certain Words

.01 The words "acceptable," "approval," "authorized," "considered necessary," "directed," "required," "satisfactory," or words of like import, shall mean approval of, directed, required, considered necessary, or authorized by and acceptable or satisfactory to the Contract Administrator, unless the context clearly indicates otherwise.

SECTION GC 2.0 - CONTRACT DOCUMENTS

GC 2.01 Reliance on Contract Documents

.01 The Owner warrants that the information furnished in the Contract Documents can be relied upon with the following limitations or exceptions:

a) The location of all mainline underground Utilities that may affect the Work shall be shown to a tolerance of:

i. 1 m horizontal, and
ii. 0.3 m vertical

.02 The Owner does not warrant or make any representation with respect to:

a) interpretations of data or opinions expressed in any Subsurface Report available for the perusal of the Contractor, whether or not such report is included as part of the Contract Documents, and

b) other information specifically excluded from this warranty.

GC 2.02 Order of Precedence

.01 In the event of any inconsistency or conflict in the contents of the following documents, such documents shall take precedence and govern in the following descending order:

a) Agreement

b) Addenda

c) Special Provisions

d) Contract Drawings

e) Standard Specifications

f) Standard Drawings

g) Instructions to Tenderers

h) Tender

i) Supplemental General Conditions

j) General Conditions

k) Working Drawings

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

.02 In the event of any conflict among or inconsistency in the information shown on Drawings, the following rules shall apply:

a) Dimensions shown in figures on a Drawing shall govern where they differ from dimensions scaled from the same drawing;

b) Drawings of larger scale shall govern over those of smaller scale;

c) Detailed Drawings shall govern over general Drawings; and

d) Drawings of a later date shall govern over those of an earlier date in the same series.

.03 In the event of any inconsistency or conflict in the contents of Standard Specifications the following descending order of precedence shall govern:

a) Owner's Standard Specifications

b) Ontario Provincial Standard Specifications

c) Other Standard Specifications, such as those produced by CSA, CGSB, ASTM, and ANSI and referenced in the Ontario Provincial Standard Specifications

.04 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all.

SECTION GC 3.0 - ADMINISTRATION OF THE CONTRACT

GC 3.01 Contract Administrator's Authority

.01 The Contract Administrator shall be the Owner's representative during construction and until the issuance of the Completion Certificate or the issuance of the Final Acceptance Certificate, whichever is later. All instructions to the Contractor, including instructions from the Owner, shall be issued by the Contract Administrator. The Contract Administrator shall have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

.02 All claims, disputes and other matters in question relating to the performance and the quality of the Work or the interpretation of the Contract Documents shall be referred to the Contract Administrator in writing by the Contractor.

.03 The Contract Administrator may inspect the Work for its conformity with the Plans and Standard Specifications, and to record the necessary data to establish payment quantities under the schedule of tender quantities and unit prices or to make an assessment of the value of the work completed in the case of a lump sum price Contract.

.04 The Contract Administrator shall determine the amounts owing to the Contractor under the Contract and shall issue certificates for payment in such amounts as provided for in Section GC 8.0, Measurement and Payment.

.05 The Contract Administrator shall, with reasonable promptness, review and take appropriate action upon the Contractor's submissions such as shop drawings, product data, and samples in accordance with the Contract Documents.

.06 The Contract Administrator shall investigate all allegations of a Change in the Work made by the Contractor and issue appropriate instructions.

.07 The Contract Administrator shall prepare Change Directives and Change Orders for the Owner’s approval.

.08 Upon written application by the Contractor, the Contract Administrator and the Contractor shall jointly conduct an inspection of the Work to establish the date of Substantial Performance of the Work or the date of Completion of the Work or both.

.09 The Contract Administrator shall be, in the first instance, the interpreter of the Contract Documents and the judge of the performance thereunder by both parties to the Contract. Interpretations and decisions of the Contract Administrator shall be consistent with the intent of the Contract Documents and, in making these decisions, the Contract Administrator shall not show partiality to either party.

.10 The Contract Administrator shall have the authority to reject part of the Work or Material that does not conform to the Contract Documents.

.11 In the event that the Contract Administrator determines that any part of the Work performed by the Contractor is defective, whether the result of poor workmanship; the use of defective material; or damage through carelessness or other act or omission of the Contractor and whether or not incorporated in the Work; or otherwise fails to conform to the Contract Documents, then the Contractor shall if directed by the Contract Administrator promptly remove the Work and replace, make good, or re-execute the Work at no additional cost to the Owner.

.12 Any part of the Work destroyed or damaged by such removals, replacements, or re-executions shall be made good, promptly, at no additional cost to the Owner.

.13 If, in the opinion of the Contract Administrator, it is not expedient to correct defective work or work not performed in accordance with the Contract Documents, the Owner may deduct from monies otherwise due to the Contractor the difference in value between the work as performed and that called for by the Contract Documents, the amount that will be determined in the first instance by the Contract Administrator.

.14 Notwithstanding any inspections made by the Contract Administrator or the issuance of any certificates or the making of any payment by the Owner, the failure of the Contract Administrator to reject any defective work or Material shall not constitute acceptance of defective work or Material.

.15 The Contract Administrator shall have the authority to temporarily suspend the Work for such reasonable time as may be necessary:

a) to facilitate the checking of any portion of the Contractor's construction layout;

b) to facilitate the inspection of any portion of the Work; or

c) for the Contractor to remedy non-compliance in the case of such non-compliance with the provisions of the Contract by the Contractor.

The Contractor shall not be entitled to any compensation for suspension of the Work in these circumstances.

.16 The Owner has the right to terminate the Contract for wilful or persistent violation by the Contractor or its workers of the Occupational Health and Safety Act legislation and regulations, Workplace Safety and Insurance Board Act, and Regulation 309 of the Environmental Protection Act.

.17 If the Contract Administrator determines that any worker employed on the Work is incompetent, as defined by the Occupational Health and Safety Act, or is disorderly, then the Contract Administrator shall provide written notice to the Contractor and the Contractor shall immediately remove the worker from the Working Area. Such worker shall not return to the Working Area without the prior written consent of the Contract Administrator.

GC 3.02 Working Drawings

.01 The Contractor shall arrange for the preparation of clearly identified and dated Working Drawings as called for by the Contract Documents.

.02 The Contractor shall submit Working Drawings to the Contract Administrator with reasonable promptness and in orderly sequence so as to not cause delay in the Work. If either the Contractor or the Contract Administrator so requests, they shall jointly prepare a schedule fixing the dates for submission and return of Working Drawings. Working Drawings shall be submitted in printed form. At the time of submission the Contractor shall notify the Contract Administrator in writing of any deviations from the Contract requirements that exist in the Working Drawings.

.03 The Contract Administrator shall review and return Working Drawings in accordance with an agreed upon schedule, or otherwise, with reasonable promptness so as not to cause delay.

.04 The Contract Administrator's review shall be to check for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the Working Drawings or of responsibility for meeting all requirements of the Contract Documents, unless a deviation on the Working Drawings has been approved in writing by the Contract Administrator.

.05 The Contractor shall make any changes in Working Drawings that the Contract Administrator may require to make the Working Drawings consistent with the Contract Documents and resubmit, unless otherwise directed by the Contract Administrator. When resubmitting, the Contractor shall notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.

.06 Work related to the Working Drawings shall not proceed until the Working Drawings have been signed and dated by the Contract Administrator and marked with the words "Reviewed. Permission to construct granted."

.07 The Contractor shall keep one set of the reviewed Working Drawings, marked as above, at the site at all times.

GC 3.03 Right of the Contract Administrator to Modify Methods and Equipment

.01 The Contractor shall, when requested in writing, make alterations in the method, Equipment, or work force at any time the Contract Administrator considers the Contractor's actions to be unsafe, or damaging to either the Work or existing facilities or the environment.

.02 The Contractor shall, when requested in writing, alter the sequence of its operations on the Contract so as to avoid interference with work being performed by others.

.03 Notwithstanding the foregoing, the Contractor shall ensure that all necessary safety precautions and protection are maintained throughout the Work.

GC 3.04 Emergency Situations

.01 The Contract Administrator has the right to determine the existence of an emergency situation and, when such an emergency situation is deemed to exist, the Contract Administrator may instruct the Contractor to take action to remedy the situation. If the Contractor does not take timely action or, if the Contractor is not available, the Contract Administrator may direct others to remedy the situation.

.02 If the emergency situation was the fault of the Contractor, the remedial work shall be done at the Contractor's expense. If the emergency situation was not the fault of the Contractor, the Owner shall pay for the remedial work.

GC 3.05 Layout

.01 The Contract Administrator shall provide baseline and benchmark information for the general location, alignment, and elevation of the Work. The Owner shall be responsible only for the correctness of the information provided by the Contract Administrator.

GC 3.06 Extension of Contract Time

.01 An application for an extension of Contract Time shall be made in writing by the Contractor to the Contract Administrator as soon as the need for such extension becomes evident and at least 15 Days prior to the expiration of the Contract Time. The application for an extension of Contract Time shall enumerate the reasons, and state the length of extension required.

.02 Circumstances suitable for consideration of an extension of Contract Time include the following:

a) Delays, subsection GC 3.07.

b) Changes in the Work, clause GC 3.10.01.

c) Extra Work, clause GC 3.10.02.

d) Additional Work, clause GC 3.10.03.

.03 The Contract Administrator shall, in considering an application for an extension to the Contract Time, take into account whether the delays, Changes in the Work, Extra Work, or Additional Work involve a Controlling Operation.

.04 The Contract Time shall be extended for such additional time as may be recommended by the Contract Administrator and deemed fair and reasonable by the Owner.

.05 The terms and conditions of the Contract shall continue for such extension of Contract Time.

GC 3.07 Delays

.01 If the Contractor is delayed in the performance of the Work by,

a) war, blockades, and civil commotions, errors in the Contract Documents;

b) an act or omission of the Owner or Contract Administrator, or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the Contract Documents;

c) a stop work order issued by a court or public authority, provided that such order was not issued as the result of an act or omission of the Contractor or anyone employed or engaged by the Contractor directly or indirectly;

d) the Contract Administrator giving notice under subsection GC 7.10, Suspension of Work;

e) abnormal inclement weather; or

f) archaeological finds in accordance with subsection GC 3.15, Archaeological Finds,

then the Contractor shall be reimbursed by the Owner for reasonable costs incurred by the Contractor as the result of such delay, provided that in the case of an application for an extension of Contract Time due to abnormal inclement weather, the Contractor shall, with the Contractor's application, submit evidence from Environment Canada in support of such application. Extension of Contract Time may be granted in accordance with subsection GC 3.06, Extension of Contract Time.

.02 If the Work is delayed by labour disputes, strikes or lock-outs, including lock-outs decreed or recommended to its members by a recognized contractor's association, of which the Contractor is a member or to which the Contractor is otherwise bound, are beyond the Contractor's control, which then the Contract Time shall be extended in accordance with subsection GC 3.06, Extension of Contract Time. In no case shall the extension of Contract Time be less than the time lost as the result of the event causing the delay, unless a shorter extension is agreed to by the Contractor. The Contractor shall not be entitled to payment for costs incurred as the result of such delays unless such delays are the result of actions by the Owner.

.03 The Contractor shall not be entitled to payment for the cost of delays incurred as a result of a dispute between the Contractor and Owner. The Contractor shall execute the Work and may pursue resolution of the dispute in accordance with subsection GC 3.13, Claims, Negotiations, Mediations.

GC 3.08 Assignment of Contract

.01 The Contractor shall not assign the Contract, either in whole or in part, without the prior written consent of the Owner.

GC 3.09 Subcontracting by the Contractor

.01 The Contractor may subcontract any part of the Work, subject to these General Conditions and any limitations specified in the Contract Documents.

.02 The Contractor shall notify the Contract Administrator 10 Days prior to the start of construction, in writing, of the intention to subcontract. Such notification shall identify the part of the Work, and the Subcontractor with whom it is intended.

.03 The Contract Administrator shall, within 5 Days of receipt of such notification, accept or reject the intended Subcontractor. The rejection shall be in writing and shall include the reasons for the rejection.

.04 The Contractor shall not, without the written consent of the Owner, change a Subcontractor who has been engaged in accordance with this subsection.

.05 The Contractor shall preserve and protect the rights of the parties under the Contract with respect to that part of the Work to be performed under subcontract and shall,

a) enter into agreements with the intended Subcontractors to require them to perform their work in accordance with the Contract Documents; and

b) be as fully responsible to the Owner for acts and omissions of the Contractor's Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the Contractor.

.06 The Owner's consent to subcontracting by the Contractor shall not be construed to relieve the Contractor from any obligation under the Contract and shall not impose any liability upon the Owner. Nothing contained in the Contract Documents shall create a contractual relationship between a Subcontractor and the Owner.

GC 3.10 Changes

GC 3.10.01 Changes in the Work

.01 The Owner, or the Contract Administrator where so authorized, may, by order in writing, make a Change in the Work without invalidating the Contract. The Contractor shall not be required to proceed with a Change in the Work until in receipt of a Change Order or Change Directive. Upon the receipt of such Change Order or Change Directive the Contractor shall proceed with the Change in the Work.

.02 The Contractor may apply for an extension of Contract Time according to the terms of subsection GC 3.06, Extension of Contract Time.

.03 If the Change in the Work relates solely to quantities, payment for that part of the Work shall be made according to the conditions specified in clause GC 8.01.02, Variations in Tender Quantities. If the Change in the Work does not solely relate to quantities, then either the Owner or the Contractor may initiate negotiations upwards or downwards for the adjustment of the Contract price in respect of the Change in the Work pursuant to subsection GC 3.13, Claims, Negotiations, Mediation or payment may be made according to the conditions contained in clause GC 8.02.04, Payment on a Time and Material Basis.

GC 3.10.02 Extra Work

.01 The Owner, or Contract Administrator where so authorized, may instruct the Contractor to perform Extra Work without invalidating the Contract. The Contractor shall not be required to proceed with the Extra Work until in receipt of a Change Order or Change Directive. Upon receipt of such Change Order or Change Directive the Contractor shall proceed with the Extra Work.

.02 The Contractor may apply for an extension of Contract Time according to the terms of subsection GC 3.06, Extension of Contract Time.

.03 Either the Owner or Contractor may initiate negotiations upwards or downwards for the payment for the Extra Work pursuant to subsection GC 3.13, Claims, Negotiations, Mediation, or payment may be made according to the conditions contained in clause GC 8.02.04, Payment on a Time and Material Basis.

GC 3.10.03 Additional Work

.01 The Owner, or Contract Administrator where so authorized, may request the Contractor to perform Additional Work without invalidating the Contract. If the Contractor agrees to perform Additional Work, the Contractor shall proceed with such Additional Work upon receipt of a Change Order.

.02 The Contractor may apply for an extension of Contract Time according to the terms of subsection GC 3.06, Extension of Contract Time.

.03 Payment for the Additional Work may be negotiated pursuant to subsection GC 3.13, Claims, Negotiations, Mediation, or payment may be made according to the conditions contained in clause GC 8.02.04, Payment on a Time and Material Basis.

GC 3.11 Notices

.01 Any notice permitted or required to be given to the Contract Administrator or the Superintendent in respect of the Work shall be deemed to have been given to and received by the addressee on the date of delivery if delivered by hand, email, or by facsimile transmission and on the fifth Day after the date of mailing, if sent by mail.

.02 The Contractor and the Owner shall provide each other with the mail and email addresses; pager, cell phone, and telephone numbers; and facsimile terminal numbers for the Contract Administrator and the Superintendent at the commencement of the Work, and update as necessary.

.03 In the event of an emergency situation or other urgent matter the Contract Administrator or the Superintendent may give a verbal notice, provided that such notice is confirmed in writing within 2 Days.

.04 Any notice permitted or required to be given to the Owner or the Contractor shall be given in accordance with the notice provision of the Contract.

GC 3.12 Use and Occupancy of the Work Prior to Substantial Performance

.01 Where it is not contemplated elsewhere in the Contract Documents, the Owner may use or occupy the Work or any part thereof prior to Substantial Performance, provided that at least 30 Days written notice has been given to the Contractor.

.02 The use or occupancy of the Work or any part thereof by the Owner prior to Substantial Performance shall not constitute an acceptance of the Work or parts so occupied. In addition, the use or occupancy of the Work shall not relieve the Contractor or the Contractor's Surety from any liability that has arisen, or may arise, from the performance of the Work in accordance with the Contract

Documents. The Owner shall be responsible for any damage that occurs because of the Owner's use or occupancy. Such use or occupancy of any part of the Work by the Owner does not waive the Owner's right to charge the Contractor liquidated damages in accordance with the terms of the Contract.

GC 3.13 Claims, Negotiations, Mediation

GC 3.13.01 Continuance of the Work

.01 Unless the Contract has been terminated or completed, the Contractor shall in every case, after serving or receiving any notification of a claim or dispute, verbal or written, continue to proceed with the Work with due diligence and expedition. It is understood by the parties that such action shall not jeopardize any claim it may have.

GC 3.13.02 Record Keeping

.01 Immediately upon commencing work that may result in a claim, the Contractor shall keep Daily Work Records during the course of the Work, sufficient to substantiate the Contractor's claim, and the Contract Administrator shall keep Daily Work Records to be used in assessing the Contractor's claim, all in accordance with clause GC 8.02.07, Records.

.02 The Contractor and the Contract Administrator shall attempt to reconcile their respective Daily Work Records on a daily basis, to simplify review of the claim, when submitted. If the Contractor and the Contract Administrator fail to reconcile their respective Daily Work Records, then the Contractor shall submit its Daily Work Records as part of its claim, whereby the resolution of the dispute about the Daily Work Records shall not be resolved until there is a resolution of the claim.

.03 The keeping of Daily Work Records by the Contract Administrator or the reconciling of such Daily Work Records with those of the Contractor shall not be construed to be acceptance of the claim.

GC 3.13.03 Claims Procedure

.01 The Contractor shall give verbal notice of any situation that may lead to a claim for additional payment immediately upon becoming aware of the situation.

.02 The Contractor shall provide written notice in the standard form "Notice of Intent to Claim" within 7 Days of the commencement of any part of the Work that may be affected by the situation.

.03 The Contractor shall submit detailed claims as soon as reasonably possible and in any event no later than 30 Days after completion of the work affected by the situation. The detailed claim shall:

a) identify the item or items in respect of which the claim arises;

b) state the grounds, contractual or otherwise, upon which the claim is made; and

c) include the Records maintained by the Contractor supporting such claim.

In exceptional cases, the 30 Days may be increased to a maximum of 90 Days with approval in writing from the Contract Administrator.

.04 Within 30 Days of the receipt of the Contractor's detailed claim, the Contract Administrator may request the Contractor to submit any further and other particulars as the Contract Administrator considers necessary to assess the claim. The Contractor shall submit the requested information within 30 Days of receipt of such request.

.05 Within 90 Days of receipt of the detailed claim, the Contract Administrator shall advise the Contractor, in writing, of the Contract Administrator's opinion with regard to the validity of the claim.

GC 3.13.04 Negotiations

.01 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, open and timely disclosure of relevant facts, information, and documents to facilitate these negotiations.

.02 Should the Contractor disagree with the opinion given in paragraph GC 3.13.03.05, with respect to any part of the claim, the Contract Administrator shall enter into negotiations with the Contractor to resolve the matters in dispute. Where a negotiated settlement cannot be reached and it is agreed that payment cannot be made on a Time and Material basis in accordance with clause GC 8.02.04, Payment on a Time and Material Basis, the parties shall proceed in accordance with clause GC 3.13.05, Mediation, or subsection GC 3.14, Arbitration.

GC 3.13.05 Mediation

.01 If a claim is not resolved satisfactorily through the negotiation stage noted in clause GC 3.13.04, Negotiations, within a period of 30 Days following the opinion given in paragraph GC 3.13.03.05, and the Contractor wishes to pursue the issue further, the parties may, upon mutual agreement, utilize the services of an independent third party mediator.

.02 The mediator shall be mutually agreed upon by the Owner and Contractor.

.03 The mediator shall be knowledgeable regarding the area of the disputed issue. The mediator shall meet with the parties together or separately, as necessary, to review all aspects of the issue. In a final attempt to assist the parties in resolving the issue themselves prior to proceeding to arbitration the mediator shall provide, without prejudice, a non-binding recommendation for settlement.

.04 The review by the mediator shall be completed within 90 Days following the opinion given in paragraph GC 3.13.03.05.

.05 Each party is responsible for its own costs related to the use of the third party mediator process. The cost of the third party mediator shall be equally shared by the Owner and Contractor.

GC 3.13.06 Payment

.01 Payment of the claim shall be made no later than 30 Days after the date of resolution of the claim or dispute. Such payment shall be made according to the terms of Section GC 8.0, Measurement and Payment.

GC 3.13.07 Rights of Both Parties

.01 It is agreed that no action taken under subsection GC 3.13, Claims, Negotiations, Mediation, by either party shall be construed as a renunciation or waiver of any of the rights or recourse available to the parties, provided that the requirements set out in this subsection are fulfilled.

GC 3.14 Arbitration

GC 3.14.01 Conditions of Arbitration

.01 If a claim is not resolved satisfactorily through the negotiation stage noted in clause GC 3.13.04, Negotiations, or the mediation stage noted in clause GC 3.13.05, Mediation, either party may invoke the provisions of subsection GC 3.14, Arbitration, by giving written notice to the other party.

.02 Notification that arbitration shall be implemented to resolve the issue shall be communicated in writing as soon as possible and no later than 60 Days following the opinion given in paragraph GC 3.13.03.05. Where the use of a third party mediator was implemented, notification shall be within 120 Days of the opinion given in paragraph GC 3.13.03.05.

.03 The parties shall be bound by the decision of the arbitrator.

.04 The rules and procedures of the Arbitration Act, 1991, S.O. 1991, c.17, as amended, shall apply to any arbitration conducted hereunder except to the extent that they are modified by the express provisions of subsection GC 3.14, Arbitration.

GC 3.14.02 Arbitration Procedure

.01 The following provisions are to be included in the agreement to arbitrate and are subject only to such right of appeal as exist where the arbitrator has exceeded his or her jurisdiction or have otherwise disqualified him or herself:

a) All existing actions in respect of the matters under arbitration shall be stayed pending arbitration;

b) All outstanding claims and matters to be settled are to be set out in a schedule to the agreement. Only such claims and matters as are in the schedule shall be arbitrated; and

c) Before proceeding with the arbitration, the Contractor shall confirm that all matters in dispute are set out in the schedule.

GC 3.14.03 Appointment of Arbitrator

.01 The arbitrator shall be mutually agreed upon by the Owner and Contractor to adjudicate the dispute.

.02 Where the Owner and Contractor cannot agree on a sole arbitrator within 30 Days of the notification of arbitration noted in paragraph GC 3.14.01.02, the Owner and the Contractor shall each choose an appointee within 37 Days of the notice of arbitration.

.03 The appointees shall mutually agree upon an arbitrator to adjudicate the dispute within 15 Days after the last appointee was chosen or they shall refer the matter to the Arbitration and Mediation Institute of Ontario Inc., which may select an arbitrator to adjudicate the dispute within 7 Days of being requested to do so.

.04 The arbitrator shall not be interested financially in the Contract nor in either party's business and shall not be employed by either party.

.05 The arbitrator may appoint independent experts and any other persons to assist him or her.

.06 The arbitrator is not bound by the rules of evidence that govern the trial of cases in court but may hear and consider any evidence that the arbitrator considers relevant.

.07 The hearing shall commence within 90 Days of the appointment of the arbitrator.

GC 3.14.04 Costs

.01 The arbitrator's fee shall be equally shared by the Owner and the Contractor.

.02 The fees of any independent experts and any other persons appointed to assist the arbitrator shall be shared equally by the Owner and the Contractor.

.03 The arbitration hearing shall be held in a place mutually agreed upon by both parties or in the event the parties do not agree, a site shall be chosen by the arbitrator. The cost of obtaining appropriate facilities shall be shared equally by the Owner and the Contractor.

.04 The arbitrator may, in his or her discretion, award reasonable costs, related to the arbitration.

GC 3.14.05 The Decision

.01 The reasoned decision shall be made in writing within 90 Days of the conclusion of the hearing. An extension of time to make a decision may be granted with consent of both parties. Payment shall be made in accordance with clause GC 3.13.06, Payment.

GC 3.15 Archaeological Finds

.01 If the Contractor's operations expose any items that may indicate an archaeological find, such as building remains, hardware, accumulations of bones, pottery, or arrowheads, the Contractor shall immediately notify the Contract Administrator and suspend operations within the area identified by the Contract Administrator. Notification may be verbal provided that such notice is confirmed in writing within 2 Days. Work shall remain suspended within that area until otherwise directed by the Contract Administrator in writing, in accordance with subsection GC 7.10, Suspension of Work.

.02 Any delay in the completion of the Contract that is caused by such a suspension of Work shall be considered to be beyond the Contractor's control in accordance with paragraph GC 3.07.01.

.03 Any work directed or authorized in connection with an archaeological find shall be considered as Extra Work in accordance with clause GC 3.10.02,Extra Work.

.04 The Contractor shall take all reasonable action to minimize additional costs that may accrue as a result of any work stoppage.

SECTION GC 4.0 - OWNER'S RESPONSIBILITIES AND RIGHTS

GC 4.01 Working Area

.01 The Owner shall acquire all property rights that are deemed necessary by the Owner for the construction of the Work, including temporary working easements, and shall indicate the full extent of the Working Area on the Contract Drawings.

.02 The Geotechnical Report and Subsurface Report that may be provided by the Owner as part of the tender documents shall form part of the Contract Drawings.

GC 4.02 Approvals and Permits

.01 The Owner shall pay for all plumbing and building permits.

.02 The Owner shall obtain and pay for all permits, licences, and certificates solely required for the design of the Work.

GC 4.03 Management and Disposition of Materials

.01 The Owner shall identify in the Contract Documents the materials to be moved within or removed from the Working Area and any characteristics of those materials that necessitates special materials management and disposition.

.02 In accordance with regulations under the Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended, the Owner advises that,

a) the designated substances silica, lead, and arsenic are generally present throughout the Working Area occurring naturally or as a result of vehicle emissions;

b) the designated substance asbestos may be present in cement products, asphalt, and conduits for Utilities;

c) the following hazardous materials are ordinarily present in construction activities: limestone, gypsum, marble, mica, and Portland cement; and

d) exposure to these substances may occur as a result of activities by the Contractor such as sweeping, grinding, crushing, drilling, blasting, cutting, and abrasive blasting.

.03 The Owner shall identify in the Contract Documents any designated substances or hazardous materials other than those identified above and their location in the Working Area.

.04 If the Owner or Contractor discovers or is advised of the presence of designated substances or hazardous materials that are in addition to those listed in paragraph GC 4.03.02, or not clearly identified in the Contract Documents according to paragraph GC 4.03.03, then verbal notice shall be provided to the other party immediately with written confirmation within 2 Days. The Contractor shall stop work in the area immediately and shall determine the necessary steps required to complete the work in accordance with applicable legislation and regulation.

.05 The Owner shall be responsible for any reasonable additional costs of removing, managing and disposing of any material not identified in the Contract Documents, or where conditions exist that could not have been reasonably foreseen at the time of tendering. All work under this paragraph shall be deemed to be Extra Work.

.06 Prior to commencement of the Work, the Owner shall provide to the Contractor a list of those products controlled under the Workplace Hazardous Materials Information System (WHMIS), that the Owner may supply or use on the Contract, together with copies of the Materials Safety Data Sheets for these products. All containers used in the application of products controlled under WHMIS shall be labelled. The Owner shall notify the Contractor in writing of changes to the list and provide relevant Material Safety Data Sheets.

GC 4.04 Construction Affecting Railway Property

.01 The Owner shall pay the costs of all flagging and other traffic control measures required and provided by the railway company unless such costs are solely a function of the Contractor's chosen method of completing the Work.

.02 Every precaution shall be taken by the Contractor to protect all railway property at track crossings; or otherwise, on which construction operations are to take place in accordance with the terms of this Contract.

.03 The Contractor shall be required to conduct the construction operations in such a manner as to avoid a possibility of damaging any railway property in the vicinity of the works. Every reasonable precaution shall be taken by the Contractor to ensure the safety of the workers, Subcontractors, and Equipment, as well as railway property throughout the duration of the Contract.

GC 4.05 Default by the Contractor

.01 If the Contractor fails to commence the Work within 14 Days of a formal order to commence work signed by the Contract Administrator or, upon commencement of the Work, should neglect to prosecute the Work properly or otherwise fails to comply with the requirements of the Contract and, if the Contract Administrator has given a written statement to the Owner and Contractor that sufficient cause exists to justify such action, the Owner may, without prejudice to any other right or remedy the Owner may have, notify the Contractor in writing that the Contractor is in default of the Contractor’s contractual obligations and instruct the Contractor to correct the default in the 5 Working Days immediately following the receipt of such notice.

.02 If the Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the Contractor’s insolvency or if a receiver is appointed because of the Contractor’s insolvency, the Owner may, without prejudice to any other right or remedy the Owner may have, by giving the Contractor or receiver or trustee in bankruptcy notice in writing, terminate the Contract.

GC 4.06 Contractor's Right to Correct a Default

.01 The Contractor shall have the right within the 5 full Working Days following the receipt of a notice of default to correct the default and provide the Owner with satisfactory proof that appropriate corrective measures have been taken.

.02 If the correction of the default cannot be completed within the 5 full Working Days following receipt of the notice, the Contractor shall not be in default if the Contractor,

a) commences the correction of the default within the 5 full Working Days following receipt of the notice;

b) provides the Owner with an acceptable schedule for the progress of such correction; and

c) completes the correction in accordance with such schedule.

GC 4.07 Owner's Right to Correct Default

.01 If the Contractor fails to correct the default within the time specified in subsection GC 4.06, Contractor's Right to Correct a Default, or subsequently agreed upon, the Owner, without prejudice to any other right or remedy the Owner may have, may correct such default and deduct the cost thereof, as certified by the Contract Administrator, from any payment then or thereafter due to the Contractor.

GC 4.08 Termination of Contractor's Right to Continue the Work

.01 Where the Contractor fails to correct a default within the time specified in subsection GC 4.06, Contractor's Right to Correct a Default, or subsequently agreed upon, the Owner, without prejudice to any other right or remedy the Owner may have, may terminate the Contractor's right to continue the Work in whole or in part by giving written notice to the Contractor.

.02 If the Owner terminates the Contractor's right to continue with the Work in whole or in part, the Owner shall be entitled to,

a) take possession of the Working Area or that portion of the Working Area devoted to that part of the Work terminated;

b) use the Equipment of the Contractor and any Material within the Working Area that is intended to be incorporated into the Work, the whole subject to the right of third parties;

c) withhold further payments to the Contractor with respect to the Work or the portion of the Work withdrawn from the Contractor until the Work or portion thereof withdrawn is completed;

d) charge the Contractor the additional cost over the Contract price of completing the Work or portion thereof withdrawn from the Contractor, as certified by the Contract Administrator and any additional compensation paid to the Contract administrator for such additional service arising from the correction of the default;

e) charge the Contractor a reasonable allowance, as determined by the Contract Administrator, to cover correction to the Work performed by the Contractor that may be required under subsection GC 7.16, Warranty;

f) charge the Contractor for any damages the Owner sustained as a result of the default; and

g) charge the Contractor the amount by which the cost of corrections to the Work under subsection GC 7.16, Warranty, exceeds the allowance provided for such corrections.

GC 4.09 Final Payment to Contractor

.01 If the Owner's cost to correct and complete the Work in whole or in part is less than the amount withheld from the Contractor under subsection GC 4.08, Termination of Contractor's Right to Continue the Work, the Owner shall pay the balance to the Contractor as soon as the final accounting for the Contract is complete.

GC 4.10 Termination of the Contract

.01 Where the Contractor is in default of the Contract the Owner may, without prejudice to any other right or remedy the Owner may have, terminate the Contract by giving written notice of termination to the Contractor, the Surety, and any trustee or receiver acting on behalf of the Contractor's estate or creditors.

.02 If the Owner elects to terminate the Contract, the Owner may provide the Contractor and the trustee or receiver with a complete accounting to the date of termination.

GC 4.11 Continuation of Contractor's Obligations

.01 The Contractor's obligation under the Contract as to quality, correction, and warranty of the Work performed prior to the time of termination of the Contract or termination of the Contractor's right to continue with the Work in whole or in part shall continue to be in force after such termination.

GC 4.12 Use of Performance Bond

.01 If the Contractor is in default of the Contract and the Contractor has provided a Performance Bond, the provisions of Section GC 4.0, Owner's Responsibilities and Rights, shall be exercised in accordance with the conditions of the Performance Bond.

GC 4.13 Payment Adjustment

.01 If any situation should occur in the performance of the Work that would result in a Change in the Work, the Owner shall be entitled to an adjustment and those adjustments shall be managed in accordance with subsection GC 3.10.01, Changes in the Work.

SECTION GC 5.0 - MATERIAL

GC 5.01 Supply of Material

.01 All Material necessary for the proper completion of the Work, except that listed as being supplied by the Owner, shall be supplied by the Contractor. The Contract price for the appropriate tender items shall be deemed to include full compensation for the supply of such Material.

GC 5.02 Quality of Material

.01 All Material supplied by the Contractor shall be new, unless otherwise specified in the Contract Documents.

.02 Material supplied by the Contractor shall conform to the requirements of the Contract.

.03 As specified in the Contract Documents or as requested by the Contract Administrator, the Contractor shall make available, for inspection or testing, a sample of any Material to be supplied by the Contractor.

.04 The Contractor shall obtain for the Contract Administrator the right to enter onto the premises of the Material manufacturer or supplier to carry out such inspection, sampling, and testing as specified in the Contract Documents or as requested by the Contract Administrator.

.05 The Contractor shall notify the Contract Administrator of the sources of supply sufficiently in advance of the Material shipping dates to enable the Contract Administrator to perform the required inspection, sampling, and testing.

.06 The Owner shall not be responsible for any delays to the Contractor's operations where the Contractor fails to give sufficient advance notice to the Contract Administrator to enable the Contract Administrator to carry out the required inspection, sampling, and testing before the scheduled shipping date.

.07 The Contractor shall not change the source of supply of any Material without the written authorization of the Contract Administrator.

.08 Material that is not specified shall be of a quality best suited to the purpose required, and the use of such Material shall be subject to the approval of the Contract Administrator.

.09 All Material inspection, sampling, and testing shall be carried out on random basis in accordance with the standard inspection or testing methods required for the Material. Any approval given by the Contract Administrator for the Materials to be used in the Work based upon the random method shall not relieve the Contractor from the responsibility of incorporating Material that conforms to the Contract Documents into the Work or properly performing the Contract and of any liability arising from the failure to properly perform as specified in the Contract Documents.

GC 5.03 Rejected Material

.01 Rejected Material shall be removed from the Working Area expeditiously after the notification to that effect from the Contract Administrator. Where the Contractor fails to comply with such notice, the Contract Administrator may cause the rejected Material to be removed from the Working Area and disposed of, in what the Contract Administrator considers to be the most appropriate manner, and the Contractor shall pay the costs of disposal and the appropriate overhead charges.

GC 5.04 Substitutions

.01 Where the Contract Documents require the Contractor to supply a Material designated by a trade or other name, the Tender shall be based only upon supply of the Material so designated, that shall be regarded as the standard of quality required by the Contract Documents. After the acceptance of the Tender, the Contractor may apply to the Contract Administrator to substitute another Material identified by a different trade or other name for the Material designated as aforesaid. The application shall be in writing and shall state the price for the proposed substitute Material designated as aforesaid, and such other information as the Contract Administrator may require.

.02 Rulings on a proposed substitution shall not be made prior to the acceptance of the Tender. Substitutions shall not be made without the prior approval of the Contract Administrator. The approval or rejection of a proposed substitution shall be at the discretion of the Contract Administrator.

.03 If the proposed substitution is approved by the Contract Administrator, the Contractor shall be entitled to the first $1,000 of the aggregate saving in cost by reason of such substitution and to 50% of any additional saving in cost in excess of such $1,000. Each such approval shall be conveyed to the Contractor in writing or by issuance of a Certificate of Equality on the Owner's standard form of "Certification of Equality" and, if any adjustment to the Contract price is made by reason of such substitution, a Change Order shall be issued as well.

GC 5.05 Owner Supplied Material

GC 5.05.01 Ordering of Excess Material

.01 Where Material is supplied by the Owner and where this Material is ordered by the Contractor in excess of the amount specified to complete the Work, such excess Material shall become the property of the Contractor on completion of the Work and shall be charged to the Contractor at cost plus applicable overheads.

GC 5.05.02 Care of Material

.01 The Contractor shall, in advance of receipt of shipments of Material supplied by the Owner, provide adequate and proper storage facilities acceptable to the Contract Administrator, and on the receipt of such Material shall promptly place it in storage, except where it is to be incorporated forthwith into the Work.

.02 The Contractor shall be responsible for acceptance of Material supplied by the Owner, at the specified delivery point and for its safe handling and storage. If such Material is damaged while under the control of the Contractor, it shall be replaced or repaired by the Contractor at no expense to the Owner, and to the satisfaction of the Contract Administrator. If such Material is rejected by the Contract Administrator for reasons that are not the fault of the Contractor, it shall remain in the care and at the risk of the Contractor until its disposition has been determined by the Contract Administrator.

.03 Where Material supplied by the Owner arrives at the delivery point in a damaged condition or where there are discrepancies between the quantities received and the quantities shown on the bills of lading, the Contractor shall immediately report such damage or discrepancies to the Contract Administrator who shall arrange for an immediate inspection of the shipment and provide the Contractor with a written release from responsibility for such damage or deficiencies. Where damage or deficiencies are not so reported, it shall be assumed that the shipment arrived in good condition and order, and any damage or deficiencies reported thereafter shall be made good by the Contractor at no extra cost to the Owner.

.04 The full amount of Material supplied by the Owner in each shipment shall be accounted for by the Contractor and such Material shall be at the risk of the Contractor after taking delivery. Such Material shall not, except with the written permission of the Contract Administrator, be used by the Contractor for purposes other than the performance of the Work under the Contract.

.05 Empty reels, crates, containers, and other type of packaging from Material supplied by the Owner shall become the property of the Contractor when they are no longer required for their original purpose and shall be disposed of by the Contractor, unless otherwise specified in the Contract Documents.

.06 Immediately upon receipt of each shipment, the Contractor shall provide the Contract Administrator copies of bills of lading, or such other documentation the Contract Administrator may require to substantiate and reconcile the quantities of Material received.

.07 Where Material supplied by the Owner is ordered and stockpiled prior to the award of the Contract, the Contractor shall, at no extra cost to the Owner, immediately upon commencement of operations, check the Material, report any damage or deficiencies to the Contract Administrator and take charge of the Material at the stockpile site. Where damage or deficiencies are not so recorded by the Contractor, it shall be assumed that the stockpile was in good condition and order when the Contractor took charge of it, and any damage or deficiencies reported thereafter shall be made good by the Contractor at no extra cost to the Owner.

SECTION GC 6.0 - INSURANCE, PROTECTION AND DAMAGE

GC 6.01 Protection of Work, Persons and Property

.01 The Contractor, the Contractor's agents, and all workers employed by or under the control of the Contractor, including Subcontractors, shall protect the Work, persons, and property from damage or injury. The Contractor shall be responsible for all losses and damage that may arise as the result of the Contractor's operations under the Contract, unless indicated to the contrary below.

.02 The Contractor is responsible for the full cost of any necessary temporary protective work or works and the restoration of all damage where the Contractor damages the Work or property in the performance of the Contract. If the Contractor is not responsible for the damage that occurs to the Work or property, the Contractor shall restore such damage, and such work and payment shall be administered according to these General Conditions.

.03 The Contractor shall immediately inform the Contract Administrator of all damage and injuries that occur during the term of the Contract. The Contractor shall then investigate and report back to the Contract Administrator within 15 Days of occurrence of incident, or as soon as possible.

.04 The Contractor shall not be responsible for loss and damage that occurs as a result of,

a) war;

b) blockades and civil commotions;

c) errors in the Contract Documents; or

d) acts or omissions of the Owner, the Contract Administrator, their agents and employees, or others not under the control of the Contractor, but within the Working Area with the Owner's permission.

.05 The Contractor and the Contractor’s Surety shall not be released from any term or provision of any responsibility, obligation, or liability under the Contract or waive or impair any of the rights of the Owner, except by a release duly executed by the Owner.

GC 6.02 Indemnification

.01 The Contractor shall indemnify and hold harmless the Owner and the Contract Administrator, their elected officials, agents, officers, and employees from and against all claims, demands, losses, expenses, costs, damages, actions, suits, or proceedings by third parties, hereinafter called "claims", directly or indirectly arising or alleged to arise out of the performance of or the failure to perform the Work, provided such claims are,

a) attributable to bodily injury, sickness, disease, or death or to damage to or destruction of tangible property;

b) caused by negligent acts or omissions of the Contractor or anyone for whose acts the Contractor may be liable; and

c) made in writing within a period of 6 years from the date of Substantial Performance of the Work as set out in the Certificate of Substantial Performance of the Work or, where so specified in the Contract Documents, from the date of certification of Final Acceptance.

.02 The Contractor shall indemnify and hold harmless the Owner from all and every claim for damages, royalties or fees for the infringement of any patented invention or copyright occasioned by the Contractor in connection with the Work performed or Material furnished by the Contractor under the Contract.

.03 The Owner expressly waives the right to indemnity for claims other than those stated in paragraphs GC 6.02.01 and GC 6.02.02.

.04 The Owner shall indemnify and hold harmless the Contractor, their elected officials, agents, officers, and employees from and against all claims, demands, losses, expenses, costs, damages, actions, suits, or proceedings arising out of the Contractor's performance of the Contract that are attributable to a lack of or defect in title or an alleged lack of or defect in title to the Working Area.

.05 The Contractor expressly waives the right to indemnity for claims other than those stated in paragraph GC 6.02.04.

GC 6.03 Contractor's Insurance

GC 6.03.01 General

.01 Without restricting the generality of subsection GC 6.02, Indemnification, the Contractor shall provide, maintain, and pay for the insurance coverages listed under clauses GC 6.03.02 and GC 6.03.03. Insurance coverage in clauses GC 6.03.04, GC 6.03.05, and GC 6.03.06 shall only apply when so specified in the Contract Documents.

.02 The Contractor shall provide the Contract Administrator with an original Certificate of Insurance for each type of insurance coverage that is required by the Contract Documents. The Contractor shall ensure that the Contract Administrator is, at all times in receipt of a valid Certificate of Insurance for each type of insurance coverage, in such amounts as specified in the Contract Documents. The Contractor will not be permitted to commence work until the Contract Administrator is in receipt of such proof of insurance. The Contract Administrator may withhold payments of monies due to the Contractor until the Contractor has provided the Contract Administrator with original valid Certificates of Insurance as required by the provisions of the Contract Documents.

GC 6.03.02 General Liability Insurance

.01 General liability insurance shall be in the name of the Contractor, with the Owner and the Contract Administrator named as additional insureds, with limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof, with a property damage deductible of not more than $5,000. The form of this insurance shall be the Insurance Bureau of Canada Form IBC 2100.

.02 Another form of insurance equal to or better than that required in IBC Form 2100 may be used, provided all the requirements listed in the Contract are included. Approval of this insurance shall be conditional upon the Contractor obtaining the services of an insurer licensed to underwrite insurance in the Province of Ontario and obtaining the insurer's certificate of equivalency to the required insurance.

.03 The Contractor shall maintain in force such policies of insurance specified by the Contract Documents at all times from the commencement of the Work until the end of any Warranty Period or as otherwise required by the Contract Documents.

.04 The Contractor shall submit annually to the Owner, proof of continuation of the completed operations coverage and, if the Contractor fails to do so, the limitation period for claiming indemnity described in paragraph GC 6.02.01 c), shall not be binding on the Owner.

.05 Should the Contractor decide not to employ Subcontractors for operations requiring the use of explosives for blasting, pile driving or caisson work, removal or weakening of support of property building or land, IBC Form 2100 as required shall include the appropriate endorsements.

.06 The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change or amendment restricting coverage.

.07 "Claims Made" insurance policies shall not be permitted.

GC 6.03.03 Automobile Liability Insurance

.01 Automobile liability insurance in respect of licensed vehicles shall have limits of not less than five million dollars inclusive per occurrence for bodily injury, death and damage to property, in the following forms endorsed to provide the Owner with not less than 30 Days written notice in advance of any cancellation, change, or amendment restricting coverage:

a) standard non-owned automobile policy including standard contractual liability endorsement, and

b) standard owner's form automobile policy providing third party liability and accident benefits insurance and covering licensed vehicles owned or operated by the Contractor.

GC 6.03.04 Aircraft and Watercraft Liability Insurance

GC 6.03.04.01 Aircraft Liability Insurance

.01 Aircraft liability insurance with respect to owned or non-owned aircraft used directly or indirectly in the performance of the Work, including use of additional premises, shall be subject to limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof, and limits of not less than five million dollars for aircraft passenger hazard. Such insurance shall be in a form acceptable to the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage.

6.03.04.02 Watercraft Liability Insurance

.01 Watercraft liability insurance with respect to owned or non-owned watercraft used directly or indirectly in the performance of the Work, including use of additional premises, shall be subject to limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof. Such insurance shall be in a form acceptable to the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage.

GC 6.03.05 Property and Boiler Insurance

GC 6.03.05.01 Property Insurance

.01 All risks property insurance shall be in the name of the Contractor, with the Owner and the Contract Administrator named as additional insureds, insuring not less than the sum of the amount of the Contract price and the full value, as may be stated in the Contract Documents, of Material that is specified to be provided by the Owner for incorporation into the Work, with a deductible not exceeding 1% of the amount insured at the site of the Work. This insurance shall be in a form acceptable to the Owner and shall be maintained continuously until 10 Days after the date of Final Acceptance of the Work, as set out in the Final Acceptance Certificate.

GC 6.03.05.02 Boiler Insurance

.01 Boiler insurance insuring the interests of the Contractor, the Owner and the Contract Administrator for not less than the replacement value of boilers and pressure vessels forming part of the Work, shall be in a form acceptable to the Owner. This insurance shall be maintained continuously from commencement of use or operation of the property insured until 10 Days after the date of Final Acceptance of the Work, as set out in the Final Acceptance Certificate.

GC 6.03.05.03 Use and Occupancy of the Work Prior to Completion

.01 Should the Owner wish to use or occupy part or all of the Work prior to Substantial Performance, the Owner shall give 30 Days written notice to the Contractor of the intended purpose and extent of such use or occupancy. Prior to such use or occupancy, the Contractor shall notify the Owner in writing of the additional premium cost, if any, to maintain property and boiler insurance, which shall be at the Owner's expense. If because of such use or occupancy the Contractor is unable to provide coverage, the Owner upon written notice from the Contractor and prior to such use or occupancy shall provide, maintain, and pay for property and boiler insurance insuring the full value of the Work, including coverage for such use or occupancy, and shall provide the Contractor with proof of such insurance. The Contractor shall refund to the Owner the unearned premiums applicable to the Contractor's policies upon termination of coverage.

.02 The policies shall provide that, in the event of a loss or damage, payment shall be made to the Owner and the Contractor as their respective interests may appear. The Contractor shall act on behalf of both the Owner and the Contractor for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the Work. Loss or damage shall not affect the rights and obligations of either party under the Contract, except that the Contractor shall be entitled to such reasonable extension of Contract Time relative to the extent of the loss or damage as the Contract Administrator may decide in consultation with the Contractor.

GC 6.03.05.04 Payment for Loss or Damage

.01 The Contractor shall be entitled to receive from the Owner, in addition to the amount due under the Contract, the amount at which the Owner's interest in restoration of the Work has been appraised, such amount to be paid as the restoration of the Work proceeds, and in accordance with the requirements of Section GC 8.0, Measurement and Payment. In addition, the Contractor shall be entitled to receive from the payments made by the insurers the amount of the Contractor's interest in the restoration of the Work.

.02 The Contractor shall be responsible for deductible amounts under the policies, except where such amounts may be excluded from the Contractor's responsibility by the terms of this Contract.

.03 In the event of a loss or damage to the Work arising from the action or omission of the Owner or others, the Owner shall pay the Contractor the cost of restoring the Work as the restoration of the Work proceeds and in accordance with the requirements of Section GC 8.0, Measurement and Payment.

GC 6.03.06 Contractor's Equipment Insurance

.01 All risks Contractor's equipment insurance covering construction machinery and equipment used by the Contractor for the performance of the Work, including boiler insurance on temporary boilers and pressure vessels, shall be in a form acceptable to the Owner and shall not allow subrogation claims by the insurer against the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage. Subject to satisfactory proof of financial capability by the Contractor for self-insurance of the Contractor's Equipment, the Owner agrees to waive the equipment insurance requirement, and for the purpose of this Contract, the Contractor shall be deemed to be insured. This policy shall be amended to provide permission for the Contractor to grant prior releases with respect to damage to the Contractor's Equipment.

GC 6.03.07 Insurance Requirements and Duration

.01 Unless specified otherwise, the duration of each insurance policy shall be from the date of commencement of the Work until 10 Days after the date of Final Acceptance of the Work, as set out in the Final Acceptance Certificate.

.02 The Contractor shall provide the Owner, on a form acceptable to the Owner, proof of insurance prior to commencement of the Work and signed by an officer of the Contractor and either the underwriter or the broker.

.03 The Contractor shall, on request, promptly provide the Owner with a certified true copy of each insurance policy exclusive of information pertaining to premium or premium bases used by the insurer to determine the cost of the insurance. The certified true copy shall include a signature by an officer of the Contractor and, in addition, a signature by an officer of the insurer or the underwriter or the broker.

.04 Where a policy is renewed, the Contractor shall provide the Owner, on a form acceptable to the Owner, renewed proof of insurance immediately following completion of renewal.

.05 Unless specified otherwise, the Contractor shall be responsible for the payment of deductible amounts under the policies.

.06 If the Contractor fails to provide or maintain insurance as required in subsection GC 6.03, Contractor's Insurance, or elsewhere in the Contract Documents, then the Owner shall have the right to provide and maintain such insurance and give evidence thereof to the Contractor. The Owner's cost thereof shall be payable by the Contractor to the Owner on demand.

.07 If the Contractor fails to pay the cost of the insurance placed by the Owner within 30 Days of the date on which the Owner made a formal demand for reimbursement of such costs, the Owner may deduct the costs thereof from monies which are due or may become due to the Contractor.

GC 6.04 Bonding

.01 The Contractor shall provide the Owner with the surety bonds in the amount required by the tender documents.

.02 Such bonds shall be issued by a duly licensed surety company authorized to transact a business of suretyship in the Province of Ontario and shall be to the satisfaction of the Owner. The bonds shall be maintained in good standing until the fulfilment of the Contract.

GC 6.05 Workplace Safety and Insurance Board

.01 The Contractor shall provide the Contract Administrator with a copy of a Certificate of Clearance indicating the Contractor's good standing with the Workplace Safety and Insurance Board, as follows:

a) Immediately prior to the Contract Administrator authorizing the Contractor to commence Work.

b) Prior to issue of the Certificate of Substantial Performance.

c) Prior to expiration of the Warranty Period.

d) At any other time when requested by the Contract Administrator.

SECTION GC 7.0 - CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF THE WORK

GC 7.01 General

.01 The Contractor warrants that the site of the Work has been visited during the preparation of the Tender and the character of the Work and all local conditions that may affect the performance of the Work are known.

.02 The Contractor shall not commence the Work nor deliver anything to the Working Area until the Contractor has received a written order to commence the Work, signed by the Contract Administrator.

.03 The Contractor shall have complete control of the Work and shall effectively direct and supervise the Work so as to ensure conformity with the Contract Documents. The Contractor shall be responsible for construction means, methods, techniques, sequences, and procedures and for coordinating the various parts of the Work.

.04 The Contractor shall provide adequate labour, Equipment, and Material to ensure the completion of the Contract in accordance with the Contract Documents. The Work shall be performed as vigorously and as continuously as weather conditions or other interferences may permit.

.05 The Contractor shall have the sole responsibility for the design, erection, operation, maintenance, and removal of temporary structures and other temporary facilities and the design and execution of construction methods required in their use.

.06 Notwithstanding paragraph GC 7.01.05, where the Contract Documents include designs for temporary structures and other temporary facilities or specify a method of construction in whole or part, such facilities and methods shall be considered to be part of the design of the Work, and the Contractor shall not be held responsible for that part of the design or the specified method of construction. The Contractor shall, however, be responsible for the execution of such design or specified method of construction in the same manner that the Contractor is responsible for the execution of the Work.

.07 The Contractor shall execute the terms of the Contract in strict compliance with the requirements of the Occupational Health and Safety Act, R.S.O. 1990, c.O.1, as amended, (the "Act") and Ontario Regulation 213/91, as amended, (that regulates Construction Projects) and any other regulations as amended under the Act (the "Regulations") that may affect the performance of the Work, as the "Constructor" or "employer," as defined by the Act, as the case may be. The Contractor shall ensure that:

a) worker safety is given first priority in planning, pricing, and performing the Work;

b) its officers and supervisory employees have a working knowledge of the duties of a "Constructor" and "employer" as defined by the Act and the provisions of the Regulations applicable to the Work, and a personal commitment to comply with them;

c) a copy of the most current version of the Act and the Regulations are available at the Contractor's office within the Working Area, or, in the absence of an office, in the possession of the supervisor responsible for the performance of the Work;

d) workers employed to carry out the Work possess the knowledge, skills, and protective devices required by law or recommended for use by a recognized industry association to allow them to work in safety;

e) its supervisory employees carry out their duties in a diligent and responsible manner with due consideration for the health and safety of the workers; and

f) all Subcontractors and their workers are properly protected from injury while they are at the Work Area.

.08 The Contractor, when requested, shall provide the Owner with a copy of its health and safety policy and program at the pre-start meeting and shall respond promptly to requests from the Owner for confirmation that its methods and procedures for carrying out the Work comply with the Act and Regulations. The Contractor shall cooperate with representatives of the Owner and the inspectors appointed to enforce the Act and the Regulations in any investigations of worker health and safety in the performance of the Work. The Contractor shall indemnify and save the Owner harmless from any additional expense that the Owner may incur to have the Work performed as a result of the Contractor's failure to comply with the requirements of the Act and the Regulations.

.09 Prior to commencement of the Work, the Contractor shall provide to the Contract Administrator a list of those products controlled under the Workplace Hazardous Materials Information System or WHMIS, which the Contractor expects to use on the Contract. Related Materials Safety Data Sheets shall accompany the submission. All containers used in the application of products controlled under WHMIS shall be labelled. The Contractor shall notify the Contractor Administrator in writing of changes in the products to be used and provide relevant Material Safety Data Sheets.

.10 The Contractor shall have an authorized representative on the site while any Work is being performed, to supervise the Work and act for or on the Contractor's behalf. Prior to commencement of construction, the Contractor shall notify the Contract Administrator of the names; addresses; positions; and cell phone, pager, and telephone numbers of the Contractor's representatives who can be contacted at any time to deal with matters relating to the Contract, and update as necessary.

.11 The Contractor shall designate a person to be responsible for traffic control and work zone safety. The designated person shall be a competent worker who is qualified because of knowledge, training, and experience to perform the duties; is familiar with Book 7 of the Ontario Traffic Manual; and has knowledge of all potential or actual danger to workers and motorists. Prior to the commencement of construction, the Contractor shall notify the Contract Administrator of the name; address; position; cell phone, pager, and telephone numbers of the designated person, and update as necessary. The designated person may have other responsibilities, including other construction sites, and need not be present in the Working Area at all times.

.12 The Contractor shall, at no additional cost to the Owner, furnish all reasonable aid, facilities, and assistance required by the Contract Administrator for the proper inspection and examination of the Work or the taking of measurements for the purpose of payment.

.13 The Contractor shall prepare and update, as required, a construction schedule of operations, indicating the proposed methods of construction and sequence of work and the time the Contractor proposes to complete the various items of work within the time specified in the Contract Documents. The schedule shall be submitted to the Contract Administrator within 14 Days from the Contract award. If the Contractor’s schedule is materially affected by changes, the Contractor shall submit an updated construction schedule, if requested by the Contract Administrator, within 7 Days of the request. This updated schedule shall show how the Contractor proposes to perform the balance of the Work, so as to complete the Work within the time specified in the Contract Documents.

.14 Where the Contractor finds any error, inconsistency, or omission relating to the Contract, the Contractor shall promptly report it to the Contract Administrator and shall not proceed with the activity affected until receiving direction from the Contract Administrator.

.15 The Contractor shall promptly notify the Contract Administrator in writing if the subsurface conditions observed in the Working Area differ materially from those indicated in the Contract Documents.

.16 The Contractor shall arrange with the appropriate Utility authorities for the stake out of all underground Utilities and service connections that may be affected by the Work. The Contractor shall observe the location of the stake outs prior to commencing the Work and in the event that there is a discrepancy between the location of the stake outs and the locations shown on the Contract Documents, that may affect the Work, the Contractor shall immediately notify the Contract Administrator and the affected Utility companies, in order to resolve the discrepancy. The Contractor shall be responsible for any damage done to the underground Utilities and service connections by the Contractor's forces during construction if the stake out locations are within the tolerances given in paragraph GC 2.01.01 a).

GC 7.02 Layout

.01 Prior to commencement of construction, the Contract Administrator and the Contractor shall locate on site those property bars, baselines, and benchmarks that are necessary to delineate the Working Area and to lay out the Work, all as shown on the Contract Drawings.

.02 The Contractor shall be responsible for the preservation of all property bars while the Work is in progress, except those property bars that must be removed to facilitate the Work. Any other property bars disturbed, damaged, or removed by the Contractor's operations shall be replaced under the supervision of an Ontario Land Surveyor, at the Contractor's expense.

.03 At no extra cost to the Owner, the Contractor shall provide the Contract Administrator with such materials and devices as may be necessary to lay out the baseline and benchmarks, and as may be necessary for the inspection of the Work.

.04 The Contractor shall provide qualified personnel to lay out and establish all lines and grades necessary for construction. The Contractor shall notify the Contract Administrator of any layout work carried out, so that the same may be checked by the Contract Administrator.

.05 The Contractor shall install and maintain substantial alignment markers and secondary benchmarks as may be required for the proper execution of the Work. The Contractor shall supply one copy of all alignment and grade sheets to the Contract Administrator.

.06 The Contractor shall assume full responsibility for alignment, elevations, and dimensions of each and all parts of the Work, regardless of whether the Contractor's layout work has been checked by the Contract Administrator.

.07 All stakes, marks, and reference points shall be carefully preserved by the Contractor. In the case of their destruction or removal, such stakes, marks, and reference points shall be replaced at the Contractor’s expense.

.08 Benchmarks and survey monuments identified in the Contract Documents shall be protected by the Contractor. In the case of their destruction or removal, such benchmarks and survey monuments shall be replaced by the Owner at the Contractor’s expense.

GC 7.03 Working Area

.01 The Contractor's sheds, site offices, toilets, other temporary structures, and storage areas for Material and Equipment shall be grouped in a compact manner and maintained in a neat and orderly condition at all times.

.02 The Contractor shall confine the construction operations to the Working Area. Should the Contractor require more space than that shown on the Contract Drawings, the Contractor shall obtain such space at no additional cost to the Owner.

.03 The Contractor shall not enter upon or occupy any private property for any purpose, unless the Contractor has received prior written permission from the property owner.

GC 7.04 Damage by Vehicles or Other Equipment

.01 If at any time, in the opinion of the Contract Administrator, damage is being done or is likely to be done to any Roadway or any improvement thereon, outside the Working Area, by the Contractor's vehicles or other Equipment, whether licensed or unlicensed Equipment, the Contractor shall, on the direction of the Contract Administrator, and at no extra cost to the Owner, make changes or substitutions for such vehicles or Equipment, and shall alter loadings, or in some other manner, remove the cause of such damage to the satisfaction of the Contract Administrator.

GC 7.05 Excess Loading of Motor Vehicles

.01 Where a vehicle is hauling Material for use on the Work, in whole or in part; upon a Highway; and where motor vehicle registration is required for such vehicle, the Contractor shall not cause or permit such vehicle to be loaded beyond the legal limit specified in the Highway Traffic Act, R.S.O. 1990, c.H.8, as amended, whether such vehicle is registered in the name of the Contractor or otherwise, except where there are designated areas within the Working Area where overloading is permitted. The Contractor shall bear the onus of weighing disputed loads.

GC 7.06 Condition of the Working Area

.01 The Contractor shall maintain the Working Area in a tidy condition and free from the accumulation of debris and prevent dust nuisance, mud, and ponding water, other than that caused by the Owner or others.

GC 7.07 Maintaining Roads and Detours

.01 Unless otherwise specified in the Contract Documents, if an existing Roadway is affected by construction, it shall be kept open to both vehicular and pedestrian traffic.

.02 Subject to the approval of the Contract Administrator, the Contractor shall, at no additional cost to the Owner, be responsible for providing and maintaining for the duration of the Work an alternative route for both pedestrian and vehicular traffic through the Working Area in accordance with the OTM, whether along the existing Highway under construction or on a detour road beside or adjacent to the Highway under construction.

.03 Subject to the approval of the Contract Administrator, the Contractor may block traffic for short periods of time to facilitate construction of the Work in accordance with the OTM. Any temporary lane closures shall be kept to a minimum.

.04 The Contractor shall not be required to maintain a road through the Working Area until such time as the Contractor has commenced operations or during seasonal shut down or on any part of the Contract that has been accepted in accordance with these General Conditions. The Contractor shall not be required to apply de-icing chemicals or abrasives or carry out snowplowing.

.05 Where localized and separated sections of the Highway are affected by the Contractor's operations, the Contractor shall not be required to maintain intervening sections of the Highway until such times as these sections are located within the limits of the Highway affected by the Contractor's general operations under the Contract.

.06 Where the Contract Documents provide for or the Contract Administrator requires detours at specific locations, payment for the construction of the detours and, if required, for the subsequent removal of the detours, shall be made at the Contract prices appropriate to such work.

.07 Compensation for all labour, Equipment, and Materials to do this Work shall be at the Contract prices appropriate to the Work and, where there are no such prices, at negotiated prices. Notwithstanding the foregoing, the cost of blading required to maintain the surface of such roads and detours shall be deemed to be included in the prices bid for the various tender items and no additional payment shall be made.

.08 Where work under the Contract is discontinued for any extended period, including seasonal shutdown, the Contractor shall, when directed by the Contract Administrator, open and place the Roadway and detours in a passable, safe, and satisfactory condition for public travel.

.09 Where the Contractor constructs a detour that is not specifically provided for in the Contract Documents or required by the Contract Administrator, the construction of the detour and, if required, the subsequent removal shall be performed at the Contractor's expense. The detour shall be constructed and maintained to structural and geometric standards approved by the Contract Administrator. Removal and site restoration shall be performed as directed by the Contract Administrator.

.10 Where, with the prior written approval of the Contract Administrator, the Highway is closed and the traffic diverted entirely off the Highway to any other Highway, the Contractor shall, at no extra cost to the Owner, supply, erect, and maintain traffic control devices in accordance with the OTM.

.11 Compliance with the foregoing provisions shall in no way relieve the Contractor of obligations under subsection GC 6.01, Protection of Work, Persons, and Property, dealing with the Contractor's responsibility for damage claims, except for claims arising on sections of Highway within the Working Area that are being maintained by others.

GC 7.08 Access to Properties Adjoining the Work and Interruption of Utility Services

.01 The Contractor shall provide at all times and at no extra cost to the Owner,

a) adequate pedestrian and vehicular access; and

b) continuity of Utility services

to properties adjoining the Working Area.

.02 The Contractor shall provide at all times and at no extra cost to the Owner access to fire hydrants, water and gas valves, and all other Utilities located in the Working Area.

.03 Where any interruptions in the supply of Utility services are required and are authorized by the Contract Administrator, the Contractor shall give the affected property owners notice in accordance with subsection GC 7.12, Notices by the Contractor, and shall arrange such interruptions so as to create a minimum of interference to those affected.

GC 7.09 Approvals and Permits

.01 Except as specified in subsection GC 4.02, Approval and Permits, the Contractor shall obtain and pay for any permits, licences, and certificates, which at the date of tender closing, are required for the performance of the Work.

.02 The Contractor shall arrange for all necessary inspections required by the approvals and permits specified in paragraph GC 7.09.01.

GC 7.10 Suspension of Work

.01 The Contractor shall, upon written notice from the Contract Administrator, discontinue or delay any or all of the Work and work shall not be resumed until the Contract Administrator so directs in writing. Delays, in these circumstances, shall be administered according to subsection GC 3.07, Delays.

GC 7.11 Contractor's Right to Stop the Work or Terminate the Contract

.01 If the Owner is adjudged bankrupt or makes a general assignment for the benefit of creditors because of insolvency or if a receiver is appointed because of insolvency, the Contractor may, without prejudice to any other right or remedy the Contractor may have, by giving the Owner or receiver or trustee in bankruptcy written notice, terminate the Contract.

.02 If the Work is stopped or otherwise delayed for a period of 30 Days or more under an order of a court or other public authority and provided that such order was not issued as the result of an act or fault of the Contractor or of anyone directly employed or engaged by the Contractor, the Contractor may, without prejudice to any other right or remedy the Contractor may have, by giving the Owner written notice, terminate the Contract.

.03 The Contractor may notify the Owner in writing, with a copy to the Contract Administrator, that the Owner is in default of contractual obligations if,

a) the Contract Administrator fails to issue certificates in accordance with the provisions of Section GC 8.0, Measurement and Payment;

b) the Owner fails to pay the Contractor, within 30 Days of the due dates identified in clause GC 8.02.03, Certification and Payment, the amounts certified by the Contract Administrator or within 30 Days of an award by an arbitrator or court; or

c) the Owner violates the requirements of the Contract.

.04 The Contractor's written notice to the Owner shall advise that if the default is not corrected in the 7 Days immediately following receipt of the written notice, the Contractor may, without prejudice to any other right or remedy the Contractor may have, stop the Work or terminate the Contract.

.05 If the Contractor terminates the Contract under the conditions set out in subsection GC 7.11, the Contractor shall be entitled to be paid for all work performed according to the Contract Documents and for any losses or damage as the Contractor may sustain as a result of the termination of the Contract.

GC 7.12 Notices by the Contractor

.01 Before work is carried out that may affect the property or operations of any Ministry or agency of government or any person; company; partnership; or corporation, including a municipal corporation or any board or commission thereof, and in addition to such notices of the commencement of specified operations as are prescribed elsewhere in the Contract Documents, the Contractor shall give at least 48 hours advance written notice of the date of commencement of such work to the person, company, partnership, corporation, board, or commission so affected.

.02 In the case of damage to or interference with any Utilities, pole lines, pipe lines, conduits, farm tiles, or other public or privately owned works or property, the Contractor shall immediately notify the Owner, Contract Administrator, and the owner of the works of the location and details of such damage or interference.

GC 7.13 Obstructions

.01 Except as otherwise noted in these General Conditions, the Contractor assumes all the risks and responsibilities arising out of any obstruction encountered in the performance of the Work and any traffic conditions, including traffic conditions on any Highway or road giving access to the Working Area caused by such obstructions, and the Contractor shall not make any claim against the Owner for any loss, damage, or expense occasioned thereby.

.02 Where the obstruction is an underground Utility or other man-made object, the Contractor shall not be required to assume the risks and responsibilities arising out of such obstruction, unless the location of the obstruction is shown on the Plans or described in the Contract Documents and the location so shown is within the tolerance specified in paragraph GC 2.01.01 a), or unless the presence and location of the obstruction has otherwise been made known to the Contractor or could have been determined by the visual site investigation made by the Contractor in accordance with these General Conditions.

.03 During the course of the Contract, it is the Contractor's responsibility to consult with Utility companies or other appropriate authorities for further information in regard to the exact location of these Utilities, to exercise the necessary care in construction operations, and to take such other precautions as are necessary to safeguard the Utilities from damage.

GC 7.14 Limitations of Operations

.01 Except for such work as may be required by the Contract Administrator to maintain the Work in a safe and satisfactory condition, the Contractor shall not carry out operations under the Contract on Saturdays, Sundays, and Statutory Holidays without permission in writing from the Contract Administrator.

.02 The Contractor shall cooperate and coordinate the Work with other Contractors, Utility companies, and the Owner and they shall be allowed access to their work or plant at all reasonable times.

GC 7.15 Cleaning Up Before Acceptance

.01 Upon attaining Substantial Performance of the Work, the Contractor shall remove surplus materials, tools, construction machinery and equipment not required for the performance of the remaining Work. The Contractor shall also remove all temporary works and debris other than that caused by the Owner or others and leave the Work and Working Area clean and suitable for occupancy by the Owner, unless otherwise specified.

.02 The Work shall not be deemed to have reached Completion until the Contractor has removed surplus materials, tools, construction machinery, and equipment. The Contractor shall also have removed debris, other than that caused by the Owner, or others.

GC 7.16 Warranty

.01 Unless otherwise specified in the Contract Documents for certain Materials or components of the Work, the Contractor shall be responsible for the proper performance of the Work only to the extent that the design and standards permit such performance.

.02 Subject to the previous paragraph the Contractor shall correct promptly, at no additional cost to the Owner, defects or deficiencies in the Work that appear,

a) prior to and during the period of 12 months from the date of Substantial Performance of the Work, as set out in the Certificate of Substantial Performance of the Work,

b) where the work is completed after the date of Substantial Performance, 12 months after Completion of the Work,

c) where there is no Certificate of Substantial Performance, 12 months from the date of Completion of the Work as set out in the Completion Certificate, or

d) such longer periods as may be specified in the Contract Documents for certain Materials or some of the Work.

The Contract Administrator shall promptly give the Contractor written notice of observed defects or deficiencies.

.03 The Contractor shall correct or pay for damage resulting from corrections made under the requirements of paragraph GC 7.16.02.

GC 7.17 Contractor's Workers

.01 The Contractor shall only employ orderly, competent, and skillful workers to do the Work and whenever the Contract Administrator shall inform the Contractor in writing that any worker or workers involved in the Work are, in the opinion of the Contract Administrator, incompetent, or disorderly such worker or workers shall be removed from the work and shall not be employed on the work again without the consent in writing of the Contract Administrator.

GC 7.18 Drainage

.01 During construction and until the Work is completed, the Contractor shall make all reasonable efforts to keep all portions of the Work properly and efficiently drained, to at least the same degree as that of the existing drainage conditions.

SECTION GC 8.0 - MEASUREMENT AND PAYMENT

GC 8.01 Measurement

GC 8.01.01 Quantities

.01 The Contract Administrator shall make an Estimate once a month, in writing, of the quantity of Work performed. The first Estimate shall be the quantity of Work performed since the Contractor commenced the Contract, and every subsequent Estimate, except the final one, shall be of the quantity of Work performed since the preceding Estimate was made. The Contract Administrator shall provide the copy of each Estimate to the Contractor within 10 Days of the Cut-Off Date.

.02 Such quantities for progress payments shall be construed and held to approximate. The final quantities for the issuance of the Completion Payment Certificate shall be based on the measurement of Work completed.

.03 Measurement of the quantities of the Work performed may be either by Actual Measurement or by Plan Quantity principles as indicated in the Contract. Adjustments to Plan Quantity measurements shall normally be made using Plan Quantity principles but may, where appropriate, be made using Actual Measurements. Those items identified on the Tender by the notation (P) in the unit column shall be paid according to the Plan Quantity. Items where the notation (P) does not occur shall be paid according to Actual Measurement or lump sum.

GC 8.01.02 Variations in Tender Quantities

.01 Where it appears that the quantity of Work to be done or Material to be supplied or both by the Contractor under a unit price tender item may exceed or be less than the tender quantity, the Contractor shall proceed to do the Work or supply the Material or both required to complete the tender item and payment shall be made for the actual amount of Work done or Material supplied or both at the unit prices stated in the Tender except as provided below:

a) In the case of a Major Item where the quantity of Work performed or Material supplied or both by the Contractor exceeds the tender quantity by more than 15%, either party to the Contract may make a written request to the other party to negotiate a revised unit price for that portion of the Work performed or Material supplied or both which exceeds 115% of the tender quantity. The negotiation shall be carried out as soon as reasonably possible. Any revision of the unit price shall be based on the actual cost of doing the Work or supplying the Material or both under the tender item plus a reasonable allowance for profit and applicable overhead.

b) In the case of a Major Item where the quantity of Work performed or Material supplied or both by the Contractor is less than 85% of the tender quantity, the Contractor may make a written request to negotiate for the portion of the actual overheads and fixed costs applicable to the amount of the underrun in excess of 15% of the tender quantity. For purposes of the negotiation, the overheads and fixed costs applicable to the item are deemed to have been prorated uniformly over 100% of the tender quantity for the item. Overhead costs shall be confirmed by a statement certified by the Contractor's senior financial officer or auditor and may be audited by the Owner. Alternatively, where both parties agree, an allowance equal to 10% of the unit price on the amount of the underrun in excess of 15% of the tender quantity shall be paid.

Written requests for compensation must be received no later than 60 Days after the issuance of the Completion Payment Certificate.

GC 8.02 Payment

GC 8.02.01 Price for Work

.01 Prices for the Work shall be full compensation for all labour, Equipment and Material required in its performance. The term "all labour, Equipment, and Material" shall include Hand Tools, supplies, and other incidentals.

.02 Payment for work not specifically detailed as part of any one item and without specified details of payment shall be deemed to be included in the items with which it is associated.

GC 8.02.02 Advance Payments for Material

.01 The Owner shall make advance payments for Material intended for incorporation in the Work upon the written request of the Contractor and according to the following terms and conditions:

a) The Contractor shall deliver the Material to a site approved by the Contract Administrator and the Contractor shall, in advance of receipt of the shipment of the Material, arrange for adequate and proper storage facilities.

b) The value of aggregates, processed and stockpiled, shall be assessed by the following procedure:

i. Sources Other Than Commercial
(1) Granular A, B, BI, BII, BIII, M, and O shall be assessed at the rate of 60% of the Contract price.
(2) Coarse and fine aggregates for hot mix asphaltic concrete, surface treatment and Portland cement concrete shall be assessed at the rate of 25% of the Contract price for each aggregate stockpiled.

ii. Commercial Sources
Payment for separated coarse and fine aggregates shall be considered at the above rate when such materials are stockpiled at a commercial source where further processing is to be carried out before incorporating such materials into a final product. Advance payments for other materials located at a commercial source shall not be made.

c) Payment for all other materials, unless otherwise specified elsewhere in the Contract Documents, shall be based on the invoice price, and the Contractor shall submit proof of cost to the Contract Administrator before payment can be made by the Owner.

d) The payment for all Materials shall be prorated against the appropriate tender item by paying for sufficient units of the item to cover the value of the material. Such payment shall not exceed 80% of the Contract price for the item.

e) All Materials for which the Contractor wishes to receive advance payment shall be placed in the designated storage location immediately upon receipt of the material and shall thenceforth be held by the Contractor in trust for the Owner as collateral security for any monies advanced by the Owner and for the due completion of the Work. The Contractor shall not exercise any act of ownership inconsistent with such security, or remove any Material from the storage locations, except for inclusion in the Work, without the consent, in writing, of the Contract Administrator.

f) Such materials shall remain at the risk of the Contractor who shall be responsible for any loss, damage, theft, improper use, or destruction of the material however caused.

.02 Where the Owner makes advance payments subject to the conditions listed in paragraph GC 8.02.02.01, such payment shall not constitute acceptance of the Material by the Owner. Acceptance shall only be determined when the material meets the requirements of the appropriate specification.

GC 8.02.03 Certification and Payment

GC 8.02.03.01 Progress Payment Certificate

.01 The value of the Work performed and Material supplied shall be calculated once a month by the Contract Administrator in accordance with the Contract Documents and clause GC 8.01.01, Quantities.

.02 The progress Payment Certificate shall show,

a) the quantities of Work performed;

b) the value of Work performed;

c) any advanced payment for Material;

d) the amount of statutory holdback, liens, Owner's set-off;

e) the amount of GST, as applicable; and

f) the amount due to the Contractor.

.03 One copy of the progress Payment Certificate shall be sent to the Contractor.

.04 Payment shall be made within 30 Days of the Cut-Off Date.

GC 8.02.03.02 Certification of Subcontract Completion

.01 Before the Work has reached the stage of Substantial Performance, the Contractor may notify the Contract Administrator, in writing that a subcontract is completed satisfactorily and ask that the Contract Administrator certify the completion of such subcontract.

.02 The Contract Administrator shall issue a Certificate of Subcontract Completion, if the subcontract has been completed satisfactorily, and all required inspection and testing of the works covered by the subcontract have been carried out and the results are satisfactory.

.03 The Contract Administrator shall set out in the Certificate of Subcontract Completion the date on which the subcontract was completed and, within 7 Days of the date the subcontract is certified complete, the Contract Administrator shall give a copy of the certificate to the Contractor and to the Subcontractor concerned.

GC 8.02.03.03 Subcontract Statutory Holdback Release Certificate and Payment

.01 Following receipt of the Certificate of Subcontract Completion, the Owner shall release and pay the Contractor the statutory holdback retained in respect of the subcontract. Such release shall be made 46 Days after the date the subcontract was certified complete and providing the Contractor submits the following to the Contract Administrator:

a) a document satisfactory to the Contract Administrator that shall release the Owner from all further claims relating to the subcontract, qualified by stated exceptions such as holdback monies;

b) evidence satisfactory to the Contract Administrator that the Subcontractor has discharged all liabilities incurred in carrying out the subcontract;

c) a satisfactory clearance certificate or letter from the Workplace Safety and Insurance Board relating to the subcontract; and

d) a copy of the contract between the Contractor and the Subcontractor and a satisfactory statement showing the total amount due the Subcontractor from the Contractor.

.02 Paragraph GC 8.02.03.03.01 d), shall only apply to Lump Sum Items and then only when the Contract Administrator specifically requests it.

.03 Upon receipt of the statutory holdback, the Contractor shall forthwith give the Subcontractor the payment due under the subcontract.

.04 Release of statutory holdback by the Owner in respect of a subcontract shall not relieve the Contractor, or the Contractor's Surety, of any of their responsibilities.

GC 8.02.03.04 Certification of Substantial Performance

.01 Upon application by the Contractor and when the Contract Administrator has verified that the Contract has been substantially performed, the Contract Administrator shall issue a Certificate of Substantial Performance.

.02 Upon verifying that the Contract has been substantially performed, the Contract Administrator shall issue a certificate of Substantial Performance and shall set out in the Certificate of Substantial Performance the date on which the Contract was substantially performed and, within 7 Days after signing the said certificate, the Contract Administrator shall provide a copy to the Contractor.

.03 Upon receipt of a copy of the Certificate of Substantial Performance, the Contractor shall forthwith, as required by Section 32(1) Paragraph 5 of the Construction Lien Act, R.S.O. 1990, c.C.30, as amended, publish a copy of the certificate in a construction trade newspaper. Such publication shall include placement in the Daily Commercial News.

.04 Where the Contractor fails to publish a copy of the Certificate of Substantial Performance as required above within 7 Days after receiving a copy of the certificate signed by the Contract Administrator, the Owner may publish a copy of the certificate at the Contractor's expense.

.05 Except as otherwise provided for in Section 31 of the Construction Lien Act, the 45 Day lien period prior to the release of holdback as referred to in clause GC 8.02.03.05, Substantial Performance Payment and Statutory Holdback Release Payment Certificates, shall commence from the date of publication of the Certificate of Substantial Performance as provided for above.

GC 8.02.03.05 Substantial Performance Payment and Substantial Performance Statutory Holdback Release Payment Certificates

.01 When the Contract Administrator issues the Certificate of Substantial Performance, the Contract Administrator shall also issue the Substantial Performance Payment Certificate and the Substantial Performance Statutory Holdback Release Payment Certificate or where appropriate, a combined payment certificate.

.02 The Substantial Performance Payment Certificate shall show,

a) the value of Work performed to the date of Substantial Performance;

b) the value of outstanding or incomplete Work;

c) the amount of the statutory holdback, allowing for any previous releases of statutory holdback to the Contractor in respect of completed subcontracts and deliveries of pre-selected equipment;

d) the amount of maintenance security required; and

e) the amount due the Contractor.

.03 Payment of the amount certified shall be made within 30 Days of the date of issuance of the payment certificate.

.04 The Substantial Performance Statutory Holdback Release Payment Certificate shall be a payment certificate releasing to the Contractor the statutory holdback due in respect of Work performed up to the date of Substantial Performance. Payment of such statutory holdback shall be due 46 Days after the date of publication of the Certificate of Substantial Performance but subject to the provisions of the Construction Lien Act and the submission by the Contractor of the following documents:

a) a release by the Contractor in a form satisfactory to the Contract Administrator releasing the Owner from all further claims relating to the Contract, qualified by stated exceptions such as outstanding work or matters arising out of subsection GC 3.13, Claims, Negotiations, Mediation;

b) a statutory declaration in a form satisfactory to the Contract Administrator that all liabilities incurred by the Contractor and the Contractor's Subcontractors in carrying out the Contract have been discharged except for statutory holdbacks properly retained;

c) a satisfactory Certificate of Clearance from the Workplace Safety and Insurance Board; and

d) proof of publication of the Certificate of Substantial Performance.

GC 8.02.03.06 Certification of Completion

.01 Upon application by the Contractor and when the Contract Administrator has verified that the Contract has reached Completion, the Contract Administrator shall issue a Completion Certificate.

.02 The Contract Administrator shall set out in the Completion Certificate the date on which the Work was completed and, within 7 Days of signing the said certificate, the Contract Administrator shall provide a copy to the Contractor.

GC 8.02.03.07 Completion Payment and Completion Statutory Holdback Release Payment Certificates

.01 When the Contract Administrator issues the Completion Certificate, the Contract Administrator shall also issue the Completion Payment Certificate and the Completion Statutory Holdback Release Payment Certificate or where appropriate, a combined payment certificate.

.02 The Completion Payment Certificate shall show,

a) measurement and value of Work at Completion;

b) the amount of the further statutory holdback based on the value of further work completed over and above the value of work completed shown in the Substantial Performance Payment Certificate referred to above; and

c) the amount due the Contractor.

.03 The Completion Statutory Holdback Release Payment Certificate shall be a payment certificate releasing to the Contractor the further statutory holdback. Payment of such statutory holdback shall be due 46 Days after the date of Completion of the Work as established by the Completion Certificate but subject to the provisions of the Construction Lien Act and the submission by the Contractor of the following documents:

a) a release by the Contractor in a form satisfactory to the Contract Administrator releasing the Owner from all further claims relating to the Contract, qualified by stated exceptions where appropriate;

b) a statutory declaration in a form satisfactory to the Contract Administrator that all liabilities incurred by the Contractor and the Contractor's Subcontractors in carrying out the Contract have been discharged, qualified by stated exceptions where appropriate; and

c) a satisfactory Certificate of Clearance from the Workplace Safety and Insurance Board.

GC 8.02.03.08 Interest

.01 Interest due the Contractor is based on simple interest and is calculated using the applicable Rate of Interest.

GC 8.02.03.09 Interest for Late Payment

.01 Provided the Contractor has complied with the requirements of the Contract, including all documentation requirements, when payment by the Owner to the Contractor for Work performed, or for release of statutory holdback, is delayed by the Owner, then the Contractor shall be entitled to receive interest on the outstanding payment at the Rate of Interest, if payment is not received on the dates set out below:

a) Progress Payment Certificates: 30 Days after the Cut-Off Date;

b) Certificate of Subcontract Completion: 30 Days after the date certified as the date on which the subcontract was completed;

c) Subcontract Statutory Holdback Release Payment Certificate: 76 Days after the date on which the subcontract was completed;

d) Substantial Performance Payment Certificate: 30 Days after the date of issuance of the certificate;

e) Substantial Performance Statutory Holdback Release Payment Certificate: 76 Days after publication of the Payment Certificate of Substantial Performance;

f) Completion Payment Certificate: 30 Days after the date certified as the date on which the Contract reached Completion; and

g) Completion Statutory Holdback Release Payment Certificate: 76 Days after the date certified as the date that the Work was completed.

.02 If the Contractor has not complied with the requirements of the Contract, including all documentation requirements, prior to expiration of the time periods described in paragraph GC 8.02.03.09.01, interest shall only begin to accrue when the Contractor has completed those requirements.

GC 8.02.03.10 Interest for Negotiations and Claims

.01 Except as hereinafter provided, where a notice of negotiation, notice of intent to claim and the subsequent claims are submitted in accordance with the time limits or procedure or both described by subsection GC 3.13, Claims, Negotiations, Mediation, the Owner shall pay the Contractor the Rate of Interest on the amount of the negotiated price for that part of the Work or on the amount of the settled claim. Such interest shall not commence until 30 Days after the satisfactory completion of that part of the Work.

.02 Where the Contractor does not attempt to resolve the negotiation or the claim in an expeditious manner, interest shall be negotiable.

.03 Where the Contractor fails to give notice of a claim within the time limit prescribed by subsection GC 3.13, Claims, Negotiations, Mediation, interest shall not be paid.

.04 Where a Contractor fails to comply with the 30 Day time limit and the procedures prescribed in paragraph GC 3.13.03.03 for submission of claims, interest shall not be paid for the delay period.

GC 8.02.03.11 Owner's Set-Off

.01 Pursuant to Section 12 of the Construction Lien Act, the Owner may retain from monies owing to the Contractor under this Contract an amount sufficient to cover any outstanding or disputed liabilities, including the cost to remedy deficiencies, the reduction in value of substandard portions of the Work, claims for damages by third parties that have not been determined in writing by the Contractor's insurer, undetermined claims by the Owner under paragraph GC 8.01.02.01 a), any assessment due the Workplace Safety and Insurance Board, and any monies to be paid to the workers in accordance with clause GC 8.02.06, Payment of Workers.

.02 Under these circumstances the Owner will give the Contractor appropriate notice of such action.

GC 8.02.03.12 Delay in Payment

.01 The Owner shall not be deemed to be in default of the Contract provided any delay in payment does not exceed 30 Days from the due dates as defined in paragraph GC 8.02.03.09.01.

GC 8.02.04 Payment on a Time and Material Basis

GC 8.02.04.01 Definitions

.01 For the purpose of clause GC 8.02.04 the following definitions apply:

Cost of Labour means the amount of wages, salary, travel, travel time, food, lodging, or similar items and Payroll Burden paid or incurred directly by the Contractor to or in respect of labour and supervision actively and necessarily engaged on the Work based on the recorded time and hourly rates of pay for such labour and supervision but shall not include any payment or costs incurred for general supervision, administration, and management time spent on the entire Work or any wages, salary, or Payroll Burden for which the Contractor is compensated by any payment made by the Owner for Equipment.

Cost of Material means the cost of Material purchased or supplied from stock and valued at current market prices for the purpose of carrying out Extra Work by the Contractor or by others, when such arrangements have been made by the Contractor for completing the Work, as shown by itemized invoices.

Operated Rented Equipment means Rented Equipment for which an operator is provided by the supplier of the equipment and for which the rent or lease includes the cost of the operator.

Payroll Burden means the payments in respect of workplace insurance, vacation pay, employment insurance, public liability and property damage insurance, sickness and accident insurance, pension fund, and such other welfare and benefit payments forming part of the Contractor's normal labour costs.

Rented Equipment means equipment that is rented or leased for the special purpose of Work on a Time and Material Basis from a person, firm, or corporation that is not an associate of the lessee as the word "associate" is defined by the Securities Act, R.S.O. 1990, c.S.5, as amended, and is approved by the Contract Administrator.

Road Work means the preparation, construction, finishing, and construction maintenance of roads, streets, Highways, and parking lots and includes all work incidentals thereto other than work on structures.

Sewer and Watermain Work means the preparation, construction, finishing, and construction maintenance of sewer systems and watermain systems, and includes all work incidental thereto other than work on structures.

Standby Time means any period of time that is not considered Working Time and which together with the Working Time does not exceed 10 hours in any one Working Day and during which time a unit of equipment cannot practically be used on other work but must remain on the site in order to continue with its assigned task and during which time the unit is in fully operable condition.

Structure Work means the construction, reconstruction, repair, alteration, remodelling, renovation, or demolition of any bridge, building, tunnel, or retaining wall and includes the preparation for and the laying of the foundation of any bridge, building, tunnel, or retaining wall and the installation of equipment and appurtenances incidental thereto.

The 127 Rate means the rate for a unit of Equipment as listed in OPSS 127, Schedule of Rental Rates for Construction Equipment, Including Model and Specification Reference, that is current at the time the work is carried out or for Equipment that is not so listed, the rate that has been calculated by the Owner, using the same principles as used in determining The 127 Rates.

Work on a Time and Material Basis means Changes in the Work, Extra Work, and Additional Work approved by the Contract Administrator for payment on a Time and Material basis. The Work on a Time and Material Basis shall be subject to all the terms, conditions, Standard Specifications and provisions of the Contract.

Working Time means each period of time during which a unit of Equipment is actively and of necessity engaged on a specific operation and the first 2 hours of each immediately following period during which the unit is not so engaged but during which the operation is otherwise proceeding and during which time the unit cannot practically be transferred to other work but must remain on the site in order to continue with its assigned tasks and during which time the unit is in a fully operable condition.

GC 8.02.04.02 Daily Work Records

.01 Daily Work Records, prepared as the case may be by either the Contractor's representative or the Contract Administrator reporting the labour and Equipment employed and the Material used on each Time and Material project, should be reconciled and signed each Day by both the Contractor's representative and the Contract Administrator. If it is not possible to reconcile the Daily Work Records, then the Contractor shall submit the un-reconciled Daily Work Records with its claim, whereby the resolution of the dispute about the Daily Work Records shall not be resolved until there is a resolution of the claim.

GC 8.02.04.03 Payment for Work

.01 Payment as herein provided shall be full compensation for all labour, Equipment, and Material to do the Work on a Time and Material Basis except where there is agreement to the contrary prior to the commencement of the Work on a Time and Material Basis. The payment adjustments on a Time and Material basis shall apply to each individual Change Order authorized by the Contract Administrator.

GC 8.02.04.04 Payment for Labour

.01 The Owner shall pay the Contractor for labour employed on each Time and Material project at 135% of the Cost of Labour up to $3,000, then at 120% of any portion of the Cost of Labour in excess of $3,000.

.02 The Owner shall make payment in respect of Payroll Burden for Work on a Time and Material Basis at the Contractor's actual cost of Payroll Burden.

.03 At the Owner's discretion, an audit may be conducted in which case the actual Payroll Burden so determined shall be applied to all Time and Material work on the Contract.

GC 8.02.04.05 Payment for Material

.01 The Owner shall pay the Contractor for Material used on each Time and Material project at 120% of the Cost of the Material up to $3,000, then at 115% of any portion of the Cost of Material in excess of $3,000.

GC 8.02.04.06 Payment for Equipment

GC 8.02.04.06.01 Working Time

.01 The Owner shall pay the Contractor for the Working Time of all Equipment, other than Rented Equipment and Operated Rented Equipment, used on the Work on a Time and Material basis at The 127 Rates with a cost adjustment as follows:

a) Cost $10,000 or less - no adjustment;

b) Cost greater than $10,000 but not exceeding $20,000 - payment $10,000 plus 90% of the portion in excess of $10,000; and

c) Cost greater than $ 20,000 - $19,000 plus 80% of the portion in excess of $20,000.

.02 The Owner shall pay the Contractor for the Working Time of Rented Equipment used on the Work on a Time and Material Basis at 110% of the invoice price approved by the Contract Administrator up to a maximum of 110% of The 127 Rate. This constraint shall be waived when the Contract Administrator approves the invoice price prior to the use of the Rented Equipment.

.03 The Owner shall pay the Contractor for the Working Time of Operated Rented Equipment used on the Work on a Time and Material Basis at 110% of the Operated Rented Equipment invoice price approved by the Contract Administrator prior to the use of the Equipment on the Work on a Time and Material Basis.

GC 8.02.04.06.02 Standby Time

.01 The Owner shall pay the Contractor for Standby Time of Equipment at 35% of The 127 Rate or 35% of the invoice price whichever is appropriate. The Owner shall pay reasonable costs for Rented Equipment where this is necessarily retained in the Working Area for extended periods agreed to by

the Contract Administrator. This shall include Rented Equipment intended for use on other work, but has been idled due to the circumstances giving rise to the Work on a Time and Material Basis.

.02 In addition, the Owner shall include the Cost of Labour of operators or associated labourers who cannot be otherwise employed during the standby period or during the period of idleness caused by the circumstances giving rise to the Work on a Time and Material Basis.

.03 The Contract Administrator may require Rented Equipment idled by the circumstances giving rise to the Work on Time and Material Basis to be returned to the lessor until the work requiring the equipment can be resumed. The Owner shall pay such costs as a result from such return.

.04 When Equipment is transported, solely for the purpose of the Work on a Time and Material Basis, to or from the Working Area on a Time and Material basis, payment shall be made by the Owner only in respect of the transporting units. When Equipment is moved under its own power it shall be deemed to be working. The method of moving Equipment and the rates shall be subject to the approval of the Contract Administrator.

GC 8.02.04.07 Payment for Hand Tools

.01 Notwithstanding any other provision of this Section, no payment shall be made to the Contractor for or in respect of Hand Tools or equipment that are tools of the trade.

GC 8.02.04.08 Payment for Work By Subcontractors

.01 Where the Contractor arranges for Work on a Time and Material Basis, or a part of it, to be performed by Subcontractors on a Time and Material basis and has received approval prior to the commencement of such work, in accordance with the requirements of subsection GC 3.09, Subcontracting by the Contractor, the Owner shall pay the cost of Work on a Time and Material Basis by the Subcontractor calculated as if the Contractor had done the Work on a Time and Material Basis, plus a markup calculated on the following basis:

a) 20% of the first $3,000; plus

b) 15% of the amount from $3,000 to $10,000; plus

c) 5% of the amount in excess of $10,000.

.02 No further markup shall be applied regardless of the extent to which the work is assigned or sublet to others. If work is assigned or sublet to an associate, as defined by the Securities Act, no markup whatsoever shall be applied.

GC 8.02.04.09 Submission of Invoices

.01 At the start of the Work on a Time and Material Basis, the Contractor shall provide the applicable labour and Equipment rates not already submitted to the Contract Administrator during the course of such work.

.02 Separate summaries shall be completed by the Contractor according to the standard form "Summary for Payment of Accounts on a Time and Material Basis." Each summary shall include the Change Directive or Change Order number and covering dates of the work and shall itemize separately the labour, Materials, and Equipment. Invoices for Materials, Rented Equipment, and other charges incurred by the Contractor on the Work on a Time and Material Basis shall be included with each summary.

.03 Each month the Contract Administrator shall include with the monthly progress payment certificate, the costs of the Work on a Time and Material Basis incurred during the preceding month all in accordance with the contract administrative procedures and the Contractor's invoice of the Work on a Time and Material Basis.

.04 The final "Summary for Payment of Accounts on a Time and Material Basis" shall be submitted by the Contractor within 60 Days after the completion of the Work on a Time and Material Basis.

GC 8.02.04.10 Payment Other Than on a Time and Material Basis

.01 Clause GC 8.02.04 does not preclude the option of the Contract Administrator and the Contractor negotiating a Lump Sum Item or unit price payment for Change in the Work, Extra Work, and Additional Work.

GC 8.02.04.11 Payment Inclusions

.01 Except where there is agreement in writing to the contrary, the compensation, as herein provided, shall be accepted by the Contractor as compensation in full for profit and all costs and expenses arising out of the work, including all cost of general supervision, administration, and management time spent on the work, and no other payment or allowance shall be made in respect of such work.

GC 8.02.05 Final Acceptance Certificate

.01 After the acceptance of the Work, the Contract Administrator shall issue the Final Acceptance Certificate, or, where applicable, after the Warranty Period has expired. The Final Acceptance Certificate shall not be issued until all known deficiencies have been adjusted or corrected, as the case may be, and the Contractor has discharged all obligations under the Contract.

GC 8.02.06 Payment of Workers

.01 The Contractor shall, in addition to any fringe benefits, pay the workers employed on the Work in accordance with the labour conditions set out in the Contract and at intervals of not less than twice a month.

.02 The Contractor shall require each Subcontractor doing any part of the Work to pay the workers employed by the Subcontractor on the Work in accordance with paragraph GC 8.02.06.01.

.03 Where any person employed by the Contractor or any Subcontractor or other person on the Work is paid less than the amount required to be paid under the Contract, the Owner may set off monies in accordance with clause GC 8.02.03.11, Owner's Set-Off.

GC 8.02.07 Records

.01 The Contractor shall maintain and keep accurate Records relating to the Work, Changes in the Work, Extra Work, and claims arising therefrom. Such Records shall be of sufficient detail to support the total cost of the Work, Changes in the Work, and Extra Work. The Contractor shall preserve all such original Records until 12 months after the Final Acceptance Certificate is issued or until all claims have been settled, whichever is longer. The Contractor shall require that Subcontractors employed by the Contractor preserve all original Records pertaining to the Work, Changes in the Work, Extra Work, and claims arising therefrom for a similar period of time.

.02 The Owner may inspect and audit the Contractor's Records relating to the Work, Extra Work, and Changes in the Work at any time during the period of the Contract. The Contractor shall supply certified copies of any part of its Records required, whenever requested by the Owner.

GC 8.02.08 Taxes

.01 Where a change in Canadian Federal or Provincial taxes occurs after the date of tender closing for this Contract, and this change could not have been anticipated at the time of bidding, the Owner shall increase or decrease Contract payments to account for the exact amount of tax change involved.

.02 Claims for compensation for additional tax cost shall be submitted by the Contractor to the Contract Administrator on forms provided by the Contract Administrator to the Contractor. Such claims for additional tax costs shall be submitted not less than 30 Days after the date of Final Acceptance.

.03 Where the Contractor benefits from a change in Canadian Federal or Provincial taxes, the Contractor shall submit to the Contract Administrator, on forms provided by the Contract Administrator, a statement of such benefits. This statement shall be submitted not later than 30 Days after Final Acceptance.

.04 Changes in Canadian Federal or Provincial taxes that impact upon commodities, which when left in place form part of the finished Work, or the provision of services, where such services form part of the Work and where the manufacture or supply of such commodities or the provision of such services is carried out by the Contractor or a Subcontractor, are subject to a claim or benefit as detailed above. Services in the latter context means the supply and operation of equipment, the provision of labour, and the supply of commodities that do not form part of the Work.

GC 8.02.09 Liquidated Damages

.01 When liquidated damages are specified in the Contract and the Contractor fails to complete the Work in accordance with the Contract, the Contractor shall pay such amounts as are specified in the Contract Documents.

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For the purposes of this contract, the Ontario Provincial Standards, General Conditions of Contract (Muni. 100, 2006) shall be amended as set out herein.

SG.1 DELAYS - GC3.07

Clause GC3.07.01 shall be revised to include the following:

The last paragraph of Clause GC3.07.01 shall be deleted and replaced with the following:

"Then the Contractor shall be reimbursed with the exception of item e) abnormal inclement weather, by the Owner for actual costs as the result of such delay, and the Owner shall not be liable for any other costs or damages whatsoever including, without limitation, any indirect, consequential or special damages, such as loss of profits, loss of opportunity or loss of productivity resulting from such delay.. Extension of Contract Time will be granted in accordance with subsection GC 3.06, Extension of Contract Time.

Clause GC3.07.2 shall be deleted and replaced with the following:

If the Work is delayed by labour disputes, strikes or lock-outs – affecting the Work or the Project including lockouts decreed or recommended to its members by a recognized contractor's association, of which the Contractor is a member or to which the Contractor is otherwise bound – which are beyond the Contractor's control, then the Contract Time shall be extended in accordance with subsection GC 3.06, Extension of Contract Time. In no case shall the extension of Contract Time be less than the time lost as the result of the event causing the delay, unless a shorter extension is agreed to by the Contractor. The Contractor shall not be entitled to payment of costs incurred as the result of such delays unless such delays are the result of actions by the Owner.

SG.2 CLAIMS, NEGOTIATIONS, MEDIATION, ARIBITRATION – GC3.13 and GC3.14

Clause GC3.13.05 and GC3.13.14shall be amended as follows: Mediation

and arbitration methods of dispute are to be invoked only upon mutual consent of both parties.

Clause GC3.13.06 delete and replace with the following:

"Payment of the claim will be made on the next Payment Certificate issued after the date of resolution of the claim or dispute. Such payment will be made according to the terms of Section GC8.0, Measurement and Payment."

SG.3 QUALITY OF MATERIAL - GC5.02

Clause (GC5.02.) shall be amended to add the following:

GC 5.02.04 - The Contractor shall obtain for the Contract Administrator the right to enter upon the premises of the material manufacturer or supplier to carry out such inspection, sampling and testing as specified or as requested by the Contract Administrator. No material that has not been approved by the Region shall be incorporated in the works.

Add new Clause GC5.02.10
"Testing of previously tested material and/or workmanship shall be carried out at the Contract Administrator's discretion at the Contractor's expense."

The cost of all testing and inspection of materials delivered to the site will be borne by the Regional Municipality of Peel, and arranged by the Engineer, unless otherwise specified in the contract documents.

However, any retesting to verify the quality of work or previous test results shall be carried out at the discretion of the Engineer and at the expense of the Contractor.

The Contractor shall provide to the Engineer for his use at all times, assistance and use of tools and construction equipment as required to safely procure, package and ship all test samples.

The Contractor shall make known to the Engineer the source of material at least one week prior to the time he proposes to use such material, unless otherwise specified in the Contract Documents.

Where required by the Engineer, or where otherwise specified in the contract document, to test materials and equipment, the Contractor shall supply certified copies of all tests upon all materials and equipment to be used in the construction of the works, indicating that materials comply with the specifications. Such test shall be made by an approved testing company and shall be at the Contractor's expense.

SG.4 GENERAL CONTRACTOR'S RESPONSIBILITY - GC7.01

Add the following at the end of Clause GC7.01.

The Contractor shall satisfy its self as to the nature of the soil, the bearing capacity and other physical characteristics included but not limited to the location of various earth or rock strata and ground water levels. Geotechnical reports or borehole logs provided to the Contractor by the Region does not relieve the Contractor of sole responsibility for determining all necessary information relevant to the construction of the works.

Add the following clause to the end of GC7.01.07.

(1) The Contractor, for purposes of the Ontario Occupational Health and Safety Act, shall be designated as the Constructor for this project and shall assume all of the responsibilities of the Constructor as set out in that Act and its regulations. The foregoing shall apply notwithstanding that the successful Vendor has been referred to as the `Contractor' in this and any other related document.

(2) (a) The Contractor acknowledges that they have read and understood the Occupational Health and Safety Act and Regulations for Construction Projects (latest edition, as amended).

(b) The Contractor covenants and agrees to observe strictly and faithfully the provisions of the said Occupational Health and Safety Act and all regulations and rules promulgated thereunder.

(c) The Contractor agrees to indemnify and save the Agency harmless for damages or fines arising from any breach or breaches of the said Occupational Health and Safety Act.

(d) The Contractor agrees to assume full responsibility for the enforcement of the said Occupational Health and Safety Act to ensure compliance therewith.

(e) The Contractor further acknowledges and agrees that any breach or breaches of the Occupational Health and Safety Act whether by the Contractor or any of its sub-contractors may result in the immediate termination of this contract.

(f) The Contractor shall allow access to the work site on demand to representatives of the Agency to inspect work sites to

ensure compliance with the Occupational Health and Safety Act.

(g) The Contractor agrees that any damages or fines that may be assessed against the Agency by reason of a breach or breaches of the Occupational Health and Safety Act by the Contractor or any of its sub-contractors will entitle the Agency to set-off the damages so assessed against any monies that the Agency may from time to time owe the Contractor under this contract or under any other contract whatsoever.

(3) Where hazardous materials, physical agents and/or designated substances are used in the performance of the required work, the successful Contractor shall ensure that the requirements of the Ontario Occupational Health and Safety Act and associated regulations are complied with.

(4) The Region of Peel reserves the right to cancel any contract for non-compliance with the terms set out herein, health and safety regulations, the Environmental Protection Act, associated regulations and other applicable legislation.

(5) The Contractor shall perform the Work so as to cause the public the least inconvenience possible. In particular, the Contractor shall not obstruct any street, thoroughfare, or footwalk longer or to a greater extent than necessary.

(6) The Contractor shall take all reasonable precaution necessary to ensure the safety of the workers and the general public, particularly children who may play in the area of work.

Add New Clause GC7.01.17 as follows:
The Contractor shall attend Progress and Co-ordination Meetings as directed by the Engineer.

The Contractor's representative at these meetings shall be Resident Supervisor or Engineer, and/or a competent and reliable person who is familiar with these works. The Contractor's representative shall have full authority to make decisions on the Contractor's behalf.

Add the Following to GC7.03 New Clauses GC7.03.04 as follows:
Vehicles and equipment are not allowed to enter any driveway. Any claims for damage arising from such incidents will be the sole responsibility of the Vendor.

SG.5 APPROVAL AND PERMITS - GC7.09

Add new Clause GC7.09.03
In the event of works affecting local municipal roads, the Contractor must notify the local area municipality concerned, i.e. Mississauga, Brampton or Caledon, 48 hours prior to commencing work. A representative of the Agency will accompany the Contractor to obtain the Road Cut Permit of the applicable municipality. The Engineer will be given a copy of the permit. The local town/municipality will issue a Road Cut Permit to cover the entire project; however, verbal notification must be given to the local town/municipality Department 48 hours in advance of each work location change which necessitates revisions in detours or single lanes of traffic.

Through traffic must be maintained at all times by the Contractor at his expense. All traffic control will be executed as required by the road cut permit. Sign requirements will be as per the latest revision of the Ontario Traffic Manual (OTM). The cost of providing all signs, delineators, flagmen, etc. will be at the Contractor's expense and should be included in the relevant tender items.

No work will be allowed if there is no flagperson on full-time duty when two lanes of traffic (one in each direction) cannot be maintained.

The Contractor must file with the local Town/municipal Department the name and telephone number of a person who will be on duty at all times in case of emergency.

It is the responsibility of the Contractor to be familiar with and to comply with the Road Cut Permit conditions and all other conditions of the local municipality when undertaking works on roads under local municipal jurisdiction.

The Contractor is to include all additional costs relating to compliance with local municipal road cut permit conditions in his tendered unit prices.

Vehicles and equipment are not allowed to enter any driveway. Any claims for damage arising from such incidents will be the sole responsibility of the Vendor."

Add New Clause GC 7.03.05
The Vendor shall provide safe and free vehicular and pedestrian movement at all times to all properties with existing access. Where there is no alternative but to shut off access temporarily to a property, the Vendor shall first notify the persons affected and shall work so as to keep the period of

the inconvenience to a minimum. Notwithstanding, any closure of access must be approved by the Project Manager in writing prior to closing.

Add new Clause GC 7.03.06
If the Contractor enters into an agreement with an individual or Municipality for the use of land for the disposal of stumps, fill or for any other reason, a copy of said Agreement clearly stating the obligations of all concerned and signed by both parties shall be submitted to the Region.

Add new Clause GC 7.03.07
The Contractor shall comply with all Federal and Provincial Acts and Regulations and Municipal By-laws regarding the use of land for these purposes.

Add new Clause GC7.03.08
The Contractor shall not enter upon or occupy with labour, plant or materials any lands other than those within the working limits unless and until consent has been received by him from the owners and a certified copy of such a consent has been furnished to the Engineer. Any rentals or damages paid for occupying private lands shall be at the Contractor's expense.

SG.6 EXCESS LOADING OF MOTOR VEHCILES – GC7.05

Delete Clause GC7.05.01 and replace with the following:

Where a vehicle is hauling material for use on the work under this Contract, in whole or in part upon a public highway and where a motor vehicle registration is required for such vehicle, the Contractor shall not cause or permit such vehicle to be loaded beyond the legal limit, as specified in the *Highway Traffic Act*, R.S.O. 1990, as amended and regulations thereunder whether such vehicle is registered in the name of the Contractor or otherwise, except where there are designated areas of the Contract where overloading is permitted. The Contractor shall be responsible for weighing disputed loads.

Notwithstanding any other provision of this Contract, the printed weigh tickets, without reference to overloading will be accepted for payment. This acceptance will not, however, exempt the vehicles registered in the name of the Contractor or otherwise, from complying with the legal weight limits as specified in the *Highway Traffic Act,* R.S.O. 1990, as amended.

SG.7 MAINTAINING ROADWAYS AND DETOURS - GC7.07

Delete Clause GC7.07 –.07) and replace with the following new Clause GC7.07.07:

"The Contractor will bear the cost of maintaining, in a satisfactory condition for traffic, a road through the working area. The road through the work will include any detour constructed in accordance with the contract document or required by the Contract Administrator. Compensation for all labour, equipment and materials for detours shall be at the contract prices appropriate to the work. Notwithstanding the foregoing, the cost of blading required to maintain the surface of such roads and detours shall be deemed to be included in the prices bid for the various tender items and no additional payment will be made."

SG.8 CONTRACTORS' RIGHT TO STOP THE WORK OR TERMINATE THE CONTRACT – GC7.11

Clause GC7.11.02 is deleted in its entirety.

Delete Clause GC7.11.04 and replace with new Clause GC7.11.04 as follows:
The Contractor's written notice to the Owner shall advise that if the default is not corrected in the 7 days immediately following the receipt of the written notice, or the Owner commences the correction within seven (7) days and provides the Contractor with an acceptable schedule for the correction and the default is not corrected in accordance with this schedule, the Contractor may, without prejudice to any other right or remedy the Contractor may have, stop the Work or terminate the Contract.

SG.9 WARRANTY - GC7.16

Delete Clause GC7.–16.02) and replace with new Clause GC7.16.02
"Subject to the previous paragraph the Contractor shall correct promptly, at no additional cost to the owner, defects and/or deficiencies in the work which appear prior to and during the warranty period noted below from the date of preliminary acceptance. The Contract Administrator will promptly give the Contractor written notice of observed defects or deficiencies."

In certain emergency situations where the safety of the public is at risk due to a deficiency, the Engineer will endeavour to contact the Contractor by telephone. If the Contractor fails to correct the deficiency within an agreed period of time, or cannot be contacted at all, the Engineer, at his option, may make any corrections necessary. In such case, the Contractor shall be responsible for the full cost, charges and expenses of such work.

Warranty Period of "24 months" shall replace "12 months" within the clauses of this section.

Warranty Holdback

In reference to GC7.15, Warranty Period:

A warranty period hold back will be retained on all of the Region's projects.

SCALE OF WARRANTY HOLDBACK

Contract Value	Formulae	Max. Holdback
$ 0 - 50,000	Actual @ 10%	5,000
$ 50,000 - 100,000	5,000 + (Actual - 50,000) @ 5%	7,500
$100,000 - 300,000	7,500 + (Actual - 100,000) @ 4%	15,500
$300,000 - 500,000	15,500 + (Actual - 300,000) @ 3%	21,500
$500,000 - and up	21,500 + (Actual - 500,000) @ 2%	No Maximum

This amount less any monies due to the Region will be released following the satisfactory completion of warranty period.

The Contractor may apply for early release of holdback after the first 12 months of the warranty period. If there are no deficiencies, then the Contractor may apply for release of 80% of the warranty holdback with a minimum of $5000 to be held for the remaining 12 months of the warranty period.

SG.10 VARIATIONS IN TENDER QUANTITIES – GC8.01.02

Replace "Completion Certificate" with "Substantial Performance Certificate".

SG.11 PAYMENT - GC8.02

SG.11.1 Advance Payment for Material - GC8.02.02

Clause GC8.02.02.01) shall be amended to read:

"The Owner may make advance payments for material intended for incorporation in the Work upon the written request of the Contractor and according to the following terms and conditions:

a) the Contractor shall deliver the materials to a site approved by the Contract Administrator and the Contractor shall in advance of receipt of shipment of the material, arrange for adequate and proper storage facilities and notify the Contract Administrator of their location(s).

The remainder of Clause GC8.02.02 is unchanged."

SG.11.2 Certification and Payment - GC8.02.03

The following is in addition to clause GC8.02.03.06:

The issuance by the Engineer of a letter certifying that the entire work has been completed will not mean that the Engineer assumes any responsibility or liability, in full or in part, for the Contractor's responsibilities and liabilities at the completion of the Contract or in the future to carry out all the work and any part of it in accordance with the terms and specifications of this Contract.

Clause GC8.02.03.07.03 (a) is deleted.

Clauses GC8.02.03.08, GC8.02.03.09 and GC8.02.03.10 are deleted in their entirety.

Clause GC8.02.03.11 - 01) shall be revised to read:

Pursuant to Section 12 of the Construction Lien Act 1990 - Set-off by Trustee, the Owner may retain from monies owing to the Contractor under this or any other contract an amount sufficient to cover any outstanding or disputed liabilities including the cost to remedy deficiencies, the reduction in value of substandard portions of the Work, claims for damages by third parties which have not been determined in writing by the Contractor's insurer, undetermined claims by the Owner under paragraph (a) of Clause GC8.01.02, Variations in Tender Quantities, any assessment due the Workers' Compensation Board and any monies to be paid to the workers in accordance with Clause GC8.02.06, Payment of Workers and as well any liquidated damages assessed by the Owner pursuant to Clause GC8.02.09.

Clause GC8.02.03.12 shall be deleted in its entirety.

SG.11.3 Payment on Time and Material Basis - GC8.02.04

Clause 8.02.04.01-01) is amended to read:

"Working Time" means each period of time during which a unit of equipment and/or labour is actively and of necessity engaged on a specific operation.

Clause 8.02.04.08-01, (a), (b) and (c) are replaced by the following:

- 5% of the amount

Clause GC8.02.04.09-04) is amended to read:

The final "Summary for Payment of Accounts on a time and Material Basis" shall be submitted by the Contractor within 30 days after the completion of the work on a Time and Material Basis.

All claims for extra work must be submitted on a form acceptable to the owner.

SG.12 GEOTECHNICAL INFORMATION GC 2.01.02

Add the following to Clause GC2.01.02

The geotechnical information contained herein is an approximation of ground conditions only and is provided to assist the Vendor in ascertaining the predominant ground conditions that the Vendor is likely to encounter, and is not a representation or warranty by the owner as to ground conditions. Notwithstanding this information, the ground conditions between boreholes may vary considerably and the Vendor specifically acknowledges that it assumes all risks and liabilities associated with ground conditions. Additionally, the Vendor shall be responsible to ensure adequate trench shoring for actual ground conditions in accordance with the requirements of the Occupational Health and Safety Act.

SG.13 WORKING HOURS, NIGHT, SATURDAY, SUNDAY AND HOLIDAY WORK

The following will take precedence where applicable in the General Conditions.

SG.13.1 Working Hours

The Contractor shall note that the performance of work on the Region's projects shall be confined to the hours of 7: 00 a.m. to 7:00 p.m.

Written authorization from the Engineer will be required to extend working hours beyond the above limits.

SG.13.2 Sunday or Holiday Work

a) No work shall be permitted on Sunday, Statutory Holidays and Holidays stipulated by Regional Policy, except in the case of an emergency.

b) The following days will be recognized Holidays as stipulated by Regional Policy:

- New Year's Day,
- Family Day,
- Good Friday,
- Victoria Day,
- Canada Day,
- Civic Holiday (August),
- Labour Day,
- Thanksgiving Day,
- Christmas Day,
- Boxing Day.

c) When any of the above noted holidays, except Boxing Day, falls on Saturday the preceding Friday or succeeding Monday shall be designated as the holiday; when Boxing Day falls on a Saturday or Sunday, the following Monday shall be designated as a holiday and when Boxing Day falls on Monday, the following Tuesday will be designated as Boxing Day holiday.

SG.13.3 Night Works

The Engineer may order work to proceed on a two or three eight-hour shift basis if he deems this necessary to speed up the installation, or he may order any work to be carried out in whole or in part at night. No work, however, shall be undertaken at night without the Engineer's written consent.

In the event night work is approved or ordered by the Engineer, the contractor shall provide all the necessary number of electric or other approved efficient lights to enable the necessary work to be carried out in an efficient, safe and satisfactory manner.

The compensation for night work, if any, shall be agreed upon between the Contractor and the Engineer, unless unit prices are quoted in the Tender.

SG.13.4 Saturday Work

It is noted that Saturday is not considered a holiday under this clause; however, work will only be permitted with written permission of the Engineer.

SG.14 STORAGE OF MACHINERY

The Contractor shall be governed by the direction of the Engineer in all matters connected with or concerning storage of machinery, materials and supplies along the line of work and shall at his own cost shift or remove such machinery, materials and supplies immediately upon notice from the Engineer and to location or locations acceptable to the Engineer.

SG.15 UTILITIES

SG.15.1 Relocations

The Region will be responsible for any necessary permanent relocations of hydro, bell, gas, and cable t.v. along the lines of construction. In the event that all utilities requiring relocation have not been relocated prior to the time when the Contractor commences work, he will be required to co-operate with the utility companies and work around the utilities such that the existing services are protected until such time as they can be removed from the line of construction.

SG.15.2 Stakeouts

Before commencing work on any street the Contractor must obtain stakeouts from all utilities concerned. Before exposing any

underground utility which may be encountered in the course of construction, the Authority concerned must be notified 48 hours in advance. Any disturbances of existing underground utilities must meet with the approval of the Authority concerned.

The Region will, at the Contractor's request, stake out the existing watermain. The Contractor is not to sawcut the asphalt until the stake out has been done.

The Contractor is to note that if the Region is unable to stake-out the sanitary sewer connections, the Region will provide the Contractor with a T.V. report showing the location of the tee for the sewer connections.

Storm sewer connections are under the jurisdiction of the City. There will be no stake out from the City. If the Contractor damages any storm sewer connections due to his operations, the Contractor has to repair or replace same to the satisfaction of the Engineer. The cost for such repair should be included in the price for the watermain or sanitary sewer construction.

If the Contractor damages a water service which is found over 1 metre from the stake-out, the Region will only pay the Contractor for the repair cost. No claim will be accepted for the delay due to incorrect stakeout.

SG.15.3 Crossing the Existing Utilities

The Contractor is required to verify the elevation of all existing utilities at the crossing point by test holes so that the watermain can be adjusted to clear them. No extra will be allowed for this work except through payment under the appropriate tender items.

SG.15.4 Protection of Live Utilities

The Contractor will be held responsible for the protection of all live utilities whether aerial or underground, including telephone cables, hydro cables, gas main, water main, sewers, cable t.v., etc., during the time of construction and will be held liable for any damage to same. The Contractor shall, at his expense, and as required by the Engineer or respective utility company, hand dig to accurately locate any underground utility. He shall assume that the utility is within 1 metre either way of the stake out. This includes hand digging at the Contractors expense, all excavations located within l

metre (horizontally measured), from a gas main or gas service whether or not the gas main or gas service is shown on the contract plans and drawings.

The Contractor shall, at his expense, provide for the temporary support of all existing services being crossed by the proposed works including the temporary support of utility poles. Such support shall be in accordance with the requirements of the respective utility and the Engineer. Where concrete and timber is ordered left in place by the Engineer, it may be paid for by the Region under the appropriate items in the Form of Tender.

Should any drains, cables, culverts or other utility within the limits of this contract be unexpectedly encountered, the Contractor shall protect such utility and shall immediately notify the Engineer in writing.

SG.15.5 Removal of Abandoned Utilities

The Contractor assumes all risks and responsibilities to remove abandoned underground utilities which interfere with the proposed works as directed by the Engineer. All abandoned underground utilities removed by the Contractor shall be disposed of off site at the Contractor's expense. This applies to all abandoned utilities shown on the contract plans and drawings. Remaining abandoned underground utilities shall be adequately blocked at the Contractor's expense. The Contractor may be entitled to additional payment under the appropriate item in the Form of Tender for such remedial works.

SG.15.6 Conflicts with Utilities

The Contractor assumes all the risks and responsibilities arising out of any conflicts between the proposed works and existing utilities whether or not the utilities are shown on the contract plans and drawings. Where such conflicts occur, the Engineer shall forthwith advise the Contractor of the necessary remedial action which may include additional trenching, relocation of the utility or other such measures. The Contractor may be entitled to additional payment under the appropriate item in the Form of Tender for any such remedial works.

SG.16 REGULATION OF PITS AND QUARRIES

The Contractor shall have regard to the provisions of the *Aggregate Resources Act*, R.S.O. 1990, Ch. A.8. and regulations thereto, as amended.

All costs related to this statute will be deemed to have been included in the appropriate tender items and no separate payments will be made .

SG.17 WEIGHING MATERIALS

For the purpose of measuring items to be paid for by weight, the Contractor, at his own expense, shall arrange for access to a truck as requested by the Engineer. The scale shall be of sufficient capacity and dimensions to fully contain the loaded vehicle in one setting and to permit weighing of the entire load in one operation.

Weight tickets shall be supplied by the Contractor showing the date, source of material, type of material, truck number, gross, tare and net weights, place of dumping, and providing spaces for the signature of the weighman and the Engineer or his agent.

The two (2) copies of the weight tickets, filled in by the weighman, shall be delivered by the truck driver to the Corporation's agent in the field at the dumping point. The Corporation's agent will then fill in the place of dumping and sign both copies, keep one and the other to be returned to the scales by the driver. Tickets shall be kept separate for each day and for each type of material weighed.

Tickets not signed by the Corporation's agent by the day's end, will not be accepted for payment.

Underloads

A charge for liquidated damages will be imposed by the Region of Peel relating to underloads. The Engineer will spot check vehicles throughout the Contract at a conveniently located weight scale. If the check weight is found to be less than that indicated on the weigh ticket, the difference in tonnage will be applied to all the loads delivered to the project on that one day. All costs herein involved are to be borne by the Contractor.

SG.18 DISPOSAL OF SURPLUS OR UNSUITABLE EXCAVATED MATERIALS

Material excavated in carrying out the work of the various tender items included in this Contract and which is unsuitable for or which is surplus to the requirements for backfill or embankment construction, shall be disposed of by the Contractor outside the limits of this Contract at locations arranged for by the Contractor. Broken concrete, curbs, asphalt and other debris must be removed from the site as soon as possible and not accumulated.

SG.19 OTHER CONTRACTORS WITHIN OR ADJACENT TO THE LIMITS OF THE CONTRACT

As other work may be in progress within and adjacent to the limits of this Contract the Contractor shall co-operate with other Contractors or Utility Companies and they shall be allowed free access to their work at all times. The Engineer reserves the right but shall not be required to alter the method of operations on this Contract to avoid interference with other work.

In order to co-ordinate his work with that of others, the Contractor shall notify the utility companies and others 48 hours prior to commencing work.

SG.20 PROTECTION OF EXISTING WATERMAIN AND WATER SERVICES

SG.20.1 Excavation under Watermains

In the case of a trench crossing under an existing cast iron watermain, the maximum unsupported length of watermain before replacement with approved material is required, shall be selected from the following table:

	STABLE SOIL		UNSTABLE SOIL	
	Maximum Allowable Unsupported Length of Watermain No Joint Exposed		Maximum Allowable Unsupported Length of Watermain No Joint Exposed	
W/M Dia.	W/M at 1.5 m Cover	W/M at 2.5 m Cover	W/M at 1.5 m Cover	W/M at 2.5 m Cover

100 mm	1.4 m	1.0 m	1.0 m	0.8 m
150 mm	1.7 m	1.4 m	1.4 m	1.1 m
200 mm	2.0 m	1.7 m	1.7 m	1.5 m
250 mm	2.5 m	2.1 m	2.0 m	1.8 m
300 mm	3.0 m	2.7 m	2.5 m	2.1 m

In the foregoing, if a joint is within the unsupported watermain length, the maximum allowable length is to be reduced by 50%.

Stable soils shall be defined as either shale or cohesive soils (clay and clayey soils) and unstable soils shall be fills and non-cohesive soils (gravel, sand, silt and gravely soils).

Allowable conditions for depth of watermain between 1.5 m and 2.5 m may be interpolated from the above table. For depth of watermain greater than 2.5 m, the allowable condition may be extrapolated from the table, but no greater than 3 m.

If the vertical separation between the watermain and the sewer is greater than 1.2 m, shoring shall be left in place to maintain a secure trench wall.

The protection of cast iron watermains larger than 300 mm will be considered on an individual basis.

SG.20.2 Tunnelling under Watermains

When tunnelling under an existing cast iron watermain, the minimum length of tunnel shall be 1.5 m, and the minimum vertical separation from tunnel roof to watermain shall be 1 m. The void in the tunnel is to be pressure filled with grout.

SG.20.3 Interruption of Water Service

The vendor shall insure minimal water service interruption during the installation and connection of new watermains and services. Each interruption of service other than for individual residents, will require approval from the Project Manager. If warranted, the Project Manager may specify that certain water service interruptions be restricted to night time, Sunday's or holidays. In these cases the Vendor will be eligible to claim extra costs for labour only. No extra claims for labour will be considered for works performed on Saturdays.

SG.21 WORK OVER OR IN THE VICINITY OF GAS MAINS

This section covers precautions necessary when heavy construction equipment (gross weight greater than 10 tonnes) is to be operated in the vicinity of buried pipelines where no pavement exists or where grading operations are taking place. This shall apply to the prime Contractor as well as his sub-contractors and suppliers involved in heavy equipment operation.

The location of the gas main must first be staked out by the gas company.

The Contractor will confirm the location and depth of the main by excavating test holes as necessary and paid for under the appropriate tender items.

SG.21.1 Equipment Moving Across Pipeline

Crossing locations for heavy equipment are to be kept to a minimum.

The crossing locations shall be determined between the Utility Company's inspector and the Contractor after reviewing the nature of the construction operations, the types and number of equipment involved, as well as the line and depth of the existing gas main.

Once the crossing locations have been established, heavy equipment shall be restricted to crossing at these locations only. The Contractor shall ensure that his personnel are made aware of these restrictions.

Pipelines shall be protected from possible damage at crossing locations by constructing beams over the staked line unless a minimum cover of twice the pipe diameter or 1.0 m (whichever is greater) has been verified. When required, beams for pipe sizes less than NPS 12 shall have a minimum depth of 0.5 m NPS 12 and larger lines require a minimum berm depth of 1.5 m.

Equipment shall be operated at "dead-slow" speeds when crossing pipelines in order to minimize impact loadings

Any works by any means occurring with-in 30m of a National Energy Board (NEB) regulated pipeline (such as TNPL, ICPL, Enbridge Pipelines, etc) will require the vendor to make application in writing to the pipeline company affected for approval. Upon written approval from the pipeline company the vendor must submit notification of commencement of construction to the pipeline

company prior to commencement and arrange for inspection no less than 3 working days prior to commencement.

SG.21.2 Equipment Moving Along Pipeline

Heavy equipment may be operated parallel to existing pipelines provided that a minimum offset of 1.0 m is maintained on sizes less than NPS 12, and 2.0 m on NPS 12 and larger lines.

Only lightweight rubber-tired equipment shall be operated directly over existing gas pipelines unless a minimum pipe cover of twice the pipe diameter or 1.0 m (whichever is greater) can be verified.

When working directly over existing gas pipelines all equipment movements shall be transverse to staked location rather than parallel to it.

SG.21.3 Compaction Equipment

Unless specified otherwise by the Operating Authority hand-held compaction equipment shall be used within 1.0 m of the sides or top of all gas pipelines.
Heavier compaction equipment may be used once pipe cover equals the greater of twice the diameter or 1.0 m.

SG.22 DEPTH OF EXCAVATION AND TRENCH STABILIZATION

SG.22.1 Depth of Excavation

Trenches shall be excavated to the depth required by the foundations of the pipe and appurtenances shown on the drawings and, where conditions make it necessary, to such additional depth as may be required by the Engineer. The bedding shown in the Contract drawings shall be placed on undisturbed ground. No adjustments in payment will be made where the depth of excavation varies due to change in pipe elevation not exceeding 300 mm. For grade changes of more than 300 mm, additional payment shall be in accordance with the appropriate tendered unit price in the Form of Tender.

SG.22.2 Trench Stabilization

Where the excavated trench is in close proximity to an existing curb or utility trench (i.e. watermain, sewer), it is the Vendor's responsibility to stabilize the trench in a suitable manner to install the watermain/sanitary sewer, at their own cost. The Vendor is further reminded that slow progress due to close proximity to the existing watermain or other utilities will not be compensated.

SG.23 TEMPORARY RESTORATION

Cold mix asphalt must be placed at the road crossings immediately after backfill. The unit price for installation of cold mix asphalt shall include the cost of removal and disposal of the cold mix asphalt and excess Granular "A" material for the final re-instatement with hot mix, hot-laid asphalt. In addition, where two full lanes of traffic cannot be maintained at the end of each day, the Vendor shall place sufficient width of cold mix at the edge of the roadway to provide a two-lane platform.

The vendor will maintain the cold mix asphalt in good condition at no additional cost to the Agency until final restoration.

SG.24 SHALE REMOVAL

Shale or thinly bedded limestone material which may be encountered in road, sewer, utility or pole base excavation and which, in the opinion of the Engineer, may be removed by conventional excavation methods using a hydraulic backhoe shall not be classified as rock and no extra payment will be considered.

SG.25 EXISTING ROAD

The Contractor should be very careful to choose and operate his equipments to avoid any damage to existing roads. Any existing asphalt, concrete curbs and sidewalks, shoulder or grass areas, which are damaged by the Contractor due to his operation, will be replaced by the Contractor to the satisfaction of the Engineer at the Contractor's cost. Concrete sidewalks and curbs which are damaged by the Contractor have to be removed from joint to joint and reconstructed to the requirement of the applicable Municipality.

SG.26 EXISTING TREES

All trees have to be preserved and protected unless otherwise instructed by the Engineer prior to the commencement of the works. Larger mature trees will require tunnelling (or auguring) anywhere within the dripline (the outer most edge of the tree crown) of the tree.

No storage of excavated material, construction equipment and material or fuel will be allowed on a boulevard or road close to a tree.

Should installation of new (or replacement of existing) private services to or beyond the streetline conflict with an existing tree, the contractor will be required to auger these particular service leads.

Any construction equipment having vertical exhaust stacks must have horizontal stack deflectors to prevent exhaust damage to existing street trees. Deflectors must be adjusted in such a way so that hot exhaust gases are directed away from trees or portions thereof.

Any articulating arm equipment (eg. cranes, backhoes) must not operate under the crowns of any street trees where the articulating arm can come in contact with the branches. If this is unavoidable, the contractor must arrange for an on site inspection as soon as possible and proceed only after an approval by the Engineer.

Any roots or branches damaged as a result of excavating must be properly pruned to reduce further injury to the tree(s).

Any compensation to homeowners or municipalities for damaged or dead trees resulting from the Contractors operations will be the sole responsibility of the Contractor.

SG.27 EROSION CONTROL

Erosion control and sedimentation control measures as required by the appropriate Conservation Authority shall be incorporated in the works to ensure that there is no sediment discharge to the watercourses. These may include sedimentation ponds, straw bales, rip-rap dams, filter beams, siltation fences or sand bags as required to retard and filter sedimentation from the construction area.

The payment for these works including all labour and materials for construction and maintenance of these devices in good working order will be as per the appropriate tender item in the Form of Tender.

THE REGIONAL MUNICIPALITY

OF PEEL

STANDARD SPECIFICATIONS

FOR

WATERMAINS

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W.1. GENERAL

The Regional Municipality of Peel Public Works (PW) Design, Specifications and Procedures Manual shall form a part of the Contract Documents.

The following Ontario Provincial Standard Specifications shall also form a part of these contract documents:

OPSS 415 Tunnelling

OPSS 416 Jacking and Boring OPSS

Horizontal Directional Drilling OPSS 503

Site Preparation for Pipelines

OPSS 504 Preservation, Protection and Reconstruction of Existing Facilities

OPSS 514 Trenching, Backfilling and Compacting

OPSS 515 Rock Excavation for Pipe Lines and Associated Structures

OPSS 516 Excavating, Backfilling and Compacting for Manholes and Valve Chambers

OPSS 517 Dewatering

OPSS 538 Shoring and Bracing

OPSS 701 Construction Specifications for Watermain Installation in Open Cut

OPSS 702 Cathodic Protection on New and Existing Watermain

The Safe Drinking Water Act shall also form a part of these contract documents; Safe Drinking Water Act, 2002 – O. Reg. 170/03 as amended.

W.2 SCOPE

The contractor shall furnish all the necessary materials, labour, tools, plant and equipment to construct watermains in accordance with the Contract Documents and Drawings.

W.3 MATERIALS

W.3.1 General

Pipe size and class shall conform to the requirements shown on the contract drawings and/or specified in the Special Provisions. Pipe material shall be selected in accordance with the Material Specifications unless otherwise specified on the contract drawings and/or in the Special Provisions.

All valves, hydrants, fittings and accessories shall be in accordance with the Material Specifications and shall be compatible with the class and type of pipe with which they will be used. All materials contacting potable water must meet NSF/ANSI 61 and all lubricants/chemicals to meet NSF/ANSI 60.

Stainless steel bolt and nuts are to be used on all fittings and joint restraints.

All metallic fittings, valves and joint restraints must be wrapped end to end with an approved corrosion protection system that includes petrolatum primer (paste), petrolatum moulding mastic, and low temperature petrolatum tape.

The contractor shall submit for review, shop drawings of any proposed 400 mm diameter and larger watermains, including special fittings and pre-cast cast in place valve chambers, prior to the manufacturing of watermain materials.

W.3.2 Concrete

Concrete for thrust blocks shall conform to the requirements of OPSS 1301 with a nominal minimum twenty-eight day compressive strength of 15 MPa. Concrete for precast valve chambers to conform to the requirements of OPSS 1351. Thrust blocks as per Region of Peel STD DWG 1-5-4 thru 1-5-7 (inclusive).

W.3.3 Pipe Bedding and Backfill Materials

Bedding material shall be placed as per Standard Drawings unless otherwise specified on the Contract Drawings or within Contract special provisions.

All granular bedding and backfill material shall conform to the requirements of OPSS 1010 and must not contain RCM/RAP.

All concrete bedding material shall conform to the requirements of OPSS 1301 with a nominal minimum twenty-eight day compressive strength of 15 MPa.

All approved native material shall be free from frozen lumps, cinders, ashes, asphalt refuse, organic matter, rocks and boulders or other deleterious materials.

W.4 CONSTRUCTION

W.4.1 Transporting, Unloading and Storing Pipe

Delivery and unloading of pipes and fittings at the job site shall cause the least possible delay to traffic.

All pipes, specials, fittings and gaskets that are unsound or damaged shall be removed from the site and replaced. All used, faded or discoloured pipe are unacceptable and shall be removed from site and replaced.

Mechanical equipment shall be used to unload the pipe.

Materials shall be placed in a safe storage location and the manufacturer's handling and storage recommendations shall be followed.

W.4.2 Installation of Pipes

Pipes shall, at all times, be handled with care to avoid damage. Damaged pipe shall be removed and shall be replaced at the Contractor's expense.

Pipe shall be lowered into the trench as per manufacturers handling recommendations and shall be laid with Bell ends facing the direction of laying, unless otherwise directed by Project Manager or designate.

Pipes and bedding materials shall not be laid on frozen ground. Pipes shall be handled with special care during temperatures below freezing and as required by the manufacturer. All work shall be protected from freezing.

Pipes shall be laid on the prepared bed, true to the line and grade as shown on the Contract Drawings. The barrel of each pipe shall be in contact with the shaped bed throughout its full length.

Pipe shall be kept clean as work progresses. Pipe shall not be installed if it has clay, soil, chemicals or other deleterious material on the inside surface of the pipe.

Water shall not be allowed to flow through the pipe during construction. The trench shall be kept in dry condition and pipe shall not be laid in water. A removable watertight bulkhead shall be installed at the open end of the last pipe laid whenever work is suspended. The Contractor is not allowed to install any watermain until he has a night plug on site. The night plug is to be used every time when work is stopped.

Pipe shall not be laid until the preceding pipe joint has been completed and the pipe is carefully embedded and secured in place.

W.4.3 Pipe Bedding and Backfill

Bedding materials shall be placed as shown on the Standard Drawings unless otherwise shown on the Contract Drawings or within Contract special provisions.
The bed shall be shaped true to line and grade, free from depressions and high points, according to the grades of the bottom of the watermain pipe. The pipe shall then be lowered to the trench, as per manufacturer's recommendations, and laid on the bedding. The remaining bedding material shall be placed simultaneously on each side to the spring line of the pipe.

Where concrete bedding is specified, the pipe shall be supported on grade and alignment by solid concrete block having the same

minimum compressive strength as the specified bedding, spaced so that no movement of the pipe occurs during placement of concrete.

At pipe joints, bedding material shall be left clear of the joints to permit their completion as specified elsewhere. After the connection has been completed, approved bedding material shall be placed under the joint and thoroughly tamped to the compaction specified.

Pipe bedding and backfill shall be compacted as follows:

a)	Bedding Material	100% Standard Proctor Density
b)	Backfill Material	
	i) Under pavement, gravel road, driveway gravel shoulder, sidewalk, curb and within 1.5 m of the edge of pavement	100% Standard Proctor Density
	ii) Other areas	95% Standard Proctor Density

Unshrinkable fill is to be used when specified by the Special Provisions and/or Road Cut Permit and/or shown on drawings shall conform to OPSS 1359.

Excavations backfilled with unshrinkable fill shall be covered with:

a) Steel plates shall be rated for minimum of H-20 loading in paved areas, driveways and areas used by vehicles.

b) Wood planks or other material approved by the Engineer in areas used by pedestrians.

W.4.4 Jointing Pipes

W.4.4.1 General

Joint surfaces shall be clean. Pipe ends shall be lubricated with material recommended by the pipe manufacturer.

Manufacturer's instructions for jointing pipes shall be followed.

Pipes shall be aligned to previously laid pipe.

Pipe shall be pulled or pushed only by hand or power operated winch. A backhoe shall not be used for homing the pipe.

Joints shall be prevented from opening after the pipe has been laid.

W.4.4.2 Jointing Ductile Iron Pipe

W.4.4.2. (a) Mechanical Joints:

The gland shall be positioned on the pipe with the lip extension toward the joint. The gasket shall be slipped on the pipe with the thick edge towards the gland.

The spigot end shall be pushed to its seat in the bell. The gasket shall be pressed to seat it evenly around the joint.

Move gland into position for bolting; insert all bolts and make nuts finger tight, keeping the spigot end centrally positioned within the bell. Bring up the gland evenly -- first tighten the bottom bolt then the top one and remaining bolts alternately from side to side.

Tighten the nuts half a turn at a time with a calibrated torque wrench. All nuts shall be tightened uniformly to the torque specified in AWWA C111/A21.11.

W.4.4.2. (b) Bell and Spigot Joints:

The gasket shall be placed in the groove of the bell making certain it is properly seated. (Warm the gasket in cold weather.)

The gasket shall be lubricated with an NSF/ANSI 60 certified product.

Pipes to be joined shall be aligned and the spigot shall be carefully entered into the bell unit until the spigot end just makes contact with the gasket.

The entry of the spigot into the bell shall be completed by hand or by use of a jack-type pulling tool until the second reference mark is flush with the face of the bell. A backhoe shall not be used for homing the pipe.

W.4.4.3 Jointing Concrete Pressure Pipe

W.4.4.3 (a) Bell and Spigot Joints:

A cotton or burlap diaper shall be placed around the bell end of the pipe already in place.

A rubber gasket shall be placed on the spigot end of the pipe to be laid ensuring that the stretch and volume of the gasket is equalized around the entire circumference of the pipe.

The pipe shall be aligned and the spigot end shall be inserted into the bell of the pipe already in place.

A feeler gauge is to be used to check location of the rubber gasket around the entire circumference of the joint. The pipe shall be pushed until the spigot enters the full depth of the socket and is retained in position.

Cement mortar consisting of one part Portland cement conforming to CSA CAN3-A5-M and three parts mortar sand conforming to OPSS 1004 shall be poured around the assembled joint. Ensure that the diaper is securely placed around the joint recess.

W.4.4.3 (b) Welded Joints

Welding of joints is to be carried out by qualified welders, in strict accordance with the pipe manufacturer's instructions for performing the weld. The joint shall be cement grouted as per Section W.4.4.3 (a) after the welding is completed.

W.4.4.3 (c) Grouting Inside Joint Recesses

The inside joint recess of the concrete watermain 750 mm diameter and larger, shall be finished by placing a sufficient amount of the joint mortar in the bell end against the shoulder of the lining, just prior to installing it in the line. When the pipe has been laid in place, the joint shall be finished off smooth with the inside surface of the lining. The joint mortar shall be composed, by volume, of one part cement, two part sand and dry mixed with sealbond and moistened with just enough water to provide a stiff plastic mix which will not fall out of the joint.

W.4.4.4 Jointing Polyvinyl Chloride (PVC) Pressure Pipe

If gaskets are supplied separately; clean gaskets shall be inserted into the clean groove of the bell end of the pipe.

The spigot shall be lubricated with an NSF/ANSI 60 certified product. The spigot end shall be inserted and pushed into the bell up to but not beyond the depth of the stop reference mark.

Field cut pipe shall be uniform and square; bevel and insertion distance mark shall correspond to that of the factory pipe of the same diameter.

W.4.4.5 Restrained Joints

Restrained joints shall be installed to manufacturer's specifications.

W.4.5 Cutting of Pipe

Whenever cutting of pipe is required, the pipe shall be cut in conformance with the recommendations of the pipe manufacturer.

W.4.6 Thrust Restraints

W.4.6.1 General

All plugs, caps, tees and reducers that are liable to "draw" or blow-off shall be protected as follows:

a) by means of concrete blocking for 300 mm in diameter and smaller.

b) by means of concrete blocking with tie rods and clamps, for 300 mm in diameter and smaller, if water has to be turned on immediately.

c) by means of restrained joints and concrete blocking for 400 mm in diameter and larger and/or as shown on the contract drawings.

Steel rods or clamps shall be stainless steel or as directed by the Project Manager or designate.

W.4.6.2 Concrete Blocking, Anchors and Cradle

Concrete blocking shall be constructed as shown on the Standard Drawings and/or the Contract Drawings. Concrete cradle and concrete encasement around the pipe shall be placed where shown on the drawings or as directed by the Project Manager or designate.

W.4.6.3 Restrained Joints and Concrete Blocking

All plugs, caps, tees, bends and reducers for watermain 400 mm in diameter and larger shall be constructed with restrained joints as shown on Contract Drawings in addition to concrete blocking.

W.4.7 Tracer Wire

Where plastic pipe is used, a tracer wire consisting of 12-gauge TWU stranded copper, light coloured plastic coated tracer wire must be installed with the pipe. The wire shall be laid along the pipe in the bottom of the trench and strapped to the pipe with tape at intervals not exceeding 6m. The wire shall be brought to the surface at all valve boxes of hydrant valves and line valves and a continuous length of wire shall be used between surface points. The wire should be taped to the outside of the valve box so as not to interfere with the operation of the valves. In the case of hydrants, the tracer wire is to be attached to the pipe by means of tape and looped around the base of the hydrant. Any wire joints made at tees etc. must be made with Marr connectors or solder and then wrapped with insulating tape to prohibit corrosion of the wire.

W.4.8 Polyethylene Encasement

Where ductile iron pipe, fittings and appurtenances are used, Polyethylene encasement shall be installed around the pipe as per manufacturer's recommendations.

W.4.9 Change in Line and Grade

Grade and line changes will be by bends or pipe joint deflections noted on the contract drawings.

Any joint deflection shall be 50 percent of the manufacturer’s specifications. PVC “pipe barrel” deflection is prohibited.

W.4.10 Installation of Valves

W.4.10.1 Direct Buried Valves

Valves shall be installed at the locations shown on the Contract Drawings or as directed by the Project Manager or designate. Each valve shall be accurately aligned with connecting pipes and set centered and plumb with box cover flush with the finished grade. Valves shall be installed in accordance with the PW, Design, Specifications & Procedures Manual.

All bolts, nuts, couplings, rubber rings and connecting pieces shall be cleaned thoroughly before installation.

W.4.10.2 Valves in Valve Chambers

Valves shall be installed at the locations as shown on Contract Drawings or as directed by Project Manager or designate. Valves shall be installed in accordance with the PW, Design, Specifications & Procedures Manual.

W.4.11 Installation of Hydrants

Hydrants shall be installed at the locations shown on the Contract Drawings or as directed by the Project Manager or designate.

The hydrant, branch valve and box and hydrant lead shall be installed in accordance with the PW, Design, Specifications & Procedures Manual.

The hydrant shall be plumb with the nozzles parallel to the edge of pavement or curb line and the pumper connection facing the roadway. Each hydrant shall be supported with concrete blocking between the hydrant and undisturbed ground as specified.

W.4.12 Protecto Caps

On all direct-buried and in chamber valves and fittings "Protecto Caps" must be applied all bolts. This provides cathodic protection to the appurtenance as a whole.

The following table illustrates the relationship of bolt diameter versus cap weights:

Bolt Dia.	Cap Weight	Maple Agencies Part No.
12.5mm(1/2”)	90 gr	90P125
10mm (5/8”) small	90 gr	90P095
16mm (5/8”) large	185 gr	185P160
19 mm (3/4")	175 gr	175 P190
22mm (7/8")	150 gr	150P220
25mm (1")	270 gr	270 P250
29mm (1 1/8")	550 gr	550 P285

32mm (1 1/4")	525 gr	525P317
35mm (1 3/8")	500 gr	500P350
38mm (1 ½")	470 gr	470P381

W.4.13 Installation of Service Connections

Water service connections shall be installed from the watermain to the property line at locations shown on the Contract Drawings or as directed by the Engineer, after the watermain has been placed into operation.

Service piping shall be installed, by pressure tap connection in accordance with Standard Drawings. Service saddles shall be used in accordance with the PW, Design, Specifications & Procedures Manual.

Joints and all connections shall be made watertight.

Service boxes shall be set centered and plumb over curb stop at the property limit and flush with the finished grade.

The Contractor shall ensure minimum water service interruption during construction of the watermain. Each interruption of service during connection to the existing watermains or during the transfer of existing water services requires approval by the Engineer. If warranted, the Engineer may specify that certain water service interruption be restricted to off peak hours and/or weekends. No extra payment will be allowed for such off-peak hours and weekend works.

W.4.14 Shutting Down or Charging Mains

The Contractor shall at no time shut down or charge any watermain or operate valves. All closures are to be arranged with the Project Manager or their designate.

W.4.15 Connections to Existing Watermains

Connection of the new watermain to the existing watermain will be permitted only when the new main has passed the bacteriological test(s) and has been accepted by the Agency or as directed by the Project Manager or designate.

The Contractor shall submit to the Project Manager or designate for his review and approval the method and timing of the intended connection.

The Contractor shall provide forty-eight (48) hours notice to the Project Manager or designate prior to making connections to the existing watermains.

All connections to existing watermains shall be made under the supervision of the Regional Inspector. The removal of a plug or blow off from any existing watermain or fitting and reconstruction of the joint will be considered part of the work of constructing the new watermain.

W.4.16 Tapping of Watermains

The Contractor has to arrange with the Agency to perform taps from 100 mm up to and including 300 mm.

The Agency will charge the Contractor for the work as described in the latest user fee by-law.

The number of hours will commence at the time of departure from Agency yard till return.

W.4.17 Boring/Tunneling

Notify the appropriate authority (Railway, MTO, etc.) and schedule work accordingly.

Meet all requirements of the applicable Road Cut Permit Conditions.

Where not specified in the contract documents, furnish and install welded steel casing pipe of the diameter, length and wall thickness specified, shown on drawings. Casing pipe shall be manufactured from structural grade steel conforming to CSA Specification G-40.1 and G-40.4 with electrically welded joints.

Supply the Project Manager or designate with detail drawings showing excavation, shaft, bracing, shoring and full description of the proposed tunnel construction procedure. Shaft drawings, bracing and shoring shall be certified by a Professional Engineer.

Tunnel/auger and jack the casing, advancing liner as materials are removed to complete crossing.

When installing watermains within steel liners, the following shall apply:

1) All casing spacers are to be made of T-304 stainless steel;
2) Bearing surfaces (runners) shall be ultra high molecular weight polymer or equivalent;
3) Positioning of spacers along the watermain is to be as per the manufacturer's specifications;
4) Position of pipe within liner to be centered and restrained, sufficient enough to provide no less than 19 mm (¾ inch) clearance between the casing pipe and the outside diameter of the bell;
5) The watermain shall be restrained laterally for the entire length of the liner and beyond when stated on the Contract Drawings;
6) Liner to be sealed using wrap around rubber ends complete with stainless steel (T-304) banding.

Where the Contract, Project Manager or designate specifies, supply material and grout the watermain pipe inside the casing. Assure that grout fills all spaces between the watermain pipe and the casing shown on the contract drawings

Complete surface restoration at bore pit locations including any granular material asphalt, concrete, sod, topsoil, etc., to match existing or as specified.

W.5 FLUSHING AND TESTING

W.5.1 Hydrostatic Testing

Hydrostatic pressure and hydrostatic leakage tests shall be conducted by the Agency or by the Contractor at his own expense under the supervision of the Regional Inspector upon completion of the watermain and backfilling.

A sustained hydrostatic pressure and hydrostatic leakage test, at 1000 kPa (150 psi), shall be conducted simultaneously for the duration of at least one hour on any test section. No pressure drop is allowed during the one-hour test period.

A test section shall be either a section between valves or the completed watermain as directed by the Project Manager or designate.

The test section shall be filled slowly with water and all air shall be expelled from the pipeline. A period of 24 hours shall be allowed before starting the test except for PVC pipe.

If the test pressure is conducted by the contractor with no pressure drop for one hour the test result will be considered satisfactory. The Agency, then, will approve or disapprove the result by a separate pressure test on the main.

If the pressure test fails, the Contractor shall identify and rectify the problem at his own expense. The Contractor shall then conduct subsequent pressure tests, at his own costs, until a satisfactory result is achieved. Then the Agency will re-test the same section of the watermain to verify the result.

Where any section of the main is provided with concrete reaction blocking, the hydrostatic pressure test shall not be made until at least five (5) days have elapsed after the concrete reaction blocking was installed.

All tapping sleeves and valves 100 mm diameter and larger are subject to hydrostatic pressure and leakage test by the Agency prior to the tapping being carried out.

The Contractor is not permitted to operate any valve that is considered Regional infrastructure. All closures are to be arranged with the Project Manager or their designate.

W.5.2 Swabbing of Watermain

Swabbing of watermain required if two consecutive bacteriological samples fail.

Watermains 150 mm diameter to 300 mm diameter shall be swabbed (following satisfactory completion of the pressure test) with swabs and chlorine solution to render the watermain clean. At least two (2) swabs shall be passed through each new hydrant and the ends of the new watermain.

Swabbing must be carried out by a company specialized in the field and approved by the Agency.

W.5.3 Flushing and Disinfecting Watermain

Following approval of the pressure test of the watermain, the Agency will undertake, at its own expense, flushing, chlorinating and sampling of the watermain. The Contractor should allow two weeks for sampling by the Agency. If the bacteriological test fails twice, any further test and mandatory swabbing, as defined above, will be at the Contractor's cost.

Watermains 50 mm in diameter are to be flushed and sampled only and do not require chlorination.

THE REGIONAL MUNICIPALITY

OF PEEL

STANDARD SPECIFICATIONS

FOR

SANITARY SEWERS

The Regional Municipality of Peel
Standard Specifications for Sanitary Sewers

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The Regional Municipality of Peel Standard Specifications for Sanitary Sewers I N D E X

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S.1 GENERAL

The Regional Municipality of Peel, Public Works (PW) Design, Specifications & Procedures Manual shall form a part of these Contract Documents.

The following Ontario Provincial Standard Specifications shall also form a part of the contract documents:

OPSS 415 Tunneling

OPSS 416 Jacking and Boring

OPSS 503 Site Preparation for Pipelines

OPSS 504 Preservation, Protection and Reconstruction of Existing Facilities

OPSS 514 Trenching, Backfilling and Compacting

OPSS 515 Rock Excavation for Pipe Lines and Associated Structures

OPSS 516 Excavation, Backfilling and Compaction for Manholes and Valve Chambers

OPSS 517 Dewatering

OPSS 538 Shoring and Bracing

S.2 SCOPE

The Contractor shall furnish all the necessary materials, labour, tools, plant and equipment to construct sewage works in accordance with the Contract Documents and Drawings.

S.3 MATERIALS

S.3.1 General

Pipe size and class shall conform to the requirements shown on the contract drawings and/or specified in the Special Provisions. Pipe material shall be selected in accordance with the Material Specifications unless otherwise specified on the contract drawings and/or in the Special Provisions.

S.3.2 Non-Pressure Pipe

Supply type and class of pipes specified in the Special Provisions section and/or indicated on the drawings. The pipe shall conform to the Regional Municipality of Peel – Material Specification, Sanitary Sewer/Forcemains.

S.3.3 Pressure Pipe

Supply type and class of pipe specified in the Special Provisions and/or indicated on the drawings. The pipes shall conform to the Regional Municipality of Peel - Material Specification, Sanitary Sewer/Forcemains.

Tees, bends, valves shall be as specified and shall conform to the Regional Municipality of Peel - Material specification - Material Specification, Sanitary Sewer/Forcemains.

S.3.4 Pre-cast Maintenance Holes

Pre-cast maintenance holes shall be constructed to the Region of Peel standards in accordance with Standard Drawings.

All maintenance holes shall be manufactured to the current applicable A.S.T.M. specifications.

The Contractor shall submit to the Project Manager or designate Shop Drawings for cast-in place manholes for approval.

S.3.5 Cement Mortar

Cement mortar shall be composed of one part portland cement to three parts of sand by volume, mixed dry with enough water added subsequently to give the proper consistency. Mortar shall be freshly mixed for the work on hand and no mortar shall be used that has become hard or that has aged one hour. The cement shall be of a brand that shall meet all the requirements of the specifications for portland cement, as set forth in the current A.S.T.M. specification. The sand used shall consist of clean, sound, sharp and durable grains, free from dirt, dust or clay or other harmful substances. It shall be uniformly graded from 100% passing No. 4 sieve and not more than 10% passing the No. 100 sieve and when tested by the colourimetric method, shall not show a darker colour than a very light amber. The water used shall be clean and free from oil, acids, salts and other injurious substances.

S.3.6 Concrete

Concrete for benching or blocking shall conform to the requirements of OPSS 1350 with a nominal minimum twenty-eight (28) day compressive strength of 15 MPa.

Concrete for precast manholes to conform to the requirements of OPSS 1351.

S.3.7 Pipe Bedding Materials

Bedding material shall be placed as per Standard Drawings unless otherwise specified on the Contract Drawings.

All granular bedding and material shall conform to the requirements of OPSS 1010.

All concrete bedding material shall conform to the requirements of OPSS 1350 with a nominal minimum twenty-eight (28) day compressive strength of 15 MPa.

All approved native material shall be free from frozen lumps, cinders, ashes, asphalt refuse, organic matter, rocks and boulders or other deleterious materials.

S.4 CONSTRUCTION

S.4.1 Transporting, Unloading and Storing Pipe

Delivery and unloading of pipes and fittings at the job site shall cause the least possible delay to traffic.

All pipes, specials, fittings and gaskets that are unsound or damaged shall be removed from the site and replaced. Faded and discoloured PVC pipe are unacceptable and shall be removed from site and replaced.

Mechanical equipment shall be used to unload the pipe.

Materials shall be placed in a safe storage location and the manufacturer's handling and storage recommendations shall be followed.

S.4.2 Installation of Pipes

Pipes shall, at all times, be handled with care to avoid damage. Damaged pipe shall be removed and replaced at the Contractor's expense.

Pipe shall be lowered into the trench carefully and shall be laid with Bell ends facing the direction of laying, unless otherwise directed by the Engineer.

Pipes shall be handled with special care during temperatures below freezing and as required by the manufacturer. All work shall be protected from freezing. Pipes and bedding materials shall not be laid on frozen ground.

Pipes shall be laid on the prepared bed, true to the line and grade as shown on the Contract Drawings. The barrel of each pipe shall be in contact with the shaped bed throughout its full length.

Pipe shall be kept clean as work progresses. Water shall not be allowed to flow through the pipe during construction. The trench shall be kept in dry condition and pipe shall not be laid in water. A removable watertight bulkhead (not applicable for sanitary sewer

replacement) shall be installed at the open end of the last pipe laid whenever work is suspended.

Pipe shall not be laid until the preceding pipe joint has been completed and the pipe is carefully embedded and secured in place.

S.4.3 Pipe Bedding and Backfill

Bedding materials shall be placed as shown on the Standard drawing 2-3-1 unless otherwise shown on the Contract Drawings. The bed shall be shaped true to line and grade, free from depressions and high points. Bedding materials shall be placed in the trench to the grades of the bottom of the pipe. The pipe shall then be lowered to the trench and laid on the bedding material which shall be shaped to conform to the bell end of the pipe. The remaining bedding material shall be placed simultaneously on each side to the spring line of the pipe.

Where concrete bedding is specified, the pipe shall be supported on grade and alignment by solid concrete block having the same minimum compressive strength as the specified bedding, spaced so that no movement of the pipe occurs during placement of concrete.

At pipe joints, bedding materials shall be left clear of the joints to permit their completion as specified elsewhere. After the connection has been completed, approved bedding material shall be placed under the joint and thoroughly tamped to the compaction specified.

Pipe bedding and backfill shall be compacted as follows:

a)	Bedding Material	100% Standard Proctor Density
b)	Backfill Material	
i)	Under pavement, gravel road, driveway gravel shoulder, sidewalk, curb and within 1.5 m of the edge of pavement	100% Standard Proctor Density
ii)	Other areas	95% Standard Proctor Density

Unshrinkable fill is to be used when specified by the Special Provisions and/or Road Cut Permit and/or shown on drawings. It shall conform to OPSS 1359.

Trench excavations backfilled with unshrinkable fill shall be covered with:

a) Steel plates rated for minimum of H-20 loading in paved areas, driveways and areas used by vehicles, as per STD DWG 5-1-4.

b) Wood planks or other approved material in areas used by pedestrians.

S.4.4 Jointing Pipes

S.4.4.1 General

Joint surfaces shall be clean. Pipe ends shall be lubricated with material recommended by the pipe manufacturer.

Manufacturer's instructions for jointing pipes shall be followed.

Pipes shall be aligned to previously laid pipe.

Pipe shall be pulled or pushed only by hand or power operated winch. A backhoe shall not be used for pushing pipe.

Joints shall be prevented from opening after the pipe has been laid.

S.4.4.2 Jointing Polyvinyl Chloride (PVC)

If gaskets are supplied separately; clean gaskets shall be inserted into the clean groove of the bell end of the pipe.

The spigot shall be lubricated. The spigot end shall be inserted and pushed into the bell up to but not beyond the depth of the stop reference mark.

Field cut pipe shall be uniform and square; bevel and insertion distance mark shall be same, corresponding to that of the factory pipe of the same diameter.

S.4.4.3 Jointing Concrete Pipe

Clean both the bell and spigot.

Place gasket on the end of the spigot and lubricate as per manufacturer's specifications.

Insert the spigot end into the bell until seated as per manufacturer's specifications.

S.4.5 Cutting of Pipe

Whenever cutting of pipe is required, the pipe shall be cut in conformance with the recommendations of the pipe manufacturer.

S.4.6 Construction of Maintenance Holes

Maintenance holes shall be constructed wherever shown on the drawings and as directed by the Project Manager or designate in accordance with the Standard Drawings.

Care should be taken to place maintenance hole frames and covers securely and to exact grade as set out by the Project Manager or designate. All maintenance hole frames shall be thoroughly imbedded and held in place by cement mortar.

Moduloc shall be installed as required between the concrete and the cast iron maintenance hole frame and the frame shall be set in cement mortar at least 12 mm thick. Benching shall be composed of 20 MPa concrete; it shall be located as shown on the drawings and in accordance with Standard Drawing 2-1-4 and shall be carefully finished so that the final surface is smooth. Not more than two maintenance holes shall remain incomplete behind the point of pipe laying. Adequate protection and provision for traffic around incomplete maintenance holes must be provided.

S.4.7 Branches and Saddles

The Contractor shall supply and build into the sewer the number of branches and saddles required for sewer connections as shown on the drawings or as directed by the Project Manager or designate. Open ends of branches and saddles shall be sealed with approved stoppers. Notwithstanding the above, saddles may only be used with the written permission of the Project Manager or designate.

S.4.8 Installation of New Sewer Service Connections

The sanitary sewer connection shall be installed from the sewer to the property line or easement limit at the locations as indicated on the contract drawings or as directed by the Project Manager or designate in accordance with Standard Drawings. Sizes and types of fittings shall be as specified. The invert elevation or depth of the test fitting shall be furnished by the Project Manager or designate. Connections to the main sewer shall be made only with manufactured tees or approved saddles.

The ends of all connections shall be left exposed at the streetline for the inspector to inspect and to tie in the clean out for location and elevation. The Contractor shall place a length of 38 mm x 38 mm lumber of sufficient length to run vertically from the clean out to 150 mm below the ground surface.

No drilling or boring will be allowed except in special circumstances and only after obtaining the approval of the Project Manager or designate.

S.4.9 Bulkheads

The sewers under construction shall be bulkheaded, as required, in such a manner as to prevent infiltration or flushing water entering existing sewers. Installation of required bulkheads and their subsequent removal on completion of the work shall be at the Contractor's expense.

S.4.10 Sanitary Sewer Replacement

S.4.10.1 Sewage Flow

The Contractor shall take careful note that existing sanitary sewers and connections contain a steady flow of sanitary sewage. The volume of sewage flow may increase during wet weather. The Contractor shall take this matter under advisement when bidding for the contract.

The Contractor shall have on the site at all times pumping equipment in good working condition, for the purpose of maintaining the sewage flow. No sewer or service connection shall be blocked or partially blocked without

written permission from the Region of Peel Engineer. No separate payment shall be allowed to meet the requirements of this clause.

S.4.10.2 Disposal of Existing Material

The Contractor shall remove and dispose off site the existing sewer and maintenance holes as shown on contract drawings. Existing material shall be taken to an approved dump site rather than a Regional facility.

S.4.10.3 Service Connections

The Contractor shall remove and replace the existing sanitary lateral from the main to the property line. A new clean out tee is to be installed at the property line.

Any abandoned sections of services shall be plugged with concrete and capped at main.

Services shall be installed in accordance with Standard Drawings and in the location as shown on the contract drawings or as directed by the Engineer.

Existing sanitary sewer connections have to be transferred to the main sewer at the time the sewer is installed to maintain the service. Before the connection is transferred to the proposed sewer, the Contractor is required to allow and assist the Agency to inspect the condition of the sewer connection. No extra payment will be allowed for this.

If the condition of an existing sewer connection is unacceptable, the Agency will authorize the Contractor to replace the sewer connection, and the Contractor will receive payment for the replacement according to the tender price.

No drilling or boring will be allowed except in special circumstances and only after obtaining the approval of the Project Manager or designate.

The Contractor shall note that the locations of connections shown on the drawings are approximate only.

S.4.11 Boring/Tunneling

Notify the appropriate authority (Railway, MTO, etc.) and schedule work accordingly.

Meet all requirements of the applicable Road Cut Permit Conditions.

Furnish and install welded steel casing pipe of the diameter, length and wall thickness specified, shown on drawings. Casing pipe shall be manufactured from structural grade steel conforming to CSA Specification G-40.1 and G-40.4 with electrically welded joints.

Supply the Project Manager or designate with detail drawings showing excavation, shaft, bracing, shoring and full description of the proposed tunnel construction procedure. Shaft drawings, bracing and shoring shall be certified by a Professional Engineer.

Tunnel/auger and jack the casing, advancing liner as materials are removed to complete crossing.

When installing sanitary sewer within steel liners, the following shall apply:

1) All casing spacers are to be made of T-304 stainless steel;
2) Bearing surfaces (runners) shall be ultra high molecular weight polymer or equivalent;
3) Positioning of spacers along the sanitary sewer is to be as per the manufacturer's specifications;
4) Position of pipe within liner to be centered and restrained, sufficient enough to provide no less than 19 mm (¾ inch) clearance between the casing pipe and the outside diameter of the bell;
5) The sanitary sewer shall be restrained laterally for the entire length of the liner;
6) Liner to be sealed using wrap around rubber ends complete with stainless steel (T-304) banding.

Where the Contract, Project Manager or designate specifies, supply material and grout the sanitary sewer pipe inside the casing. Assure that grout fills all spaces between the sanitary sewer pipe and the casing shown on the contract drawings

Complete surface restoration at bore pit locations including any granular material asphalt, concrete, sod, topsoil, etc., to match existing or as specified.

S.5 FLUSHING AND TESTING

S.5.1 Flushing

The Contractor shall flush and thoroughly clean all sewers. The Contractor shall provide all equipment and water required for this operation. Access to water through approved meter permit or bulk water station only.

S.5.2 Test Requirement

S.5.2.1 Deflection Test

P.V.C. pipe shall be tested for any deflection after installation and prior to acceptance.

In the presence of the Project Manager or designate, the Contractor shall pull a plug or a ball through the installed pipe line not sooner than 24 hours after completion of backfilling. The plug or ball shall not be less than 95% of the minimum internal diameter of the new pipe.

Any deficiency shall be corrected at the Contractors expense and the sewer line shall be re-tested.

S.5.2.3 Field Testing

Field tests described in this subsection shall be conducted when specified in the Contract Documents and applied to sanitary and storm pipe sewers. All tests shall be carried out in the presence of and accepted by the Contract Administrator.

When specified in the Contract Documents, leakage tests shall be carried out on completed pipe sewers 1,200 mm in diameter and smaller. There shall be no visible leakage for pipe sewers larger than 1,200 mm in diameter.

Testing shall be carried out from maintenance hole to maintenance hole, including house service connections as work progresses.

The construction of new mainline sewers shall not proceed when three previously placed sections of the pipe have not been tested or have been tested and are unsatisfactory.

Leakage up to 25% in excess of the calculated limits shall be approved in any test section provided that the excess is offset by lower leakage measurements in adjacent sections such that the total leakage is within the allowable limits for the combined sections.

Pipe sections shall be repaired and retested, as required, until the test results are within the limits specified in this specification. Visible leaks shall be repaired regardless of the test results.

No part of the work will be accepted until the pipe sections are satisfactorily tested following completion of installation of service connections and backfilling.

S.5.2.4 Prequalification Leakage Tests

When specified in the Contract Documents, prequalification leakage tests shall be carried out as either infiltration or exfiltration tests as required.

The test shall be performed on the first section of the pipe sewer of each size, not less than 100 m in length, installed by each crew in order to prequalify the crew and the material. Tests may be carried out prior to service connections being installed in the section being tested.

When tests are unsatisfactory, the test shall be repaired and retested until satisfactory results are obtained.

S.5.2.5 Infiltration Test

Discontinue dewatering operations at least three days before conducting the test and allow the groundwater level to stabilize. Infiltration tests shall be conducted where the groundwater level at the time of testing is 600 mm or more above the crown of the pipe for the entire length of the test section. The test section is normally between adjacent maintenance holes.

A watertight bulkhead is constructed at the upstream end of the test section. All service laterals, stubs, and fittings are

plugged or capped to prevent water from entering at these locations. A V-notch weir or another suitable measuring device shall be installed at the downstream end of the test section. Infiltrating water is allowed to build up behind the weir until flow through the V-notch has stabilized. The rate of flow is then measured. The rate of flow shall not exceed the maximum allowable infiltration calculated for the test section. Allowable infiltration is calculated as 0.075 litres/millimeter diameter/100 metres of pipe sewer/hour.

S.5.2.6 Exfiltration Test

Exfiltration tests shall be conducted where the groundwater level is lower than 600 mm above the crown of the pipe or the highest point of the highest service connection included in the test section.

The test section is normally between adjacent maintenance holes. The test section of the pipe sewer shall be isolated by temporarily plugging the downstream end and all incoming pipes of the upstream maintenance holes. All service laterals, stubs, and fittings are plugged or capped to prevent water from entering at these sections.

S.5.2.7 Testing with Water

The test section shall be slowly filled with water making sure that all air is removed from the line. A period of 24 hours for absorption or expansion shall be allowed before starting the test, except if exfiltration requirements are met by a test carried out during the adsorption period.

Water shall be added to the pipeline prior to testing until there is a head in the upstream maintenance hole of 600 mm minimum over the crown of the pipe or at least 600 mm above the existing groundwater level, whichever is greater. The maximum limit of the net internal head on the line is 8 m. In calculating net internal head, allowance for groundwater head, if any, shall be made.

The distance from the maintenance hole frame to the surface of the water shall be measured. After allowing the water to stand for one hour, the distance from the frame to the surface of the water shall again be measured. The leakage shall be calculated using volumes.

The leakage at the end of the test period shall not exceed the maximum allowable calculated for the test section. Allowable leakage is calculated as 0.075 litres/millimetre diameter/100 metres of pipe sewer/hour.

An allowable of 3.0 litres per hour per metre of head above the invert for each maintenance hole included in the test section shall be made.

Maintenance holes shall be tested separately, if the test section fails.

S.5.2.8 Low Pressure Air Testing

The Contract Administrator may allow or require testing by use of air where water is not readily available of the differential head in the test section is greater than 8 m or freezing temperatures exist.

Air control equipment that includes a shut off valve, safety valve, pressure regulating valve, pressure reduction valve and monitoring pressure gauge with pressure range from 0 to 35 kPa with minimum divisions of 0.5 kPa shall be recorded.

The time taken for a pressure drop of 3.5 kPa shall not be less than the time shown in Table 1 for the appropriate size pipe.

If the results of an air test are marginal, the Contract Administrator may require the section to be retested using water.

S.5.2.9 Deflection Testing of Pipe Sewers

Ring deflection testing shall be performed on all pipe sewers constructed using plastic pipe. The allowable deflected pipe diameter is calculated as:

Pipes 100 to 750 mm:	7.5% of the Base Inside Diameter of the Pipe
Pipes Greater Than 750 mm:	5.0% of the Base Inside Diameter of the pipe

Where:

Base Inside diameter is defined in the C.S.A or A.S.T.M standard to which the pipe is manufactured.

A suitably designed device as defined shall be pulled through the pipe sewer to demonstrate that the pipe deflection does not exceed the allowable deflected pipe diameter. The device shall be pulled manually through the pipe not sooner than 30 days after completion of backfilling and installation of service connections.

The suitably designed device shall be a mandrel, cylindrical in shape, and constructed with an odd number of evenly spaced arms or prongs, minimum 9 in number. The minimum diameter of the circle scribed around the outside of the mandrel shall be measured between the points of contact on the mandrel arm or between sets of prongs. This length shall not be less than that shown in table 2.

The mandrel shall be checked with a go-no-go proving ring. The proving ring shall have a diameter equal to the allowable deflected pipe diameter ± 0.1 mm. An acceptable mandrel shall not pass through the proving ring. The proving ring shall be fabricated from steel a minimum of 6 mm thick.

Any section of the pipe that does not allow the mandrel to pass shall be considered to have failed the deflection test.

All section of the pipe that fail the deflection test shall be repaired and retested.

S.5.2.10 Cleaning and Flushing of Pipe Sewers

When specified in the Contract Documents, all pipe sewers shall be cleaned and flushed just prior to inspection and acceptance.

S.5.2.11 Clay Seals

Clay seals shall be placed as specified in the Contract Documents and compacted to 95% of the maximum dry density.

S.5.2.12 Concrete Appurtenances

Concrete appurtenances shall be constructed as specified in the Contract Documents. Concrete in concrete

appurtenances shall be placed according to OPSS 904. Steel reinforcement shall be placed according to OPSS 905. Steel grading shall be installed, when specified in the Contract Documents.

S.5.2.13 Maintenance Hole Inspection

Maintenance hole inspection is to completed once the base asphalt is layed.

S.5.2.14 Site Restoration

Site restoration shall be according to OPSS 507.

S.6 C.C.T.V. INSPECTION

S.6.1 Flushing

The sewer sections and maintenance holes must be clean before inspection.

If not, they shall be thoroughly flushed and all silt, debris, grease. Solid or semisolid material shall be removed at the down stream maintenance hole and disposed of at an authorized site. A high velocity truck mounted sewer flusher complete with its own water tank shall be used. A hydrant permit must be obtained for water tank filling for the procedure.

Precautions shall be taken to ensure that flooding or damage does not occur due to water pressures or the debris build-up resultant from flushing operations.

The flusher may also be used to draw down flows in instances where the pipe invert or entire pipe cannot be seen, but when the flusher is used for this purpose it must be noted when ponding problems are present.

S.6.2 Plugging/Blocking or By-Pass Pumping

Before plugging, blocking or by-passing of a section of sewer the Agency must approve the location and duration of the operation. Plugging, blocking or by-pass pumping is only to be used when the inspection is hampered by excessive flows of over 1/2 pipe. The Contractor must continually monitor flows so that no surcharging of the sewers in question occurs. (If flows are excessive, see by-pass pumping).

S.6.3. Plugging/Blocking

A sewer plug shall be inserted into the line at a maintenance hole upstream from the section to be inspected when sewer flows are above the minimum of 1/2 pipe and/or the inspection is impeded by heavy flows. The plug is required to substantially shut-off flows to permit inspection of the pipe. After the inspection is completed, flows will be returned to normal and the Project Manager shall be informed that the procedure is completed. Blocked flows must not be permitted to exceed existing building foundations or ground

levels. Where risk of property damage or environmental impact is high, trucking or by-pass pumping must be used.

S.6.4. Pumping or By-Passing

When adequate flow control cannot be obtained by plugging methods, pumps or siphons shall be used to divert all or a portion of the flows as may be necessary to perform the specified inspection. Excess sewage flows shall be transported through closed pipeline to a downstream manhole or by tank truck to the nearest approved disposal area. The Project Manager shall be informed once the procedure is completed and flows have returned to normal.

S.6.5 Inspection

Sewer inspections shall be performed to observe and record structural conditions, service defects and construction features, to assess thoroughness of cleaning, and to verify and asses the quality of new installations and rehabilitation works prior to acceptance.

The inspection shall be a continuous unedited examination of the entire length of sewer main. The face of the start maintenance hole shall be clearly visible at the start of the inspection and the picture shall be in focus from the point of observation to a minimum of two pipe diameters ahead.

The inspection will be performed on a single maintenance access chamber run, and is to begin and end in the center of a maintenance access chamber and shall be accurate to 1% of the actual sewer length as verified by a steel tape measurement in the field by the Contractor. Agency personnel, at its sole discretion, may check as to the accuracy of these measurements and payment will be adjusted accordingly.

The inspection DVD recording will have a continuous chainage indicated and the maintenance access chamber numbers of the section being inspected on the screen at all times.

The CCTV inspection of each sewer shall be done in the same direction as the sewer flow unless circumstances prevent this. If this occurs, the sewer main shall then be inspected against the flow, and this action shall be noted in the report and on the video at the beginning only.

Prior to commencing an inspection, the Contractor will ensure that 75% of the diameter of the pipe is visible. The Contractor will be expected to camera inspect the entire length of the pipe.

Multiple attempts to camera inspect a section will be done at the Contractor's expense.

The Contractor shall provide all necessary equipment to produce "fog free" conditions in the sewer. The Contractor will ensure the camera lens is free from debris to ensure high picture quality.

Video with excessive fog will not be accepted and the sewer lines must be re-inspected at the Contractor's expense.

The speed with which the inspection is preformed must ensure that a clear image of the inside periphery of the pipe is provided. The maximum camera speed during inspection shall follow NAAPI specifications.

If a fault or lateral is noted, the camera is to halt and a detailed (pan-and-tilt) inspection of the area is to be recorded. Pan and tilt operations will be done slowly so that all details of items noted in the report are fully captured. All connections are to be viewed as far as possible into the service.

The Contractor shall provide all necessary equipment and labour to access locked down/bolted down maintenance holes, including proper securing of maintenance hole lids after completion of inspection.

If inspection of an entire sewer cannot be completed due to collapse, excessive deformation or solid debris, intruding connections, obstructions, or large displaced joints, the equipment shall be moved to the downstream maintenance hole and inspection again attempted. If complete inspection still cannot be performed, the Contract Administrator shall be immediately advised. Jointly, the Contract Administrator shall decide to:

a) Abandon the inspection
b) Re-perform the inspection subsequent to:
    i. Cleaning of sewer
    ii. Performing solid debris cutting
    iii. Removing intruding connections.

The Contractor shall take careful note that the Region of Peel "Safety Procedures" requirements exceeds the minimum requirements of the Ontario Health and Safety Act. A minimum of one member of the Contractor's staff performing work at each work site on this contract shall possess a certificate of completion of a safety course equivalent to the Agency requirements. A proof of compliance with this clause shall be submitted at a meeting prior to the commencement of the Contract.

For all work in and around the sanitary maintenance access chambers, a person qualified in Confined Space Entry shall be present. Proof of atmospheric testing of each maintenance access chamber where work was performed shall be submitted to the Agency on the Region of Peel Confined Space Entry form.

The Contractor will ensure that all staff have been trained in the WRC format and that they are providing clear and accurate interpretations of this data.

S.6.6 Reports – Specifications

The Vender shall submit to the Agency the completed "TV Inspection Report" (as stipulated below) of work completed.

Each report shall contain:

- Exact distance from the starting maintenance hole to defects, abnormalities and general condition of the sewer line. All observations shall be coded in accordance with latest applicable version of WRC "Manual of Sewer Condition Classification";
- The service connections with reference to the distance from starting maintenance hole and the periphery using standard clock position, i.e. 1 o'clock;
- The condition, type and depth of the maintenance hole and appurtenances in the system. Each report submitted shall include the Region of Peel designated maintenance hole numbers and zones;
- The on-screen display which will indicate the Contractor's name, the DVD Identification number, the job description (i.e. maintenance hole number to maintenance hole number etc.), the video recording chainage in metres, the location (street name and municipality), the date, pipe size and type of sewer, the maintenance hole type and condition, the compass direction of the flow, and if the inspection is being done against the flow.

S.6.6.1 Digital Video and Viewing Software Specifications

The inspection shall be captured in colour MPEG format (minimum video compression as provided by MPEG-2 standard) from the live video source to the computer hard drive with no frame loss. One complete single digital file shall be submitted for each inspection.

Digital video files shall meet the following minimum requirements:

- MPEG-2 Requirements:
  Picture Size: NTSC 720 x 480 @ 29.97 frames per second
  Data/Bit Rate: 4000 kbps

- Optional MPEG-4 Requirements:
  Picture Size: NTSC 704 x 480 @ 29.97 frames per second
  Data/Bit Rate: 4000 kbps

S.6.7 Equipment Requirements

S.6.7.1 Camera System

A pan-and-tilt closed circuit colour television self-contained camera capable of radial rotation of 360° and a lateral ro tation of 270° and produce a continuous picture resolution of no less than 400 lines, equipped with a self-contained lighting system compatible with the camera lens angle, that will not create “shadows” or “hot spots”. It will be capable of inspecting sewers 200 mm to 1200 mm diameter for a minimum distance of 300 metres without reversal.

S.6.7.2 Monitoring System

A digital video recording system(s) synchronized micro-computer data recording equipment and an electronic distance encoding device. The individual recording, monitoring and distance measurement components will be appropriately interconnected to provide a totally integrated inspection system. The video recording equipment must also be capable of producing imbedded video overlays and indexing video chainage in metres. A Digital Video File must be available at all times for Emergency Works.

S.6.7.3 Displays

The displays shall be suitable character size, type, style, and colour to be clearly visible and easily readable. The display shall be placed in such a manner as not to interfere with the image of the video.

S.6.7.4 Electronic Distance Encoder

The sewer chainage will be measured simultaneously with the camera travel and recorded automatically using an electronic encoder.

THE REGIONAL MUNICIPALITY

OF PEEL

STANDARD SPECIFICATIONS

FOR

RESTORATION

The Regional Municipality of Peel
Standard Specifications for Restoration

INDEX

PAGE

R.1 GENERAL

The Public Works Department (PW) Design, Specifications & Procedures Manual shall form a part of these contract documents.

The following Ontario Provincial Standard Specifications shall also form a part of the contract documents:

OPSS 304 Tar and Chip Surface Treatment

OPSS 309 Cold Mix Asphalt

OPSS 310 Hot Mix Asphalt

OPSS 314 Granular Subbase

OPSS 351 Concrete Sidewalk

OPSS 353 Concrete Curb and Gutter

OPSS 540 Highway Fence

OPSS 541 Chain Link Fence

OPSS 552 Guide Rail

OPSS 570 Topsoil

OPSS 571 Sodding

OPSS 572 Seeding and Mulching

OPSS 1010 Aggregates

R.2 SCOPE

This specification covers the requirements for restoration of the site following road construction, resurfacing, bridge/culvert rehabilitation**,** and the installation of sanitary sewers, forcemains, watermains, service connections and their associated appurtenances.

R.3 MATERIALS

All material shall be selected in accordance with the Ontario Provincial Standard Specifications unless otherwise specified on the Contract Drawings or in the Special Provisions or as directed by the Engineer.

R.4 CONSTRUCTION

R.4.1 General

All areas disturbed by construction shall be restored to the condition equal or better than existing prior to the commencement of construction and shall be restored as specified herein.

The Contractor shall provide good vehicular and pedestrian access at all times to all properties with existing access. Where there is no alternative but to shut off access temporarily to a property, the Contractor shall first notify the persons affected, and shall work so as to keep the period of inconvenience to a minimum. Notwithstanding, any closure of access must be approved by the Project Manager or designate in writing prior to closing.

The Contractor shall perform clean-up to within 10 metres of the excavated area by the end of each work day for water and sanitary sewer construction. If clean-up is not performed the Project Manager or designate will arrange for clean-up and any cost associated with this work will be deducted from the contractors progress payment.

Cold patching to be placed immediately as a temporary surface. Permanent pavement repairs using hot-mix asphalt shall be made within 14 days. All Regional roads having heavy traffic volumes must be repaired immediately with hot-mix asphalt. Between November 15th and May 15th all cuts must be filled immediately with hot mix. Under no circumstances shall a cut be left with a granular surface.

A primary objective during execution of the works will be to minimize inconvenience to the abutting residents and the travelling public. Accordingly, restoration shall be completed on a street by street or area by area basis not more than four (4) weeks following installation of services. Restoration means complete restoration of asphalt and sod or roadways, driveways and boulevards as well as any other areas damaged during construction.

If the Contractor fails to properly restore an area, the Project Manager or designate will issue a written order describing the required restoration works and completion date. Failure to comply by the Contractor will result in the Project Manager or designate ordering the works by a third

party and such additional costs, over and above the contract item, will be deducted from the Contractor's next progress payment certificate.

R.4.2 Grading

Grading shall be performed to the levels, grades and contours, as specified on contract drawings, allowing for the placement of surface materials. Backfilling, grading and compaction shall be carried out to within 30 m of the excavated area on a daily basis or a stop work order will be issued until this work is completed.

The final grade shall be a smooth uniform surface within 30 mm of the required elevation. Surface irregularities shall be corrected by removing or adding and compacting material.

Where construction is performed on existing roads, temporary restoration to carry traffic and pedestrians shall be provided as soon as possible. In asphalt roads and driveways cold mix asphalt shall be placed as directed by the Project Manager or designate.

R.4.3 Roads and Driveways

R.4.3.1 Treated Roads

Trenches in surface treated roads shall be initially reinstated with granular material compacted to 100% Standard Proctor Density to restore existing elevation.

Final restoration of trenches and damaged portions of the tar and chip road will be with granular 'A' and asphalt as specified and shown on Contract Drawings.

R.4.3.2 Gravel Road, Shoulder and Driveway

For trenches in a gravel road, shoulder or driveway the top 300 mm shall be reinstated with Granular `A' compacted in 150 mm layers to 100 percent Standard Proctor Density.

The surface of trenches and any disturbed sections shall be reinstated to match existing or as directed by the Project Manager or designate.

R.4.3.3 Joint Tape and Asphalt Paved Roads and Driveways

Trenches in asphalt paved roads and driveways shall be initially reinstated with granular material compacted to 100 percent Standard Proctor Density to match the existing elevation.

The road shall be washed from edge to edge of pavement with power sweeper and water immediately prior to final reinstatement.

Final reinstatement of all trenches shall be as per the detail specified on the contract drawings unless otherwise directed by the Project Manager or designate.

In the event the trench runs through the road's crown restore the pavement to match the existing pavement cross section.

A Joint Sealing Product, when specified, shall provide a tough, flexible, waterproof seal between new asphalt and existing asphalt, concrete or steel.

Secondly, the Joint Sealing Product should be unaffected by extremes in temperature. Once the joint has been sealed with a Joint sealing Strip or Tape, water, road salt and other pollutants are kept from penetrating.

The sealing strip or tape should be made from a Polymer Modified Bitumen Compound. Densoband and TBond HMA Joint tape meet this requirement.

On Regional roads, the limit of the pavement construction joints must be sealed with Densoband, TBond HMA Joint Tape or approved equivalent as per the manufacturer's specifications as directed by Region staff.

R.4.3.4 Pavement Marking

Regional Roads and Intersection works

For Regional Road and/or intersection works, the Tenderer shall be responsible for all pavement markings as described with all pavement markings applied by one of the vendors currently recognized by the Region of Peel as having the necessary

qualifications to work within the Region's right of way, refer to the Regional Roads and Traffic section of the PW Design, Specifications & Procedures Manual for additional information.

Watermain and Wastewater works

For Water and Wastewater works, where pavement marking would be minimal, the following shall be applicable:

1. The Tenderer is advised that the Region of Peel has retained a Contractor for pavement marking operations on Regional Road projects. The Contractor will not carry the pavement marking operation in the tender price, but will be required to:

   a) notify the Region's site inspector seventy two (72) hours in advance of any required pavement marking application (temporary or permanent) or grinding operation of existing markings;

   b) be responsible for ensuring the road surface scheduled for pavement marking applications, is clean to the satisfaction of pavement marking inspector;

   c) be responsible for all temporary control signs and delineators requiring removal and/or relocation to facilitate pavement marking application operations.

2. In reference to (a), the Region will not consider and accept any claims arising out of inability to undertake any pavement marking applications due to inclement weather.

3. No additional payment will be paid to the Contractor for all works required to assist the Region's pavement marking contractor and to prepare the road surface.

R.4.3.5 Concrete Driveway

For trenches crossing a concrete driveway remove all concrete between the curb or road edge and the first expansion joint beyond the trench cut or as directed by the Engineer.

Provide a minimum of 150 mm Granular `A' material compacted to 100 percent Standard Proctor Density and match the existing base depth and grade.

Construct the new section to match the existing driveway width, depth, grade and alignment ensuring that a minimum depth of 130 mm of concrete is provided.

Provide 30 MPa 5.7% air entrained concrete to meet OPSS 1301 specifications.

Spray all finished concrete surfaces with a curing compound in accordance with the manufacturer's instructions and protect all surfaces from temperature extremes until the concrete is cured.

R.4.3.6 Paving Stone Driveway

For trenches crossing paving stone driveways the existing blocks shall be removed and stock piled for reinstatement.

The trench shall initially be reinstated with 150 mm Granular `A' material compacted to 100% Standard Proctor Density.

Final reinstatement shall include the removal of Granular `A' to the depth of existing bedding; placement and compaction of bedding material to match existing and replacement of paving stone.

R.4.3.7 Concrete Curb and Gutter Systems

Concrete curb, gutter, and curb and gutter shall be replaced to conform to the dimensions of the existing curb, gutter and curb and gutter, as per OPSS 353

Damaged sections of curb, gutter, and curb and gutter shall be removed to the nearest joint.

A minimum depth of 100 mm of Granular `A' shall be placed as a base for the curb, gutter, and curb and gutter.

R.4.4 Sidewalk

R.4.4.1 Asphalt Sidewalk

The asphalt sidewalk should be saw cut full depth, 300 mm each side of the trench and perpendicular to edges of walk. The asphalt is to be removed and disposed off site. Provide a minimum of 150 mm compacted thickness of Granular `A' base over disturbed area.

Place HL3 asphalt to match the existing walk, with a minimum of 50 mm of finished asphalt thickness. Roll, compact surfaces to match the existing walk, grade and alignment. The texture and finish shall match the existing asphalt walk.

R.4.4.2 Concrete Sidewalk

Concrete sidewalk shall be replaced to conform to the dimensions of the existing sidewalk.

The entire section of any damaged section of sidewalk shall be removed. A minimum depth of 150 mm of Granular `A' shall be placed as a base for the sidewalk.

Concrete sidewalk shall be constructed to meet the specification of the applicable municipality and to a minimum thickness of 130 mm.

R.4.5 Topsoil

Topsoil shall be placed after fine grading operations have been completed and immediately prior to seeding or sodding operations.

R.4.5.1 Top Soil Qualities

Top soil will be defined as fertile, friable, sandy loam with a maximum of 52% sand, 50% silt and 27% clay. The soil shall be free of stones over 25 mm in diameter, debris, organic or other deleterious contaminants and fragments larger than 75mm in size, plants or their roots, sticks, noxious weeds, soil sterilants or other material detrimental to plant growth. Top soil shall have an acidity range of 6-7.5, contain not less than 5% organic material and shall have a salt conductivity of less than 2 millisiemens/cm. Proof of soil composition, supplied by an accredited OMAFRA (Ontario Ministry of Agriculture, Food and Rural Affairs) commercial lab, shall be provided to the Project Manager.

R.4.5.2 Imported Topsoil

When imported topsoil is to be used, the bidding contractor will have proof of soil testing and suitability for the proposed work as outlined in this document will be provided to the Region of Peel before commencing work.

R.4.5.3 Preservation of Topsoil

Topsoil shall be defined as the existing "A" horizon containing organic material. The use of onsite native topsoil is encouraged, providing it meets requirements and/or can be modified to meet the requirements outlined in this document. All areas designated for construction or hardscaping shall be stripped of topsoil and organic matter. Topsoil will be stripped to full depth and care shall be taken not to mix it with the subsoil.

R.4.6 Seeding and Seeding

The Contractor will be reimbursed for resodding all areas damaged as a result of the Contractor's normal operations. However, the Contractor shall ensure that his operations result in minimal damage to the sod. Any sod damaged, in the opinion of the Engineer shall be repaired by the Contractor at his cost.

The Contractor shall engage a sodding sub-contractor whose primary business is landscaping. Alternatively, the Contractor may undertake the works with his own forces provided he has demonstrated expertise in quality landscaping workmanship. All sodding shall meet or exceed the requirements of these standard specifications in addition to OPSS 571and OPSS 572. Permits are required for any water taking from hydrants or bulk water stations. The Contractor shall obtain written authorization from the Engineer to proceed with sodding after completion of topsoil, but prior to placing of sod.

Sodding restoration shall be on a street by street or area by area basis as approved by the Engineer. Resodding shall take place not later than four (4) weeks following completion of services. Prior to sodding, the Engineer shall mark out the areas to be resodded and shall advise the Contractor which, if any, are deemed to be his responsibility.

R.4.6.1 Site Preparation

Once final site grading is complete, topsoil shall be placed and spread over prepared sub-grade and shall be allowed to compact or be compacted by light rolling. Seeding and sodding operations should take place immediately after the application of the topsoil to prevent soil loss. Topsoil requirements are as follows:

- On steep slopes 3: 1 or greater an application of topsoil no greater than 100mm shall be applied to prevent slumping of growing medium.

- A minimum of 100mm of topsoil shall be placed before seeding with hydro seeding or terra seeding. Seeding by hand is unacceptable except in the restoration of small cuts in the blvd maximum 1 m2.

- A minimum of 150mm of topsoil shall be placed before sodding operations.

R.4.6.2 Seed Specifications

Grass seed shall meet the requirements of the Seed Act for: Canada Certified No. 1, Canada Common No. 1, and Canada Common No. 2. Seed mixtures shall be suited to the climate, soil conditions and type, orientation, sun exposure, terrain, establishment and maintenance conditions under which they are to be grown.

Seed shall have a minimum germination rate of 85% and minimum purity of 97%, except where otherwise required by the specification of the seed mixture. A mixture of turf-type Kentucky Bluegrass, turf-type Fine Fescue, turf type Chewing's Fescue, turf type Perennial Ryegrass seed shall be used provided the percentage of Kentucky Bluegrass seed is no more that 50% by composition.

In addition, seed may include Colonial Bentgrass, *t*urf-type Tall Fescue*,* Weeping Alkaligrass (*Puccinellia distans),* Canada Blue Grass.

Seeding shall be carried out when seasonal conditions are likely to ensure successful germination and a continued growth of all species of seed in the grass mix establishment. All seeding shall be done during calm weather and on soil that is free of frost, snow and standing water.

Seeding can be performed during the periods of mid-April to Early June, mid July to end of September or as a dormant seeding. The period from mid August to mid September is preferred as soil moisture and temperature conditions are optimum for germination.

R.4.6.3 Wildflower Mixes

When restoration occurs in naturalized areas by the Project Manager, care should be taken to apply a mix of grass and wildflower varieties native to the area. Grasses should comprise no more than 30% of the mixture.

R.4.6.4 Turfgrass Sod

The supplier shall provide, upon request by the Region of Peel, a label or statement certifying the quality grade, location of sod source and species of grass in the sod. Sod shall be of mixed species, composed of Kentucky Bluegrass and Fine Fescue.

Sod shall be a minimum age of 12 months, with root development that will support its own weight without tearing, when suspended vertically by holding up the upper two corners. Sod shall have strong fibrous root system, free of stones, burned or bare spots.

Turfgrass sod shall be reasonably free from thatch. Up to 10 mm of thatch (uncompressed) is acceptable.

R.4.6.5 Handling, Storage and Installation of Sod

Sod shall be protected during transportation (i.e. tarpaulin) for load security and reduction of wind exposure to prevent drying out and shall arrive at the site in a fresh and healthy condition. Sod delivered to the job site shall be stored in such a manner to minimize drying out or overheating of product.

Sod shall be installed within 24 hours after delivery to the site, and within 36 hours after harvesting. The height of the grass in the sod at the time of harvesting shall be between 40 mm and 60 mm.

Sod shall be laid in smooth and even rows, closely knit, tight together in such a manner with no open joints visible, joints staggered a minimum of 25 cm, and no pieces are stretched or overlapped. Sod shall be laid at right angles to slopes or the flow of water. On slope areas, sodding shall be started at the bottom of the slope. On slopes steeper than 2:1 every row shall be pegged with wooden lath pegs, of sufficient length to ensure satisfactory anchorage of the sod, at intervals of not more than 0.5 metres. Pegs shall be driven flush with sod. Protection of sodded areas against erosion shall be employed.

Sod shall be laid flush with adjoining grass areas, paving and the top surface of curbs.

The sodded area shall be rolled, tamped, or planked providing sufficient pressure, to ensure a close contact between sod and soil. Heavy rolling to correct irregularities in grade shall not be permitted.

The sod area shall be watered immediately with sufficient amounts to saturate.

R. 4. 7 Mechanical Seeding (HYDROSEEDING)

Acceptable methods for mechanically applying seed are Hydraulic Seeding and Terra Seeding™ using a pneumatic blower. Seeding rates shall be determined on a site by site basis and guaranteed by the contractor to produce an 85% germination rate. The mulch shall be evenly dispersed with no bare spots evident.

The materials forming the hydraulic mulch shall consist of a mixture of fiber, seed, fertilizer and water mixed and applied in the specified proportion. The mulch shall be dyed for the ease of monitoring application.

Fiber should be green coloured fibrous, wood cellulose mulch not containing any growth or germination inhibitors and shall be manufactured so that it will form a uniformly suspended homogeneous slurry when added to the fertilizer, seed and water in a tank and agitated.

The seeding operations shall not begin until final grading and topsoil have been applied and site preparation is approved by the Region. The contractor will maintain the site and control erosion until the seeding operation is complete.

Materials are to be applied at the specified proportion and depth of cover as specified by the manufacturer.

R.4.8 Restoration of Trees, Shrubs and Bushes

Supply and replace all trees, shrubs or bushes accidentally or willfully removed.

Trees shall be of equal quality nursery stock of a minimum calliper of 50 mm.

Shrubs or bushes shall be of equal quality of the same age and size.

R.4.8.1 Transporting Trees, Shrubs and Bushes to Site

Trees, shrubs and bushes should be protected during delivery to prevent damage to branches, root ball or desiccation of leaves.

Adequate protection and spacing shall be placed between trees so that trunks are not scarred and branches are not broken.

Plants should be transported in enclosed trucks or covered with a tarpaulin. For large material transported in open trucks, the trees shall be wrapped to prevent damage and windburn.

Movement of container grown, ball and burlap (B&B) and wire-basketed (WB) plants should be restricted to closed van or well-covered trucks with mesh tarpaulin or similar material to protect the leaves or needles from windburn or desiccation.

R.4.8.2 Site Preparation

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Depth of top soil for planting shall conform to the following the guideline:

Application	Over Prepared Sub-grade, retaining the "A" horizon	Over rapidly draining soil	Over poorly draining soil
Small Shrubs	300 mm	450 mm	225 mm
Large Shrubs	450 mm	600 mm	450 mm
Trees	600 mm	600 mm	600-900 mm

The transition of the tree planting area to shallower growing medium shall have a shallow angle.

Excavation of the sub-grade below the root balls of trees shall be only as necessary to permit the bottom of the rootball to sit on undisturbed material or compacted fill such that the top of the rootball remains at the proper finished grade. Disturbed sub-grade or fill below the rootball shall be compacted to prevent settlement of the tree after planting. Excess excavated material shall be removed from the site.

Planting pits or areas excavated in fine soils or by mechanical means shall have all bottoms and sides scarified to ensure that they do not have glazed surfaces. Where the growing medium in a planting pit

or area is different in texture, structure or organic content from the surrounding soil, the sides and bottom shall be scarified and the two materials thoroughly mixed to avoid an abrupt interface. Growing medium shall be free from interfaces or textural differences that could impede root development.

R.4.8.3 Installation

Plants shall be planted so that after settlement the level of the adjacent growing medium surface matches the level of the original growing medium surface in the nursery. The soil mark on the stem or container soil level is an indication of this, and it shall be maintained on the finished level, allowing for settling of the growing medium after planting. The total depth of the root ball shall be planted in growing medium.

If no other factors come into play, the plant should be oriented in the same direction that it was grown in the nursery. Face the lowest branch away from the greatest traffic (pedestrian and vehicular); and position the plant for best viewing.

Growing medium shall be placed preferably by hand in layers around the roots or ball. Each layer shall be carefully tamped so as to avoid injuring the roots or ball, or disturbing the position of the plant. The hole should be backfilled and gently tamped so that no air pockets are left around the ball.

When growing medium is up to about two-thirds of the rootball height, all ties shall be cut and the top one- third of burlap on B&B, plants shall be cut off or folded back carefully, so as not to disturb the rootball integrity. No burlap shall show above grade.

Growing medium should be moist in tree pits or beds at this stage. After the water has been absorbed, the backfilling shall be completed and tamped lightly. Any settling shall be brought up to the intended grade with growing medium.

All imperishable containers and tying materials shall be removed. Perishable containers such as fibre tubs should be removed where possible.

All string, rope, burlap and other restricting elements shall be cut and removed out to the perimeter of the rootball. Top lacing shall not be left in place at the time of planting.

A 100 mm raised saucer should be constructed over the rootball to enhance water infiltration into the rootball.

All planting hole depths should only be dug deep enough to accommodate the root system or root mass at the desired depth relative to the surrounding grade. Plant tree with the root collar at the same level as the surrounding ground.

The planting hole width should be at least 30 cm wider than the perimeter of the rootball or root system.

No separate payment will be made and the cost for meeting the provisions of this clause shall be included in the unit prices for the watermain, sewer, service connection and permanent restoration.

R.4.8.4 Watering and Mulching

Upon the completion of tree plantings trees shall be watered deeply and a layer of mulch shall be placed around the tree. The mulch shall be shredded bark, free from weeds and any deleterious materials that would impede growth. The mulch shall be layered 100mm thick. Mulch shall not be placed in direct contact with the tree trunk.

R.4.8.5 Fertilizers

Fertilizers shall be spread uniformly over the plant base with a suitable mechanical spreader. If soil testing is not performed to determine fertilization requirements a starter fertilizer similar to 16-25-12 may be used.

R.4.8.6 Maintenance Periods

Maintenance for landscaped areas shall begin immediately after installation and shall continue until the date set for acceptance by the Region. Maintenance shall include all measures necessary to establish and maintain grass, wildflowers, trees, shrubs and all other plantings in a vigorous growing condition. Grass and sod shall be vigorous with few bare patches and free of noxious weeds.

R.4.9 Signs and Mail Boxes

All signs and mail boxes along the line of excavation shall be carefully removed, and reinstalled by the Contractor at his cost.

If signs, mail boxes and/or posts are damaged due to construction, the Contractor shall replace them with similar materials at the Contractor's own cost.

R.4.10 Fences and Guide Rails

The Contractor shall give property owners at least 72 hours' notice in advance of dismantling fences.

Fences and guide rails shall be dismantled at the location as shown on Contract Drawings. All broken, bent and damaged components shall be removed from the site and replaced with new components. All reusable components shall be stored and protected.

Fences and guide rails shall be restored with the same type of fence or guide rail that existed prior to construction, or as specified on the contract drawings, or as directed by the Engineer.

For new wooden steel beam guide posts a reflectorized strip shall be supplied and installed as follows:

1. Steel beam guide posts shall contain a reflectorized strip on 0.5 mm aluminium, type 3M-H18 silver or approved equal, fastened to the wooden post with four 50 mm aluminium nails.

2. Reflector spacing shall start at the second post from the traffic approach end, and on curves, every third post; on tangent, every fifth post.

3. Reflectorized strip size to be 570 mm X 100 mm.

4. Reflectorized strips shall conform to MUTCD.

5. This standard to be read in conjunction with OPSD-902.03.

R.4.11 Ditches and Culverts

Where necessary for construction, the Contractor may temporarily fill the ditch to operate the trenching machine or to pile excavated material. However, the Contractor will be responsible for any damage due to flooding from blocking the ditch. Immediately after backfilling is completed, the Contractor shall carefully clean out the

ditch and culverts and restore the ditch to a condition equal to or better than existing prior to construction.

The manner of remaking the ditch shall be approved by the Project Manager or designate and a Gradall or similar machine should be used. The finished ditch must conform to the existing ditch both in grade and cross-section. Where the existing ditch has been sodded or has finished surface or grass, the Contractor shall resod any portion of the ditch disturbed by his construction to the satisfaction of the Project Manager or designate. Seeding will be acceptable in open field only as directed by the Project Manager or designate.

For all seeded ditches, the inverts and slopes 300 mm from the bottom shall be sodded.

Driveway sideslopes shall be topdressed with a minimum 50 millimetres of topsoil, sodded and graded to a maximum 3:1 ratio from the access driveway platform to the ends of the culvert invert.

Culverts replaced by the Contractor on Region roads shall be new, riveted, galvanized steel, with the wall thickness meeting or exceeding the manufacturer's specification for the design loading condition (minimum 16 gauge/1.6 mm). Materials also approved for use shall be as per the Region's Material Specifications and Standard Drawings. Bedding and backfill requirements shall meet current OPS specifications. Minimum C.S.P. diameter shall not be less than 375 mm for entrances and 600 mm for roadway cross culverts, where permitted.

R.4.12 Headwalls

All headwalls excavated or damaged in the line of the trench shall be replaced or repaired to match the condition in which they were found. No extra payment will be allowed for this work.

R.5 REINSTATEMENT REQUIREMENTS FOR ROAD CUT PERMITS

Where trenches are undertaken under a permit from a road authority, the reinstatements specified by the road authority shall govern.

THE REGIONAL MUNICIPALITY OF PEEL

STANDARD SPECIFICATIONS

FOR

TRAFFIC SIGNALS, STREETLIGHTING AND ELECTRICAL WORK

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E.1 QUALIFICATIONS

The Vendor's field representative for the electrical works shall be a qualified electrician certified under the "The Apprenticeship and Tradesmen's Qualification Act" or a worker who is similarly qualified by training and experience and is acceptable to the Agency and also has International Municipal Signal Association (IMSA) certification. The Vendor's representative shall have a minimum of five (5) years previous experience in the assembly or maintenance of traffic signals as well as related experience in the overall fields of traffic signal and streetlighting installations. A qualified field representative must be present and on-site whenever electrical work is being carried out under this contract.

The Agency may pre-qualify any new Vendor to carry out the electrical works. Such pre-qualification process may take up to four (4) weeks to complete. The new Vendor seeking pre-qualification shall submit to the Agency satisfactory evidence as to their field representative's experience, the Vendor's list of equipment and list of previous similar projects.

The Vendors currently recognized by the Region of Peel as having the necessary qualifications are as follows:

- Guild Electric Limited
- AGI Traffic Technology (Aecon)
- Fellmore Electric Company Limited
- Trans Power Company
- EC Power & Lighting Limited
- Beacon Utility Contractors Limited
- Black & McDonald Limited

E.2 ABBREVIATIONS

AASHTO	-	shall mean "American Association of State Highway and Transportation Officials"
AGENCY	-	shall mean "Region of Peel"
AODA	-	shall mean "Accessibility for Ontarians with Disabilities Act"
ASA	-	shall mean "American Standards Association"
ASTM	-	shall mean "The American Society of Testing Materials"
AWG	-	shall mean "American Wire Gauge"
CSA	-	shall mean "Canadian Standards Association"
ESA	-	shall mean "Electrical Safety Authority"
ELV	-	shall mean "Extra Low Voltage"
GTT	-	shall mean "Global Traffic Technologies" (Formerly 3M)
IES	-	shall mean "Illuminating Engineering Society"
IMSA	-	shall mean "International Municipal Signals Association"
ITE	-	shall mean "Institute of Transportation Engineers"
LED	-	shall mean "Light Emitting Diode"
OPSD	-	shall mean "Ontario Provincial Standard Drawings"
OPSS	-	shall mean "Ontario Provincial Standard Specification"
OTM	-	shall mean "Ontario Traffic Manual"
PSN	-	shall mean "Public Sector Network"

Whenever a publication of any one of the above or similar organization is mentioned in these specifications, such mention shall refer to the latest issue of the said publication, including all appendices and revisions thereto.

E.3 REQUIREMENTS

E.3.1 Region of Peel's Electrical Traffic Control Signal Standards

All Region of Peel's Electrical Traffic Control Signal Standard Drawings shall apply to this Contract. It shall be the Vendor's responsibility to have the most recent drawings in their possession at the start of this Contract.

E.3.2 Ontario Provincial Standards

All requirements of the latest revisions of the OPSS and OPSD shall apply to this Contract, as defined. It shall be the Vendor's responsibility to obtain a copy of these standards for their use.

E.3.3 Hydro Streetlighting Standards

It shall be the Vendor's responsibility to obtain a copy of the appropriate local Hydro's latest streetlight standard drawings and material specifications.

E.3.4 General Conditions of Contract – Ontario Provincial Standards

The Ontario Provincial Standards General Conditions of Contract shall apply to this Contract. It shall be the Vendor's responsibility to obtain a copy of this document for their use. The following items of Supplemental Specifications shall supplement OPSS 600 series and OPS-General Conditions of Contract.

E.3.5 Order of Precedence

The order of precedence for the electrical work shall be as follows:

- Special Provisions of Contract
- Volume 2.5 Standard Specifications for Traffic Signals, Streetlighting and Electrical Work (Revised April 2014)
- Region of Peel's Electrical Traffic Control Signal Standards
- OPSS
- OPSD
- General Conditions of Contract – Ontario Provincial Standards

E.4 ELECTRICAL CODES, RULES AND REGULATIONS

All work shall be performed in accordance with ESA and CSA Standards, Ontario Electrical Safety Code (OESC), or the latest revisions thereto, including all appending bulletins which are applicable to the work.

All work shall be governed by and performed in accordance with Federal, Provincial and Local laws and by-laws pertaining to the work, as well as by the latest issue of CSA standards pertinent to the work.

In the event of conflict between regulations, the strictest regulation shall apply.

E.5 FEES, CERTIFICATES, INSPECTION AND PAYMENT

The Vendor shall obtain permits for all work and shall file applications for inspection with the appropriate local Hydro authorities and the Ontario Electrical Safety Authority as required by the progress of the work. The Vendor shall pay all fees related to permits, applications and inspections. Upon completion of the work, the Vendor shall obtain final approval from the appropriate local Hydro Authorities and shall submit one copy of the Certificate to the Agency.

The Vendor shall remedy all defects in workmanship and replace all electrical equipment that is not approved, within such time and in such manner as notices of deficiency from ESA direct, at no cost to the Agency.

The Agency shall assist the Vendor in coordinating services with both Bell Canada and local Hydro authorities. Further, the Vendor shall receive support in coordinating services to the area municipalities Public Sector Networks.

Where required, the Vendor shall locate and expose all existing utilities, by either hand digging or using any other method that safely exposes the utility, prior to laying out the traffic signals.

Payment at the Contract price for Tender items shall include all labour, equipment, and material required to do the work.

E.6 TESTING

Tests on electrical wiring and material shall, unless otherwise specified, conform to the Ontario Electrical Safety Code (OESC) and shall include insulation value readings and resistance to ground readings.

Testing shall be performed by a certified electrician only and shall be done in the presence of the Agency, local Hydro Authority and/or ESA Inspectors, as requested.

The Vendor shall provide all necessary instruments, equipment and personnel required to satisfactorily carry out prescribed tests at their own expense.

The following tests shall be performed as directed by the Agency:

6.1 All conduits and duct systems shall be proven free of stones, dirt, water or other debris by pulling a test mandrel 6mm smaller in diameter than nominal conduit or duct size through each individual conduit or duct.

6.2 All circuits shall be proven continuous and free of short circuits or ground faults.

6.3 All circuits shall be proven free of unspecified grounds and the resistance to ground for all circuits shall be no less than fifty (50) mega ohms.

6.4 All circuits shall be proven to be operable. Each control or switching device shall be operated no less than ten (10) times and each circuit no less than eight (8) hours.

6.5 The resistance to ground for the power service facility ground, the controller ground, and the intersection system ground shall be proven not to exceed 25 ohms. The Vendor shall perform the necessary test and record the values on the form provided by the Agency.

6.6 The Vendor shall measure the incoming voltage at the power service facility and shall record the value on the form provided by the Agency.

In addition to the above tests, the Vendor shall, where directed by the Agency, perform any tests called for where performance of the electrical system indicates a deficiency.

The Agency shall provide for tests on materials other than electrical materials as described elsewhere in the Specifications for the Contract.

Where any tests indicate faulty workmanship or unacceptable electrical measurements, the Vendor shall repair or replace the faulty equipment at their own expense, and to the satisfaction of the Agency.

The Vendor or its duly appointed representative shall be in charge of all testing and shall assume full responsibility for any damage which may occur to the equipment installed as a result of such testing.

Prior to energizing the traffic control signals, the Vendor shall “flash-out” all field circuits, perform a conflict monitor check as per the Region of Peel’s Conflict Monitor Check Sheet provided.

The work of testing shall not be submitted for payment but considered as part of the unit prices bid.

E.7 COORDINATION

This work shall be coordinated with the other work required by different trades so as to minimize the disturbance, alteration or damage to the adjacent or adjoining facilities. Coordination shall be done by the General Contractor unless otherwise requested by the Agency.

The Vendor is required to coordinate the installation of vehicle detection loops to ensure installation in the top course asphalt, in advance of pavement markings being placed.

Except as provided for in the Specifications, or as may be approved by the Agency, adjacent or adjoining facilities shall not be disturbed, altered or damaged in any way.

Where the Agency approves the disturbance, alteration or removal and subsequent replacement of an adjacent or adjoining structure or other facility not provided for in the Contract, all work and costs resulting from the disturbance, alteration or removal and subsequent replacement shall be at the Vendor's expense and no separate payment will be made therefore. The Vendor’s bid price will include all items required to restore the areas to as good or better than original condition.

E.8 LAYOUT OF EQUIPMENT

The layout of equipment shown on the Traffic Signal Drawings is a schematic indication of the general requirements only. All electrical vehicle sensors, chambers, pole footings and controller base locations shall be given final approval either verbally or in the field by a representative from the Traffic Signals and Streetlighting group, prior to installation. The Vendor shall give a minimum of 48 hours notice prior to pouring of the concrete.

E.9 ADJUSTMENT OF EQUIPMENT

All equipment shall be installed in a neat and orderly manner. Minor adjustments to equipment required to improve the appearance of the installation shall be carried out at the Contractor's expense when ordered by the Agency. At no time shall a signal head be installed so as to block the visibility of an existing signal head.

The Contractor shall make adjustments during nighttime conditions to any equipment if so required to provide optimum performance. All such adjustments shall be carried out at the Contractor's expense.

E.10 MATERIALS

E.10.1 Materials – General

E.10.1.1 New Materials

Unless otherwise provided for in the Contract, all materials shall be new and of a uniform pattern throughout the work. All materials or components or custom equipment shall be CSA approved, where applicable, and comply with the requirements of the ESA with respect to their application.

All materials, equipment and apparatus used in this Contract shall be "Made in Canada" unless otherwise specified or approved by the Agency.

E.10.1.2 Substitution of Materials

Where materials are identified specifically by the manufacturer's trade name or catalogue number and suffixed with the word "only", no substitution of the specified material will be allowed unless the material cannot be delivered in time to complete the work in proper sequence, or if for any reason the manufacturer has terminated production of the material. In such cases, the Vendor shall submit to the Agency a request for substitution accompanied by proof of equality and cost comparisons in the form of Certified Quotations from suppliers of both specified and proposed materials. Responsibility for any delay caused by the unavailability of or the difficulty of procuring materials shall be that of the Vendor.

Where materials are identified by a manufacturer's trade name or catalogue number and suffixed with the word "or equal", materials of equivalent design and quality may be substituted subject to the approval of the Agency prior to the Tender closing.

Where materials are identified as alternative by use of the word "OR", the design of the system shown on the drawings corresponds to the material named first in the description and substitution of the material is subject to approval of shop drawings, performance data, test reports and production samples where requested by the Agency.

Materials not specified particularly and which are indicated elsewhere as being required, (including minor accessories such as connectors, fasteners, tape, etc.) which are considered incidental to the work, shall be standard construction grade materials supplied in accordance with CSA Standards where applicable, to suit the application as required by recognized trade practice.

The Agency may approve any new product that the Vendor wishes to substitute during this contract. The Agency may require up to six (6) weeks to approve the product and this approval time shall not cause delay to the works. The Vendor shall be responsible to prepare a report on why the new product should be substituted and how it is equal to or better than the original.

All materials to be used for the electrical work and associated work on the Contract, shall be supplied by the Vendor, unless otherwise specified. All clips, bolts, nuts and other fittings shall be stainless steel or cast aluminum.

All materials, equipment and apparatus used in this Contract shall be “Made in Canada” unless otherwise specified or approved by the Agency.

The Agency shall reserve the right to negotiate directly with manufacturers and suppliers for materials required under this contract and the Vendor can apply normal handling and administration costs to the equipment supplied.

E.10.1.3 Storage of Materials

All materials shall be stored in accordance with manufacturer's instructions to prevent damage, soiling or surface finish spoilage.

New poles shall be stacked to prevent bending or warping and shall be protected against any condition which may cause chipping or pitting of the finish.

E.10.1.4 Agency Materials – Pickup and Delivery

All materials supplied by the Agency shall be picked up at the Agency's Signal Shop located at 230 Advance Boulevard, Brampton, by the Vendor. All surplus traffic signal materials returned to the Agency shall be delivered to the Agency's Signal Shop and placed in storage as directed by the Agency. All other materials identified by contract items shall be disposed of at a suitable landfill site.

The Vendor shall provide 24 hours advance notice when delivering materials to the yard. It shall be the Vendor's responsibility to obtain a signed receipt for the materials from the Agency's representative upon delivery of the material. The Vendor assumes full responsibility for all Agency equipment once it has been picked up from and/or until the item has been delivered and signed for at the Agency’s Signal Shop.

The Vendor will be required to obtain materials, such as Oversize Street Name Signs or other specialized equipment, from other municipalities within the Region of Peel.

E.10.2 Concrete Footing/Base/Handwell

Concrete shall be placed, vibrated, cured, protected and finished conforming to OPSS.MUNI.904 and shall be formed as one monolithic slab. All concrete shall be 30 MPa. The alignment of the sleeves and/or duct entry points shall be scribe marked on the top of the concrete pad. The method of installation shall be at the sole discretion of the Vendor. Works may require hand digging or other special methods due to existing utility locations.

The bid item price shall include all works, including restoration, regardless of existing surface materials to bring it to as good or better than original condition.

E.10.2.1 Pole Footing

Proposed concrete footings for all traffic signal poles and streetlight poles shall be constructed as per Region of Peel Electrical Traffic Standards Drawing #4-7-2. The anchorage assembly shall be manufactured by NCA/Acrow-Richmond, in the size and configuration shown in the Region of Peel Electrical Traffic Standards Drawing #4-7-1.

E.10.2.2 Controller Base

Proposed concrete traffic signal controller base shall be constructed in accordance with the Region of Peel Electrical Traffic Standards Drawings # 4-4-1, as applicable. Final orientation shall be determined in the field and approved by the Agency.

The Vendor may be required to install a pole mounted controller during temporary stages. The controller shall be installed as indicated on the drawings and in accordance with OPSD 2510.01.

E.10.2.3 Concrete Junction Box/Handwell

Proposed 300mm, 460mm and 600mm concrete handwells shall be constructed according to OPSD 2112.01, 2112.02, 2112.04, respectively and additionally OPSD 2117.02, 2118.02, and 2123.03. All 600mm chambers shall have standard end bells grouted inside the chamber. The requirements for the installation of the concrete electrical chambers shall be in accordance with OPSS 602.

E.10.3 Traffic Ducts

All rigid and flexible ducts used shall be to:

i. CSA Standard C.22.2 No. C211.2-06 for Rigid conduit; and
ii. CSA Standard C.22.2 No. C227.1-06 for Flexible conduit.

The Vendor shall supply and install conduits as per OPSS 603.

All road crossings are to be installed using an underground boring method only. If three (3) boring attempts prove to be unsuccessful, the Vendor shall notify the Agency so that the Agency may verify the boring attempts and consider alternatives. Should it be determined that boring is not possible, the Vendor shall provide an open-cut crossing at the same bid price as provided for underground boring. The bid item price for open trenching in either boulevard or median shall include all works, including restoration, regardless of existing surface materials to bring it to as good or better than original condition.

At intersections where underground conduits are to be installed for future traffic signals, as shown on the drawing, the Vendor shall supply and install a continuous #6 AWG (green) insulated ground wire. A minimum of 1.5m of ground cable shall be coiled in each electrical chamber. Where necessary, a split bolt connector shall be used.

The Vendor is advised that an existing conduit system may be present, as indicated on the drawings. All conduits shall be inspected and the Vendor shall ensure they are free of obstructions or blockage. Any obstructions shall be cleaned prior to using the conduits. Where a blockage cannot be cleared, the Vendor shall report it to the Agency for authorization to proceed on repairs.

Conduit stacks on wood or concrete poles shall be with a weatherhead entrance fitting and installed to a minimum height of 4m above ground.

E.10.4 Wiring

E.10.4.1 Signal Cable

Traffic signal cables used shall be #14 AWG colour coded and as per OPSS 604/2409, IMSA or an approved equal, according to the requirements of the ESA, prior to installing the cable. Refer to the Region of Peel Electrical Traffic Standards Drawings #4-3-1 and #4-3-2 for typical traffic signal wiring schematics.

It shall be the Vendor's responsibility to provide functional signal operation which will be compatible to the timing and phasing of the controller unit provided for each location.

E.10.4.2 Power Service

The Vendor shall refer to Region of Peel Electrical Traffic Standards

Drawings #4-1-1, #4-1-2, #4-1-3 and #4-1-4 for typical power service supply details. However, the Vendor shall comply with all applicable local Hydro Authority and ESA requirements. The Vendor shall be responsible for arranging all necessary inspections/connections and shall file required applications mandatory for connection to the power source. The Agency shall provide the local Hydro Authority with all appropriate documentation required to set up the invoicing account between the Agency and the Hydro Authority. Each breaker in the power service shall be labelled to identify its connection source.

Installation of the power service shall be completed within the first ten (10) working days of the project to allow Hydro Authority sufficient time to provide power prior to date of signal turn on.

E.10.4.3 Power Feed Cables

All power feed cables shall be installed from the source location to the traffic signal controller and intersection luminaires, as shown on the drawings.

Power feed cables to the traffic signal controller shall be 2-1/C #8 AWG (Black and White) copper stranded RWU (-40^{o}C).

Power feed cables to the intersection luminaires shall be 2-1/C #8 AWG (Red and White) copper stranded RWU (-40^{o}C).

E.10.4.4 Ground Rod/Plates and Cable

The Vendor shall supply and install electrical grounding equipment as per OPSS 609 (as applicable) and Region of Peel Electrical Traffic Standards Drawings #4-1-2, #4-1-4, #4-3-1 and #4-3-2.

The Vendor shall supply and install #6 AWG type RWU (Green) insulated copper ground wire in the underground duct system as shown on the drawing. All connections shall be bonded to the leads from poles and ground rods with compression sleeve connectors.

E.10.4.5 Vehicle Detector Loops

Vehicle detector loops shall be installed in the road surface in accordance with Region of Peel Electrical Traffic Standards Drawing #4-2-1, OPSD 2520.01, OPSD 2520.02 at the locations specified on the drawings. Final placement is to be determined in the field in coordination with Agency staff.

Detector loops shall be in place prior to signal activation unless otherwise directed by the Agency.

A 25mm Electrical Non-Metallic Tubing for each individual loop lead

wires shall be installed from the edge of roadway to the handwell, as indicated on the drawings.

Loop lead-in wires shall be spliced to run wires in the pole handhole at all times. Where lead-in wires are greater than 15 metres in length, the splice shall be made in an electrical chamber and shall be soldered, marretted, taped and encapsulated in an approved reusable connector housing.

The Vendor shall coordinate the placement of detector loops in the top course asphalt, such that they are installed prior to the pavement markings being placed. The crosswalk markings are not to be installed until all vehicle detection loops have been completed.

The Vendor may be requested to install alternate means of detections, such as overhead detectors and wireless in-road sensors (such as the SENSYS system). It is the Vendor's responsibility to educate themselves on the installation and operation of these technologies to provide a fully operating system.

The Vendor shall, where required, supply and install the alternate detection system equipment; the Vendor will be responsible for all installations, set up and ensure proper operation.

If necessary, the Vendor will make arrangements with all equipment suppliers to provide training and education to ensure proper operation at all times.

E.10.4.6 Detector Run Wires

The Vendor shall supply and install 2/C #14 AWG ELV shielded detector cable for runs from each vehicle detector splice point to the traffic controller. All detector run wires shall be connected to the appropriate controller cabinet terminals, as identified on the cabinet wiring diagram and in accordance with the Region of Peel Electrical Traffic Standards Drawing #4-2-1.

E.10.5 Traffic Signal Heads

All vehicle and pedestrian signal heads supplied under this contract shall be LED type (which must be purchased from Fortran Traffic Systems) with yellow polycarbonate housing, as approved by the Agency and as shown on the Region of Peel Electrical Traffic Standards Drawing #4-5-1, OTM Book 12 and OPSS 2460. All LED type signals shall meet or exceed ITE specifications.

All fastening components shall be stainless steel screws, washers, nuts and bolts.

The pedestrian countdown unit shall be LEOTEK Model No. TP12N-CD-RE by Electromega Limited. The units shall be programmed to count down the "Don't Walk" time with a flashing hand, rest in a blank display with a solid hand and the numbers should not flash during countdown.

The Vendor may be required to supply and install a fully functioning Audible Pedestrian Signal system. The approved equipment is as follows;

- DS3000 with VibraWalk2 (Novax Industries Corporation); and
- EZ Communicator Navigator (Polara Engineering Incorporated).

The mode of operation shall be defined by the Agency in consultation with the CNIB.

Four-section signal heads with double image LED bi-modal display left turn arrows shall be capable of providing both amber and green signal outputs.

The Vendor may be required to install traffic signal equipment supplied from the Agency's inventory. As such, an install only price will be required.

All vehicle signal heads on mast arms shall be mounted with a plumbizer and will have two full size reinforcing plates with one mounted on the inside bottom of the red section and the other mounted on the inside top of the amber section, as a minimum.

All LED kits shall have a warranty period on the equipment no less than five (5) years from date of completion of the signal installation.

Backboards shall be polycarbonate type, PolyFlex by Fortran Traffic Systems, or an Agency approved equal, suitable for mounting vehicle signal heads on plumbizer hangers or on double arm pipe brackets, as shown on the signal drawing. Signal heads shall be supplied with necessary bird stops and neoprene gasket on the top of the head only.

All signal heads that are not operational shall be covered with 'Traffic Jackets" as distributed by Sentinel Pole & Traffic Equipment Limited, or an approved equal, complete with mounting hardware.

The Vendor may be requested to supply an empty three (3) section traffic signal head and install the following Region-owned LED kits to provide a complete working unit:

- 12" (300mm) Red (Model No. TRV-R12SG-D2T, 2005 ITE);
- 8" (200mm) Amber (Model No. TRV-Y08SG-D1T, 2005 ITE); and
- 8" (200mm) Green (Model No. TRV-G08SG-D1T, 2005 ITE).

The bid price will also include the installation of the complete head on a traffic signal mast arm or overhead span wire.

E.10.6 Mast Arm/Brackets

The Vendor shall supply and install the equipment in accordance with the Region of Peel Electrical Traffic Standards Drawing #4-5-1, OPSS 2460, OPSD 2501.01 and OPSD 2501.02, as applicable.

Single member mast arms shall be spun aluminum and shall be in accordance with the drawing. Mast arms shall be complete with hot-dipped galvanized steel collar type pole face plate and adjustable pole back plate. The thickness of the plates is to be in accordance with the manufacturer's requirements.

Mast arm hangers shall be adjustable elevated plumbizer type, Sentinel Pole and Traffic Limited, Model AP42830, or approved equal, according to the Agency.

All 400mm brackets shall be aluminum with cast aluminum fittings and stainless steel mounting hardware, in accordance with OPSD 2524.01.

In locations where decorative poles are used, the Vendor shall use the following mast arms:

a)	Size:	6.7m (22')
	Type:	Aluminum
	Manufacturer:	Sentinel Pole at Traffic Equipment Ltd.
	Cat. No.:	TR22-SMA (No Approved Equals)
	Colour:	Black
b)	Size:	6.1m (20')
	Type:	Aluminum
	Manufacturer:	Sentinel Pole at Traffic Equipment Ltd.
	Cat. No.:	TR20-SMA (No Approved Equals)
	Colour:	Black
c)	Size:	5.5m (18')
	Type:	Aluminum
	Manufacturer:	Sentinel Pole at Traffic Equipment Ltd.
	Cat. No.:	TR18-SMA (No Approved Equals)
	Colour:	Black
d)	Size:	3.0m (10')
	Type:	Aluminum
	Manufacturer:	Sentinel Pole at Traffic Equipment Ltd.
	Cat. No.:	TR10-SMA (No Approved Equals)
	Colour:	Black
e)	Size:	1.8m (6')
	Type:	Aluminum
	Manufacturer:	Sentinel Pole at Traffic Equipment Ltd.
	Cat. No.:	TR6-SMA (No Approved Equals)
	Colour:	Black

f) Size: 1.2m (4')
Type: Aluminum
Manufacturer: Sentinel Pole at Traffic Equipment Ltd.
Cat. No.: TR4-SMA (No Approved Equals)
Colour: Black

The Vendor will also be required to use black powder coated pipe brackets at decorative pole locations.

Note: Colour to match King Luminaire arm and luminaire.

The Vendor is required to install a ¼"-20 set screw between the mast arm and mounting shoe to prevent rotation of the mast arm.

The bid price shall include all materials, including the signal cable that runs within the mast arm.

E.10.7 Traffic Signal/Streetlight Poles

E.10.7.1 Steel Poles

All steel poles shall be hot-dipped, galvanized and of strength and rigidity to withstand without failure the accepted "design and pressure" for Southern Ontario.

All traffic signal steel poles shall be POWCO or SPINA series, as shown on the signal drawing, or approved equal, according to the Agency.

The Contractor shall field drill all apertures at the appropriate location, for internal wiring and attachment of mast arms, brackets, and push buttons. All apertures shall be treated with a zinc rich paint and fitted with a rubber grommet.

Combination traffic signal/streetlight poles shall be octagonal base mounting, POWCO 8545 or Agency approved equal.

For installations in close proximity to the GTAA (Pearson Airport), the Vendor may be required to supply/install Cooper Lighting luminaire, Model No. TRU15SC42FBZ4SU pole to be in compliance with GTAA clearance regulations.

For locations with decorative traffic signal poles, these shall be black powder coated aluminum.

The poles shall conform to:

a) Size: 13.4m (44')
Type: Round Aluminum (Heavy Duty)
Cat. No.: P44-1955FBL-AB0-406 (No Approved Equals)
Manufacturer: Sentinel Pole at Traffic Equipment Ltd.
Colour: Black

b)	Size:	5.8m (19')
	Type:	Round Aluminum (Heavy Duty)
	Cat. No.:	P19-1080E-AB-406 (No Approved Equals)
	Manufacturer:	Sentinel Pole at Traffic Equipment Ltd.
	Colour:	Black
c)	Size:	3.0m (10')
	Type:	Round Aluminum (Heavy Duty)
	Cat. No.:	TP10-423A-AB-150 (No Approved Equals)
	Manufacturer:	Sentinel Pole at Traffic Equipment Ltd.
	Colour:	Black

Note: Colour to match King Luminaire arm and luminaire.

The bid price shall include all materials, including the signal cable that runs within the pole.

E.10.7.2 Concrete Poles

Concrete streetlight poles shall be supplied in accordance with the local Hydro's standard drawing. All concrete streetlight poles shall be Class 'D', 15m direct buried, unless otherwise shown, and shall be similar models constructed by the same manufacturer. OPSD 2225.01 is amended by deleting reference to "concrete encasement" and replacing with "limestone screening."

The bid item price for open trenching in either boulevard or median shall include all works, including restoration, regardless of existing surface materials to bring it to as good or better than original condition.

E.10.8 Pedestrian Pushbutton and Signs

The Vendor shall supply and install pedestrian pushbuttons on the traffic signal poles as shown on the signal drawing. The pedestrian pushbutton shall be APEL-3210-P Series 'Soft Touch' by Electromega Ltd. with interface module. The pushbuttons and interface module are to be installed according to the manufacturers' specifications. Pushbuttons are to be installed using drill/tap method and fastened using ¼"-20 stainless steel machine screws. All openings around the pushbutton and the wiring aperture shall be sealed with silicone. A 1-2/C #12 AWG riser cable shall be installed in the riser conduit from the pushbutton to the splice point.

The Agency shall supply all pushbutton signs. The signs are to be installed using stand off brackets and metal banding as shown in the Region of Peel Electrical Traffic Standards Drawing #4-5-1.

E.10.9 Supply and Install Traffic Sign on New Post/Pole

The Vendor shall supply and install all signs as shown on the drawing and according to OTM Book 5, with the exception of pedestrian pushbuttons and “sunburst” signs. The Oversize Street Name Signs will be supplied by the Agency.

All signs proposed for installation on soil or gravel shall be installed on a 100mm x 100mm x 5m pressure treated wood post, supplied by the Vendor and installed with appropriate lag screws.

All signs proposed for installation in asphalt or concrete shall be installed with Telespar post, to be supplied by the Vendor. The installation method shall be in accordance with the Region of Peel – Sign Mounting Specification, as shown in the Appendix.

Where required, the Vendor shall supply and install signs to the pole with steel banding and stand off brackets, in accordance with the Region of Peel Electrical Traffic Standards Drawings #4-5-1 and #4-6-1.

E.10.10 Install and/or Remove Traffic Sign on Existing Post/Pole_

The Vendor shall remove all “Stop”, “Intersection Ahead”, “Keep Right” and “Hazard” signs, and any other signs as directed by the Agency. The Vendor shall also install signs on existing posts, traffic signal poles or hydro poles, if suitable, with steel banding, in accordance with the Region of Peel Electrical Traffic Standards Drawing #4-5-1 and #4-6-1.

E.10.11 Controller Field Installation

The Vendor shall install a traffic signal controller, supplied by the Agency, at the location and in accordance with the signal drawings and appropriate standards. The Vendor shall connect all field signal circuits and vehicle detector run wires as shown on the cabinet-wiring diagram. The Vendor shall perform “Flash-out” and “Conflict Monitor” field checks prior to energizing the signals for operation. The Vendor’s electrician will sign/date the Conflict Monitor sheet prior to final energization of the permanent traffic signals.

As well, the Vendor shall ensure the connection of any existing or new traffic systems communications cable, hardware and other related devices are fully operational and maintained at all times.

The Vendor must give a minimum of 48 hours notice to the Agency before obtaining the traffic signal controller.

It shall be the Vendor's responsibility to provide functional signal operation compatible to the timing and phasing of the controller unit provided. Further, any modifications required to a new or existing cabinet to provide a fully functional traffic signal shall be made by the Vendor. If required, the Vendor will make arrangements with other Distributors for training/support of their products, at the Vendor's own expense.

E.10.12 Roadway Lighting

Luminaries supplied under this contract shall be cobra head style and shall meet the requirements of the local Municipality and local Hydro Authority specifications. Installation of luminaire with mast arm shall be in accordance with the local Hydro's standard drawing.

The Vendor may be required to install LED luminaries on traffic signal poles. The approved units are:

- CONXCORP LRL3 - Type II Medium with 100\120 LEDs with Control
- CONXCORP LRL3 - Type III Medium with 100\120 LEDs with Control

All existing luminaries shall be kept in operation and wired overhead if necessary, until the new lighting system is in operation or until disconnection is authorized by the Agency.

E.10.13 Fire Pre-emption EVP/TSP Installation

In Caledon and Mississauga locations, the Vendor shall supply and install 3/C #20 AWG, Global Traffic Technologies GTT (Formerly 3M) SPEC 138 pre-empt cable from each signal pole to the traffic controller, as shown on the drawings. Adequate spare cable will be left coiled at the detector location and in the signal cabinet for final connection by the Agency's forces.

The Vendor shall also supply and install GTT Opticom 721 Detectors and mounting hardware at each location as shown on the drawings.

All connections in the cabinet and testing are to be completed by the Agency's maintenance contractor.

In Brampton locations, the Vendor will be directed to install an EMTRAC wireless pre-emption system. All equipment will be supplied by the City of Brampton and the Vendor will be responsible for all installation and set up. The Agency will be responsible for proper operation of the EMTRAC system.

The Vendor may be required to obtain this equipment directly from the City of Brampton and schedule times for drop off and pick up with City staff.

The EMTRAC system is to be fully operational one week before the scheduled activation date. Final connections and testing will be done by the Agency's maintenance contractor.

E.10.14 Concrete Sidewalk/Pads

E.10.14.1 Sidewalks with Depressed Curbs

Concrete sidewalks with depressed curbs shall be constructed in the quadrants shown on the drawings and in accordance with the appropriate City standards. Concrete shall be placed, vibrated, cured, protected and finished conforming to OPSS.MUNI.904 and shall be formed as monolithic slab.

The Vendor may be required to install depressed curbs with a tactile surface treatment, in accordance with the AODA. The Vendor is to become familiar with the technical requirements of the "Act" in order to provide the appropriate works.

The tactile treatment suppliers currently approved by the Agency are as follows:

- East Jordan Iron Works (Michigan);
- Neenah Foundry (Wisconsin); and
- Deeter Foundry (Nebraska).

Payment at the Contract price shall be the full compensation for all materials, labour and equipment required to do the work, including restoration, regardless of existing surface materials, to bring it to as good or better than original condition.

E.10.14.2 Sidewalk Pads

Concrete sidewalk pads shall be constructed in the quadrants shown on the drawings and in accordance with the appropriate City standards. Concrete shall be placed, vibrated, cured, protected and finished conforming to OPSS.MUNI.904 and shall be formed as monolithic slab.

Payment at the Contract price shall be the full compensation for all materials, labour and equipment required to do the work, including restoration, regardless of existing surface materials, to bring it to as good or better than original condition.

E.10.15 System Communications

The Vendor may be required to include connections to the Central Traffic Control system. A 50mm conduit is to be supplied and installed by Vendor for installing Bell cable, as shown on the drawings, from the nearest Bell supply point to the traffic controller location. The Bell pedestals are to be supplied by the Agency. Bell cable is to be supplied and placed in the field by Bell Canada.

The Vendor may be required to include connections to the City of Brampton's fibre-optic Public Sector Network (PSN) system. A 50mm conduit is to be supplied and installed by the Vendor, as shown on the drawings, from the nearest PSN access point to the traffic controller location. The PSN facilities shall be installed in the traffic cabinet by other forces; the Vendor will assist in the completion of any PSN works. It is anticipated that three (3) to five (5) hours of labour is required for this item.

The Vendor may be required to install only wireless radio equipment, such as antennas, cables and cabinet equipment to make the system fully operational. All equipment and programming assistance shall be supplied by the Agency.

Any existing communications in place shall be maintained during all stages of construction.

E.10.16 Temporary And/Or Overhead Signal Installation

The Vendor may be requested to provide an overhead or a temporary signal installation, as shown on the Contract drawings and in accordance with OPSD 2540.01, 2242.02, and 2245.01, as applicable.

The Contractor shall perform all routine and emergency maintenance work required for proper operation of the temporary traffic signal and roadway lighting systems. The Contractor shall arrange for connection of electrical power with the local Hydro Authority and shall pay for all costs associated with installation, energizing, maintenance, operation, and removal of the temporary service connections and traffic control equipment.

For a temporary traffic signal installation all the temporary traffic signal equipment supplied by the Vendor shall remain the Vendor's property at the end of the project.

E.10.16.1 Traffic Signal Heads

The Vendor shall supply and install signal heads on span wires or mast arms in an overhead or temporary installation. All vehicle and pedestrian signal heads supplied under this contract shall conform to the specifications of this Contract, as defined previously.

All signal heads shall be supplied with either a span wire hanger or plumbizer hanger. For all hangers, both the upper and lower signal head mount shall be reinforced with a steel plate in each section.

The Vendor, as directed by the Agency, may be required to install signal heads with mast arms directly to wood poles, as per OPSS 2461 and OPSD 2501.02.

All signal heads that are not operational shall be covered with 'Traffic Jackets" as distributed by Sentinel Pole & Traffic Equipment Limited, or an approved equal, complete with mounting hardware.

E.10.16.2 Wood Poles – Class 4

All wood poles supplied by the Vendor shall be 12.5m minimum height, class four (4), unless otherwise shown. Wood poles shall be installed, as indicated on the drawings, in accordance with the appropriate Region of Peel Electrical Traffic Standards Drawings and OPSD 2238.01. All backfill shall be limestone screening and hand tampered securely in place.

Where wood poles are installed in the vicinity of existing overhead hydro cable, a minimum offset (as per local Hydro Authority) shall be maintained or where it is impractical to achieve this offset, the installation of the pole shall be coordinated with the appropriate local Hydro Authority.

The bid price shall include all materials, including the signal cable runs along the pole.

E.10.16.3 Back Guy Anchors

The Vendor shall supply and install back guys for wood poles and hydro poles, as indicated in the drawings, in accordance with OPSD 2540.01 and OPSD 2235.01.

Where it is impractical to install the normal back guy, a sidewalk strut type back guy shall be provided. All back guys shall be installed prior to the installation of suspension spans, cables, signal heads and luminaires.

E.10.16.4 Steel Messenger Cable

The Vendor shall supply and install steel messenger cable and all associated mounting hardware, as indicated on the signal drawings and in accordance with OPSD 2540.01.

Messenger cable is to be spanned between poles using thimble eyebolts that are to be bolted through wood poles and steel tape banded to steel poles.

Wherever aerial cable crosses under high voltage hydro lines, the Vendor shall arrange with the appropriate local Hydro Authority for the neutral conductor to be raised to clear the top span by a minimum distance as per local Hydro Authority. If they are unable to achieve this separation, the Vendor shall arrange with the local Hydro Authority to protect the neutral with a flexible line insulator hose. The covers shall be installed as per Electrical Utility Operations Manual, section “Rubber and Fibre Protective Equipment” and shall extend no less than the minimum distance as per local Hydro Authority on each side of the outmost high voltage conductor. The minimum distance as per local Hydro Authority working clearance from high voltage conductors shall be maintained.

The Vendor shall arrange with the appropriate local Hydro Authority for the attachment of overhead traffic signal equipment on their existing concrete hydro poles at the intersection, as required.

E.10.16.5 Signal Cable

The Vendor shall supply and install overhead traffic signal cable, as indicated on the drawings and in accordance with OPSD 2540.01, and shall have a sun resistant rating.

The Vendor shall ensure that no portion of the overhead span installation will be lower than 5.8m over the travelled portion of the roadway. The Vendor shall record and provide documentation to the Agency.

E.10.16.6 Power Feed Cables

The Vendor shall supply and install overhead power feed cable for both the traffic controller and streetlights, as shown on the drawings and in accordance with OPSD 2540.01 and shall have a sun resistant rating.

E.10.16.7 Streetlight Cable

The Vendor shall supply and install overhead streetlight cable, as shown on the drawings, which conforms to the appropriate local Hydro Authority requirements and in accordance with OPSD 2540.01 and shall have a sun resistant rating.

E.10.16.8 Ground Rods/Wire

The requirements for the installation of grounding equipment shall be in accordance with OPSS 609.

At wood poles near a ground rod, the Vendor shall install a ground wire from the upper span to the lower span and then to the ground rod inside a protective wood moulding stapled to the pole.

E.10.16.9 Wood Post/Stand for Pedestrian Pushbutton/Sign/Traffic Heads

The Vendor may be required to provide a wood post or stand, on which to install the pedestrian pushbuttons and signs. The Agency shall supply all pushbutton signs.

Where indicated on the drawing, a pushbutton with sign shall be mounted on a 100mm x 100mm x 5m pressure treated direct buried wood post, as indicated on the drawings. Wood posts shall be direct buried to a minimum depth of 1.0m and backfilled with limestone screening, compacted as required. Sufficient cable shall be coiled to permit relocation, if required.

Where indicated on the drawing, a pushbutton with sign shall be mounted on a moveable stand and must be constructed of sufficient strength to withstand outside conditions and weighted down to prevent tipping. Sufficient cable shall be coiled to permit relocation, if required.

A 13mm steel or plastic riser conduit shall be fastened to the wood post or moveable stand from the pushbutton to the top.

Under temporary conditions (Capital project), the Vendor is responsible for maintaining the pedestrians posts/stands in their proper location and ensuring full operation during all stages of construction. Moveable pedestrian stands should be placed on a level and pedestrian accessible location and may require relocation during construction.

E.10.16.10 Overhead Vehicle Detector

The requirements for the installation of an overhead vehicle detector shall be in accordance with OPSS 620.

Depending on the type of vehicle detector shown on the drawing the Vendor shall be required to supply and install the proper cable to operate the vehicle detector when supplied by the Agency. The detector shall be installed in the locations indicated on the drawings.

When the Agency supplies the detector, the Vendor shall:

1) Leave sufficient length of cable coiled, unconnected at each detector location, for relocation/adjustment, as required; and
2) Leave a 1.0m length of cable left coiled unconnected in the controller cabinet.

When the Vendor supplies the detector units:

The Vender will supply and install the detection unit, as shown on the drawings. The Vendor may select from the attached listing of pre-qualified suppliers and their designated products. By specifying a detection system, all cabling/connectors and ancillary equipment necessary for proper operation shall be supplied by the Vendor. Any equipment required for the setup of the detectors to ensure full operation, such as laptops, is the responsibility of the Vendor.

The approved overhead detection systems are as follows:

1)	Autoscope Solo Terra	[Video]	(Econolite)
2)	SmartSensor Matrix	[Radar]	(Fortran Traffic Systems)
3)	FC-Series T	[Thermal]	(FLIR Systems)

The Vendor is responsible to adjust the location and recalibrate the detector heads as directed by the Agency representative or Contract Administrator during the staging of the temporary traffic signal operation and up to three (3) occurrences for maintenance, as specified by the Agency representative or Contract Administrator. At the end of Contract, this equipment will become property of the Agency.

All temporary overhead detector units and brackets/harnesses shall be returned to the Agency's Signal Shop when they are no longer required.

Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and material required to do the work including supply, install, setup and relocation of the overhead vehicle detectors, for up to three (3) occurrences for maintenance. After three (3) occurrences, the Vendor may charge on a time and material basis, including mobilization.

E.10.16.11 Overhead Fire Pre-emption Installation

The Vendor may be required to supply (when there is not an existing GTT 721 detector to be relocated) and install the GTT 721 detectors on overhead span wires. The Vendor shall supply and install 3/C #20 AWG, GTT SPEC 138 pre-emption cable from each fire pre-emption detector head location to the traffic controller, as shown on the drawings and according to the Region of Peel Electrical Traffic Standards Drawing #4-9-1.

Adequate spare cable will be left coiled at the detector location and in the signal cabinet for final connection by the Agency's forces. All necessary hardware/brackets to ensure safe and consistent operation shall be supplied by the Vendor.

In Brampton locations, the Vendor may be directed to install an EMTRAC wireless pre-emption system. All equipment will be supplied by the City of Brampton and the Vendor may be required to obtain this equipment directly from the City. Final connections and testing will be done by the Agency's maintenance contractor.

E.10.16.12 Luminaires on Wood Poles

The Vendor may be required to supply and install cobra head style luminaires with mast arm on wood poles, as per the signal drawing. These shall meet the requirements of the area municipality standards and governing Hydro Authorities.

E.10.17 Install Left Turn Phase

The Vendor may be required to install a left turn phase at an existing traffic signal installation. It is expected that all previously bid contract items will be used for this work. Additionally, the Vendor will be required to make all necessary cabinet connections and documentation to make this phase active. A minimum of 48 hours notice must be given before phase activation so that the Agency's maintenance contractor can make the required system connection to ensure proper operation. The Agency will provide loop detector amplifiers, load switches and the necessary signs.

E.10.18 Installation of Oversize Street Name Signs

The Vendor shall be required to install an oversized street name sign onto a mast arm, in accordance with the City of Brampton's Drawing #445 and City of Mississauga's Drawing #2430.150 (supplied in the Region of Peel Electrical Traffic Standards) and the requirements of the area municipality. The signs and mounting brackets shall be made available to the Vendor. The oversized street name signs and mounting brackets shall be picked up by the Vendor from a facility within the Region of Peel as directed by the Agency.

E.10.19 Programmable Traffic Signal Head

The Vendor may be required to supply and install an optically programmable traffic signal head in order to provide precise lane control for traffic signal displays. The Vendor must clearly identify the unit selected for use under this contract.

Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and material required to aim the traffic signal heads to the satisfaction of the Agency.

E.10.20 Pavement Markings

The Vendor may be required to supply and install temporary pavement markings and symbols using water borne paint or permanent pavement markings using durable thermoplastic pavement marking materials. The installation methods shall conform to OPSS 710, 1716 and 1750 and also OTM Book 7 (Temporary) and 11 (Permanent) and the layout shall be according to the drawing(s) supplied.

A grinder shall be a unit capable of grinding a line a minimum of 10cm in width. All labour, materials and equipment necessary for the removal of pavement markings shall be supplied by the Vendor. The Vendor shall remove markings without damage to the asphalt, to the satisfaction of the Agency. Failure to remove the markings as specified by the Contract Administrator will require the Vendor to return to the location and remove remaining markings at their own expense. Any excessive damages to the asphalt caused by the grinding operations shall be repaired at the Vendor's expense. The Agency shall undertake repairs of the asphalt and shall invoice the Vendor for these costs.

All manual or hand powered application equipment shall meet or exceed the following specifications:

- Be portable, fully self-contained and stand on a minimum of 3 tires;
- Be capable of producing top quality markings with true edges free from waviness or variations;
- Be capable of simultaneous application of "drop-on" reflective glass beads (hand gun excluded); and
- Paint application by means of a pneumatic system through a spray gun nozzle similar to that on truck mounted equipment.

All labour, materials and equipment necessary for the layout and application of pre-marking shall be supplied by the Vendor.

Standby time shall be the time the Vendor has to wait before being able to commence their operation at no fault of their own. For example, in the case where the Vendor is called out and the asphalting process is not yet completed.

The contractor shall ensure all freshly painted lines are suitably marked and identified by the placement of fluorescent red cones to protect freshly laid materials from being tracked or smeared by traffic. The cones shall be left in place until the paint is dry and will not track and must be picked up within one half (1/2) hour after the paint is dry.

All signage and placement of cones shall be in accordance with OTM Book 7, or as directed by the Contract Administrator.

The Vendor will be responsible for the immediate cleaning up of the road allowance of all dirt, debris, excess paint and beads and any other rubbish from their operations. In the case of undue delay, the Contract Administrator will have these operations carried out by Agency forces and deduct all costs incurred from monies due to the Vendor.

Durable thermoplastic pavement markings are to be applied on the newly resurfaced road, including stop bars in all directions. Ladder pavement markings are to be used for pedestrian crossings in all directions at intersections, or as directed by the Contract Administrator.

Ladder crossings are to contain 10cm lines spaced at three (3) metres and 60cm bars with 60cm spaces throughout the length of the crosswalk.

OPSS 710, 1713, 1716 and 1750 shall apply to these items except as modified herein;

The Vendor shall provide all equipment, labour and materials necessary for application of all pavement markings included in the contract and as specified by the Contract Administrator. The thermoplastic pavement marking materials must be suitable for the permanent marking of asphalt surfaces with high traffic loads. The material shall be manufactured and applied to the pavement so that the material will not smear, spread, crack and/or separate from the pavement surface under normal traffic conditions. The Vendor shall be responsible to ensure that inventory of the existing pavement markings are taken prior to any removal.

Payment at the Contract price for the above tender item shall be full compensation for all labour, equipment, and material required to perform the work to the satisfaction of the Agency.

E.10.21 Removals and Salvage

The requirements for removal of electrical equipment shall be in accordance with OPSS 610.

The Vendor is advised that existing traffic signal and streetlighting equipment may be present and require removal before the work can begin.

The Vendor will be responsible for removing all equipment identified on the drawings. The Vendor shall meet with the Agency on site to identify what equipment shall be salvaged or disposed of. Salvaged equipment must be delivered to the Agency's yard within a week. The Vendor is required to restore the areas to as good as or better than original condition. The Contract price shall include all costs related to the removal of all ancillary hardware such as brackets, clamps and cables, for example, and for the proper and environmentally responsible disposal of all removed equipment identified for removal and/or delivery to local Hydro's or Agency's yard.

Any salvaged equipment damaged during the removal operation shall be repaired or replaced by the Vendor at the Vendor's expense.

The Vendor is also advised that a number of existing traffic signal locations within the Region of Peel are operating Red Light Cameras. The equipment at these locations will be removed by the Agency's forces prior to the Vendor starting any works.

E.10.22 Uninterruptable Power Supply (UPS)

The Vendor may be required to supply and install ALPHA UPS that shall be capable of being a Side Mount or Pad Mount. It should house four (4) batteries and bypass switches. Dimensions of the UPS shall not exceed 50''H x 17''W x 17''D. The UPS enclosure must not interfere with the opening of the traffic cabinet door.

All four (4) batteries must meet their specifications out of the box immediately after the initial 24-hour top off charge. Batteries that require cycling to meet the AH rating specifications are not acceptable. The UPS shall provide a minimum four (4) hours of full run-time operation at 500 watts with an additional nine (9) hours of Red Flash operation at 125 watts.

It also shall have two (2) independently programmable timers, zero (0) to eight (8) hours, with two (2) times-of-day restrictions on each timer, providing dry contacts to provide Red Flash operation at user definable times of day. The UPS and batteries shall be easily replaced with all needed hardware and shall not require any special tools for installation.

E.11 DRAWINGS AND SPECIAL PROVISIONS

While these Standard Specifications have been sub-divided into sections, this is solely for the purpose of convenience and expediency, and the Vendor shall in no way be relieved of any responsibility for satisfactory completion of the entire systems regardless of which sub-division of the Special Provisions, or on which drawing any particular item of work should appear.

No claims for extra work will be allowed because a particular item of the work has been omitted from the sub-division of the Special Provisions normally covering that work, or from a drawing which would normally show the work, which would normally be performed by the Vendor, provided that the particular item of work has been shown or specified elsewhere.

Unless otherwise specified, the Drawings and Special Provisions are intended to cover everything obviously requisite and necessary for the complete work, and anything omitted which is essential to proper workmanlike construction, or to fulfill the intent of these Special Provisions, shall be provided by the Vendor the same as though included in the drawings and mentioned in the Special Provisions.

Bid prices will be payment in full for supply of all materials and labour, including wire, parts, accessories and equipment necessary to install, test and place in operation each unit and complete systems.

E.12 SHOP DRAWINGS

a) The Vendor shall submit Shop Drawings of the following for the Agency's review and approval:

   1. Concrete poles
   2. Luminaires (all types)
   3. Luminaire mast arm
   4. LED kits

b) Shop Drawings may be reviewed by the Agency and Hydro Authority to ensure conformity with the design concept of the project and compliance with the Contract Documents.

c) Prior to submission of Shop Drawings to the Agency, the Vendor is required to review Shop Drawings. By this review, the Vendor represents that it has determined and verified field measurements, field construction criteria, catalogue numbers and similar data, and that it has checked and coordinated each Shop Drawing with the requirements of the Contract Documents. The Vendor shall indicate the review of each Shop Drawing by stamp, date and signature of a responsible person.

E.13 APPROVAL OF PLANS AND MODIFICATIONS

The Vendor shall inspect the plans and note any modifications that are deemed to be required for their own purposes.

Preliminary approval of the plans shall be obtained from the local Hydro Authority, and modifications deemed necessary by them shall be incorporated. All modifications to the plans must be consistent with the purpose of the overall scheme of the design. All modifications must be approved by the Agency and be consistent with the local Hydro regulations or specifications.

The Vendor shall maintain on site one (1) complete set of electrical plans and specifications on which he will record all modifications to the work. Prior to acceptance of the work, the Vendor shall submit the modifications to the Agency.

E.14 ELECTRICAL POWER SERVICE CONNECTIONS

The local Hydro Authority shall connect the power service facility to the power supply at a specified time once it receives the approval from ESA, which the Vendor shall make arrangements with for inspection of the service. The Vendor shall install the complete service facility with ground rods as soon as possible so as to permit hydro connection prior to the completion of the signal works.\

On all power supply poles, non-metallic service conduits (SCEPTRE OR EQUIVALENT) shall be used. The size of circuit breakers shall be according to the drawing.

This work shall be carried out in coordination with and, if required, under the supervision of the local Hydro Authority.

Installation of the power service shall be completed within the first ten (10) working days of the project to allow the Hydro Authority sufficient time to provide power prior to date of signal turn on.

The Agency shall make written application to the local Hydro Authority, giving them a minimum of two (2) weeks notice of when this work is to be carried out in order to arrange power supply connection.

E.15 WORKMANSHIP

All workmanship shall be in every respect in accordance with the best modern practices. Whenever the General Conditions, Special Provisions, Form of Tender or the direction of the Agency admit to a reasonable doubt about what is permissible, and when they fail to state the quality of any work, the interpretation which requires the best quality of work shall be followed by the Contractor.

E.16 PROGRESS

A period of six (6) weeks is permitted for each traffic control signal installation awarded under this contract, based on a start date mutually agreeable between the Vendor and Agency. Progress of the work must be maintained on a continuous and organized basis. Intermittent work is not acceptable except as required by the Work Schedule or approved by the Agency.

The Vendor must notify the Agency when it becomes aware that the agreed upon progress schedule cannot be met. Should the project extend beyond the completion date without reason, a “Poor” performance rating will be recorded. The Vendor may be removed from the Agency’s list of pre-qualified Vendors. An eight percent (8%) administration charge will be assessed to the Vendor to cover the Agency’s costs related to completing outstanding aspects of the project, should the Agency be required to finish the task.

E.17 PROVISIONAL ACCEPTANCE OF THE ELECTRICAL WORK

The streetlighting work is subject to the inspection and acceptance of the local Hydro Authority. The traffic signal work is subject to inspection by the Agency’s signal maintenance contractor and acceptance by the Agency.

The Vendor shall notify the Agency in writing when, in the opinion of the Vendor, the work has been satisfactorily completed and the Agency will then cause the work to be inspected. When it is found by the Agency to be completed in accordance with the plans and specifications, they will give notice in writing to the Vendor of the provisional acceptance of the work. The provisional acceptance of the work by the Agency is without prejudice to the rights of the Agency, and the obligations of the Contractor with respect to the repair of defects discovered after completion.

Any defects in the work arising from faulty installation, material supplied by the Vendor, or workmanship discovered or occurring within twelve months from the date fixed by the Agency, as the provisional acceptance of the work by Agency, shall be made good by the Vendor at their expense.

If any such defect is not promptly remedied to the satisfaction of the Agency, by the Vendor, the latter shall be responsible for all loss and damage to the Agency through such defect. The Agency may proceed to do the work itself at the Vendor's risk and expense, and the cost thereof shall be payable forthwith by the Vendor to the Agency.

Provided the Contractor is not otherwise in default under the terms of the Contract, and subject to the provisions of the Vendor's liability in this section, the Vendor's liability in respect of the work, whether in contract, tort, or otherwise, except as to damage to other property of the Agency or the Agency's right of indemnity, shall cease upon the fulfillment by the Vendor of the Vendor's obligations under this clause, provided that any part of the work made good under this clause shall be subject to all the provisions of this clause, for a further period of 12 months, from the date when the same has been made good as aforesaid.

E.18 FINAL ACCEPTANCE OF THE WORK

The final acceptance of the work will be 18 months after the date of the provisional acceptance of the work except when defects are discovered after completion, in which case it shall, in respect of such defects, be 18 months after the date upon which such defects are made good. The Vendor shall notify the Agency in writing, requesting final acceptance of the work, and the Agency will then cause the work to be inspected. When it is found by the Agency to be completed in accordance with the plans and specifications, the Agency will give notice in writing to the Vendor of the final acceptance of the work.

An 18 month guarantee on all workmanship, materials and equipment supplied by the Contractor shall be required. The Contractor will not be required to provide on-call emergency repair support. All maintenance during the warranty period will be performed by the Region's maintenance contractor.

The Region will determine whether any maintenance work required during the warranty period can be attributed to the Contractor's original work and if such responsibility is assigned, the Region will bill the Contractor for the appropriate charges.

E.19 TRAFFIC CONTROL

E.19.1 Maintenance of Vehicular Traffic Operation

The Vendor shall ensure that traffic movement is not unduly restricted due to the presence of their vehicles and equipment on the Highway. All traffic signing, as outlined in OTM Book 7 – Temporary Work, shall be maintained during the course of the work.

E.19.2 Maintenance of Traffic Signal Operation

The Vendor shall perform the work in such a way that minimum down times are required on existing signal installations. Where modifications to detection systems are required, the Vendor shall cause the signals to cycle by removing the detector amplifier's fuse, as approved by the Agency.

Where modifications to an existing signal installation are required, at no time shall any part of the signal installation be left de-energized, nor shall the installation of a new signal head block the visibility of an existing operating signal head. The Vendor shall ensure that the workers on-site have access to a cell phone at all times.

The Vendor shall be charged the full cost of any required emergency maintenance calls that are as a direct result of their work that occur within the 24 month warranty period.

E.19.3 Police Assistance

The Vendor shall arrange and pay for any pay-duty police supervision necessary to direct traffic during any stage that would interfere with normal traffic flow. Pay-duty police supervision shall be required whenever a "flash condition" or a power outage occurs. The Vendor shall not be entitled to any additional compensation for the cost of the police officers' time.

E.20 ENERGIZING TRAFFIC SIGNALS

The Agency or designate must be present when the Vendor energizes the traffic signals for full operations. The Vendor shall provide a minimum of 72 hours advance notice to the Agency when the signals are scheduled to be energized. The Agency reserves the right to cancel any traffic signal activations that it has not been advised of within the 72 hour notice period.

The Vendor shall have a licensed electrician (experienced with energizing traffic signal installations) present when energizing a temporary or permanent traffic signal. When energizing the signals for acceptance a flash out and a conflict monitor check must be completed. Pay-duty police supervision is also required when the signals are energized for full operation. The Vendor shall not be entitled to any additional compensation for the cost of the police officer's time.

Temporary and/or permanent traffic control signal installations may be energized after all vehicle/pedestrian detection has been installed, the central computer control hardware relocated, and all fire pre-emption hardware installed.

E.21 MAINTENANCE OF TEMPORARY TRAFFIC SIGNALS

The Agency or designate must be present when the Vendor energizes the traffic signals for full operations. The Vendor shall provide a minimum of 72 hours advance notice to the Agency when the signals are scheduled to be energized.

During temporary conditions, the Vendor is responsible for all repairs on a continuous 24/7 basis and must respond to after-hours calls immediately.

APPENDIX –
STANDARD DRAWINGS

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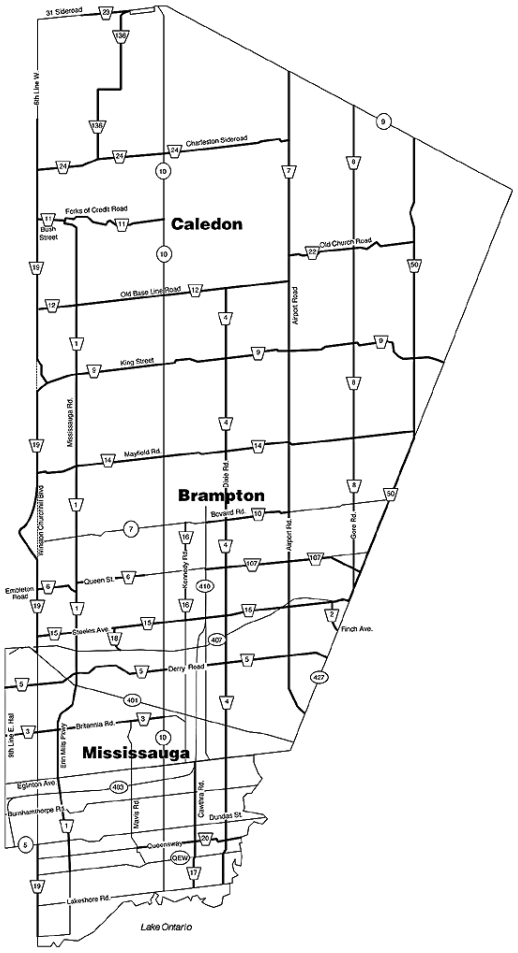
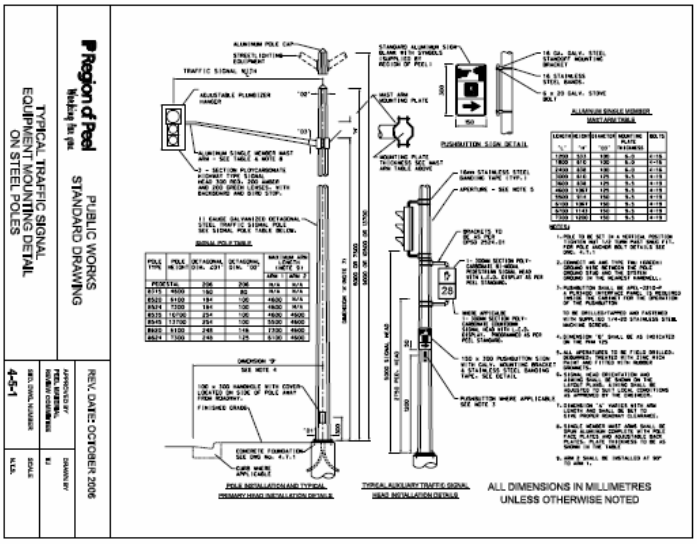
Region of Peel

Working for you



Standard Traffic Signal Drawings



REGIONAL MUNICIPALITY OF PEEL
ELECTRICAL TRAFFIC STANDARDS
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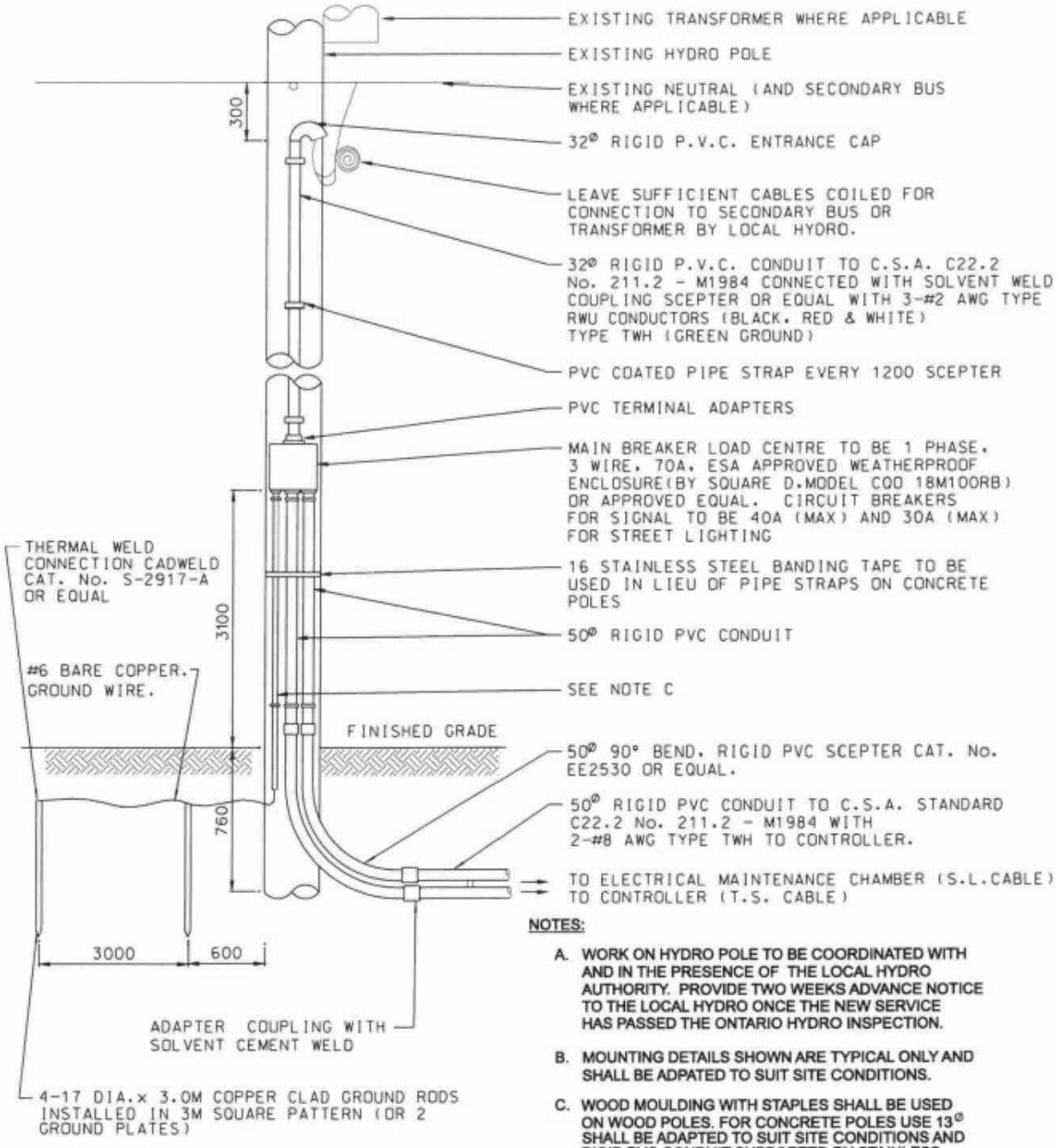

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED

NOTES:

A. WORK ON HYDRO POLE TO BE COORDINATED WITH AND IN THE PRESENCE OF THE LOCAL HYDRO AUTHORITY. PROVIDE TWO WEEKS ADVANCE NOTICE TO THE LOCAL HYDRO ONCE THE NEW SERVICE HAS PASSED THE ONTARIO HYDRO INSPECTION.

B. MOUNTING DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE ADPATED TO SUIT SITE CONDITIONS.

C. WOOD MOULDING WITH STAPLES SHALL BE USED ON WOOD POLES. FOR CONCRETE POLES USE 13Ø SHALL BE ADAPTED TO SUIT SITE CONDITIONS AND RIGID PVC CONDUIT SUPPORTED BY STAINLESS STEEL BANDING EVERY 1200.

D. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING 4.1.4

Region of Peel
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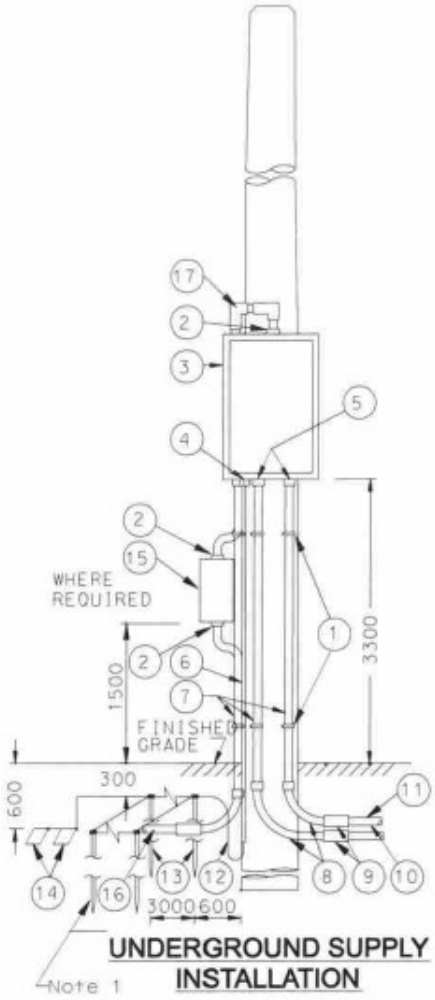
PUBLIC WORKS
STANDARD DRAWING

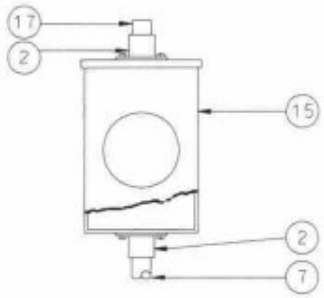
REV. DATE: AUGUST 1, 2005

OVERHEAD SUPPLY CONTROL CABINET WOOD/CONCRETE POLE MOUNTED TRAFFIC SIGNAL & STREETLIGHT APPLICATION

APPROVED BY	DRAWN BY
JA	TJ
STD. DWG. NUMBER	SCALE
4-1-1	N.T.S.



UNDERGROUND SUPPLY INSTALLATION



DETAIL OF METER BASE INSTALLATION

1. PVC COATED STEEL PIPE STRAPS SPACED 1.2m (NOTE 5)
2. FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT) IN METER HUB, 50mm RIGID STEEL, C/W GASKET
3. SUPPLY CONTROL CABINET, SQUARE D, MODEL CQO18M100RB, OR APPROVED EQUAL, STRAPPED TO POLE
4. TERMINAL ADAPTER AND LOCKNUT, 25mm RIGID PVC
5. TERMINAL ADAPTER AND LOCKNUT, 50mm RIGID PVC
6. CONDUIT, 25mm RIGID PVC
7. CONDUIT, 50mm RIGID PVC
8. 90° SWEEP, 50mm RIGID PVC
9. ADAPTER COUPLING, 50mm
10. CONDUIT, 50mm, RIGID PVC, AS INDICATED IN CONTRACT DRAWINGS, TO TRAFFIC SIGNAL CONTROLLER OR MAINTENANCE HOLE/ HANDWELL
11. CONDUIT, 50mm RIGID PVC TO MAINTENANCE HOLE/ HANDWELL FOR STREETLIGHTING, IF REQUIRED.
12. GROUND WIRE, (NOTE 1)
13. COPPER CLAD GROUND ELECTRODE, (NOTE 1)
14. GROUND PLATE, (NOTE 1)
15. METER BASE, 100A, 600V (REQUIREMENT INDICATED IN THE CONTRACT)
16. CONDUIT, 50mm, RIGID PVC OR STEEL AS INDICATED TO POWER SUPPLY POINT
17. "LB" ELBOW, 50mm RIGID PVC

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING # 2/0 AWG BARE STRANDED COPPER GRD WIRE, 4-20mm x 3.0m COPPER CLAD GROUND RODS AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTRAINT (4) RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART. GROUND PLATE (2) MAY BE SUBSTITUTED FOR GROUND RODS.
2. WORK ON HYDRO POLE SHALL BE DONE ONLY IN THE PRESENCE OF OR WITH THE PERMISSION OF THE LOCAL HYDRO AUTHORITY.
3. CO-ORDINATE CONNECTION WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE ONCE THE NEW SERVICE HAS PASSED INSPECTION BY THE ELECTRICAL SAFETY AUTHORITY
4. MOUNTING DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE ADAPTED TO SUIT SITE CONDITIONS AND THE LOCAL HYDRO AUTHORITY.
5. 16mm STAINLESS STEEL BANDING TAPE TO BE USED IN LIEU OF PVC STRAPS ON CONCRETE OR STEEL POLES.
6. ALL DIMENSIONS ARE EXPRESSED IN MILLIMETERS UNLESS OTHERWISE NOTED.

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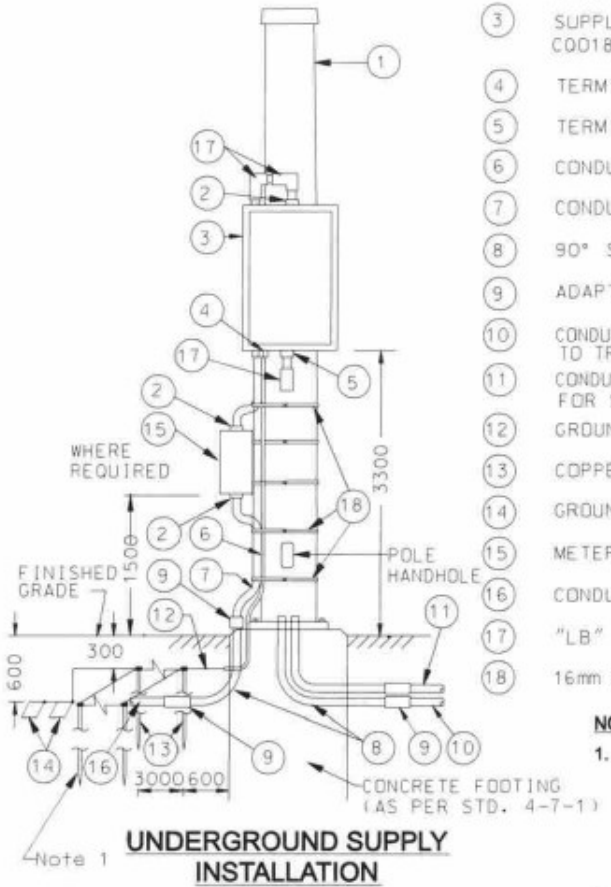
PUBLIC WORKS
STANDARD DRAWING

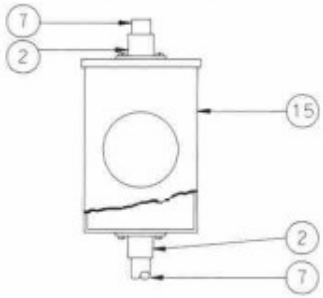
REV. DATE: JANUARY 2003

APPROVED BY	DRAWN BY
JA	MRC
STD. DWG. NUMBER	SCALE
4-1-2	N.T.S.

UNDERGROUND SUPPLY CONTROL CABINET WOOD/CONCRETE POLE MOUNTED TRAFFIC SIGNAL & STREETLIGHT APPLICATION



UNDERGROUND SUPPLY INSTALLATION



DETAIL OF METER BASE INSTALLATION

1. BASE MOUNTED OCTAGONAL STEEL POLE (POWCO 8315) OR APPROVED EQUAL
2. FEMALE ADAPTER & METALLIC CONDUIT NIPPLE (POLYMER TAPE OR TEFLON TAPE TO BE USED FOR NIPPLE ATTACHMENT) IN METER HUB. 50mm RIGID STEEL. C/W GASKET
3. SUPPLY CONTROL CABINET. SQUARE D. MODEL C0018M100RB. OR APPROVED EAUAL. STRAPPED TO POLE
4. TERMINAL ADAPTER AND LOCKNUT. 25mm RIGID PVC
5. TERMINAL ADAPTER AND LOCKNUT. 50mm RIGID PVC
6. CONDUIT. 25mm RIGID PVC
7. CONDUIT. 50mm RIGID PVC
8. 90° SWEEP. 50mm RIGID PVC
9. ADAPTER COUPLING. 50mm
10. CONDUIT. 50mm. RIGID PVC. AS INDICATED IN CONTRACT DRAWINGS. TO TRAFFIC SIGNAL CONTROLLER OR MAINTENANCE HOLE/ HANDWELL
11. CONDUIT. 50mm RIGID PVC TO MAINTENANCE HOLE/ HANDWELL FOR STREETLIGHTING. IF REQUIRED.
12. GROUND WIRE. (NOTE 1)
13. COPPER CLAD GROUND ELECTRODE. (NOTE 1)
14. GROUND PLATE. (NOTE 1)
15. METER BASE. 100A. 600V (REQUIREMENT INDICATED)
16. CONDUIT. 50mm. RIGID PVC TO POWER SUPPLY POINT
17. "LB" ELBOW. 50mm RIGID PVC
18. 16mm STAINLESS STEEL STRAPPING. 1200mm SPACING MAXIMUM

NOTES:

1. 3.0m x 3.0m GROUND GRID CONSTRUCTED USING # 2/0 AWG BARE STRANDED COPPER GRD WIRE, 4-20mm x 3.0m COPPER CLAD GROUND RODS AND MOULDED TYPE CONNECTION. IN AREAS OF PROPERTY CONSTRAINT (4) RODS TO BE INSTALLED IN STRAIGHT LINE, 3.0m APART. GROUND PLATE (2) MAY BE SUBSTITUTED FOR GROUND RODS.
2. CO-ORDINATE CONNECTION WITH THE LOCAL HYDRO AUTHORITY, GIVING TWO WEEKS ADVANCE NOTICE ONCE THE NEW SERVICE HAS PASSED INSPECTION BY THE ELECTRICAL SAFETY AUTHORITY.
3. MOUNTING DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE ADAPTED TO SUIT SITE CONDITIONS AND THE LOCAL HYDRO AUTHORITY.
4. ALL DIMENSIONS ARE EXPRESSED IN MILLIMETERS UNLESS OTHERWISE NOTED.

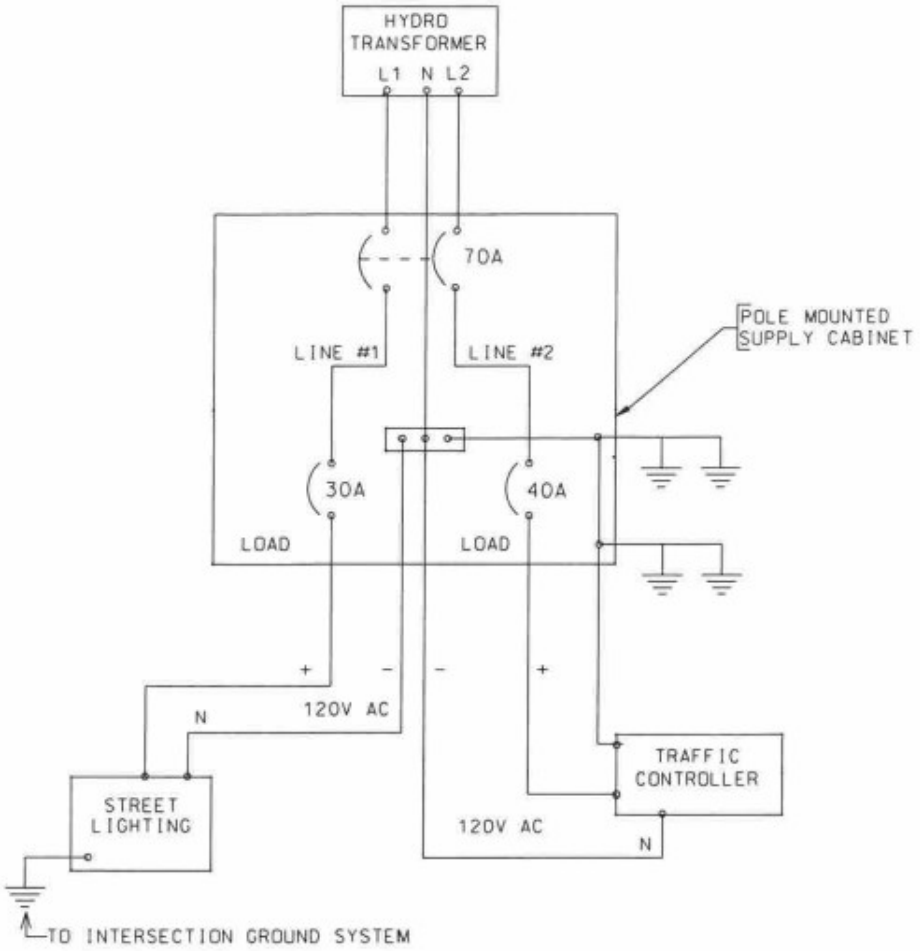
Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

REV. DATE: AUGUST 2005

APPROVED BY	DRAWN BY
JA	TJ
STD. DWG. NUMBER	SCALE
4-1-3	N.T.S.

UNDERGROUND SUPPLY CONTROL CABINET BASE MOUNT STEEL POLE TRAFFIC SIGNAL & STREETLIGHT APPLICATION



NOTES:

1. STREET LIGHT FEED CABLE TO BE 2-#8 AWG (RED & WHITE). (Minimum size)
2. TRAFFIC SIGNAL FEED CABLE TO BE 2-#8 AWG (BLACK & WHITE). (Minimum size)
3. GROUND WIRE TO BE #6 AWG COPPER.
4. POWER PEDESTAL APPLICATION SHALL REQUIRE 2 SEPARATE HOUSINGS, SQUARE D (Q02L70RB) AND INSTALLED AS PER STD. 4.1.5.

ALL DIMENSIONS IN MILLIMETRES

UNLESS OTHERWISE NOTED

Region of Peel *Working for you*	PUBLIC WORKS STANDARD DRAWING	REV. DATE: OCTOBER 2004
SUPPLY CONTROL CABINET - SCHEMATIC FOR TRAFFIC SIGNAL & STREETLIGHT CIRCUITS	APPROVED BY: JA	DRAWN BY: MRC
	STD. DWG. NUMBER: 4-1-4	SCALE: N.T.S.

Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

TYPICAL LOOP VEHICLE DETECTOR LAYOUT

REV. DATE: OCTOBER 1999

APPROVED BY: JA

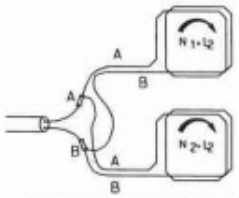
DRAWN BY: MRC

STD. DWG. NUMBER: 4-2-1

SCALE: N.T.S.

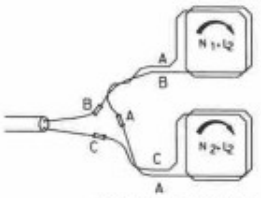
NOTES:

1. LOOP WIDTH TO BE 1830 IN ALL CASES. FOR LOOP LENGTH 'L' NUMBER OF TURNS AND ORIENTATION, SEE LAYOUT DRAWING.
2. ON LANES NARROWER THAN 3600, MAINTAIN 1830 SEPARATION BETWEEN ADJACENT LOOPS BY MOVING THE OUTER LOOP TO THE SIDE OR MEDIAN OF THE ROADWAY.
3. SHIELDED CABLE HAS AN INDUCTANCE OF APPROIMATELY μ22 H PER 30m. TOTAL INDUCTANCE IS TO BE SET BETWEEN 100 AND 300 H BY CHOOSING THE PROPER NUMBER OF LOOP TURNS FOR EITHER SERIES OF PARALLEL CONNECTION AND ADDING THE SHIELDED CABLE INDUCTANCE. LEAD IN INDUCTANCE MUST BE LESS THAN LOOP INDUCTANCE.
4. LEADS BETWEEN THE LOOP AND THE HANDWELL SHALL BE TWISTED AT 3 TURNS PER 300 WITH AN EQUAL LAY ON EACH WIRE. EACH LOOP LEAD SHALL BE RUN TO THE HANDWELL IN A SEPARATE 25 DUCT
5. NO SPLICES ALLOWED IN LOOP WIRING.
6. WIND ALL LOOPS IN ADJACENT LANES IN THE SAME DIRECTION. NO MORE THAN THREE LOOPS ARE TO BE CONNECTED TOGETHER IN SERIES.
7. GROUND SHIELD WIRE AT THE CONTROLLER AND DETECTOR UNIT ONLY.
8. POURING TEMPERATURE OF SEALANT SHALL NOT EXCEED 204°C, SEALANT SHALL BE POURED IN LAYERS TO AVOID BURNING THE WIRE INSULATION.
9. INDUCTANCE AND CONTINUITY TO BE METER CHECKED PRIOR TO SEALING LOOP.
10. LOOP CABLE AND RUN WIRES TO BE SPLICED AT THE SIGNAL POLE HANDHOLE.
11. CONNECTOR HOUSING WITH WATERPROOF GREASE TO BE USED FOR ALL UNDERGROUND SPLICING.
12. SOLDER AND MARRETTE ALL LOOP AND RUN WIRE CONNECTIONS. INSERT SPLICES INTO CONNECTION HOUSING OR TAPE AT POLE HANDHOLE.
13. THIS STANDARD SHALL BE USED IN CONJUNCTION WITH OPSD 2520.01.
14. ALL LEFT TURN LANE LOOPS SHALL BE CONNECTED TO A SEPARATE RUN WIRE AND BROUGHT TO THE CONTROLLER



PARALLEL LOOP CONNECTIONS

TOTAL LOOP INDUCTANCE $\frac{L1 \times L2}{(L1 + L2)}$



SERIES LOOP CONNECTIONS

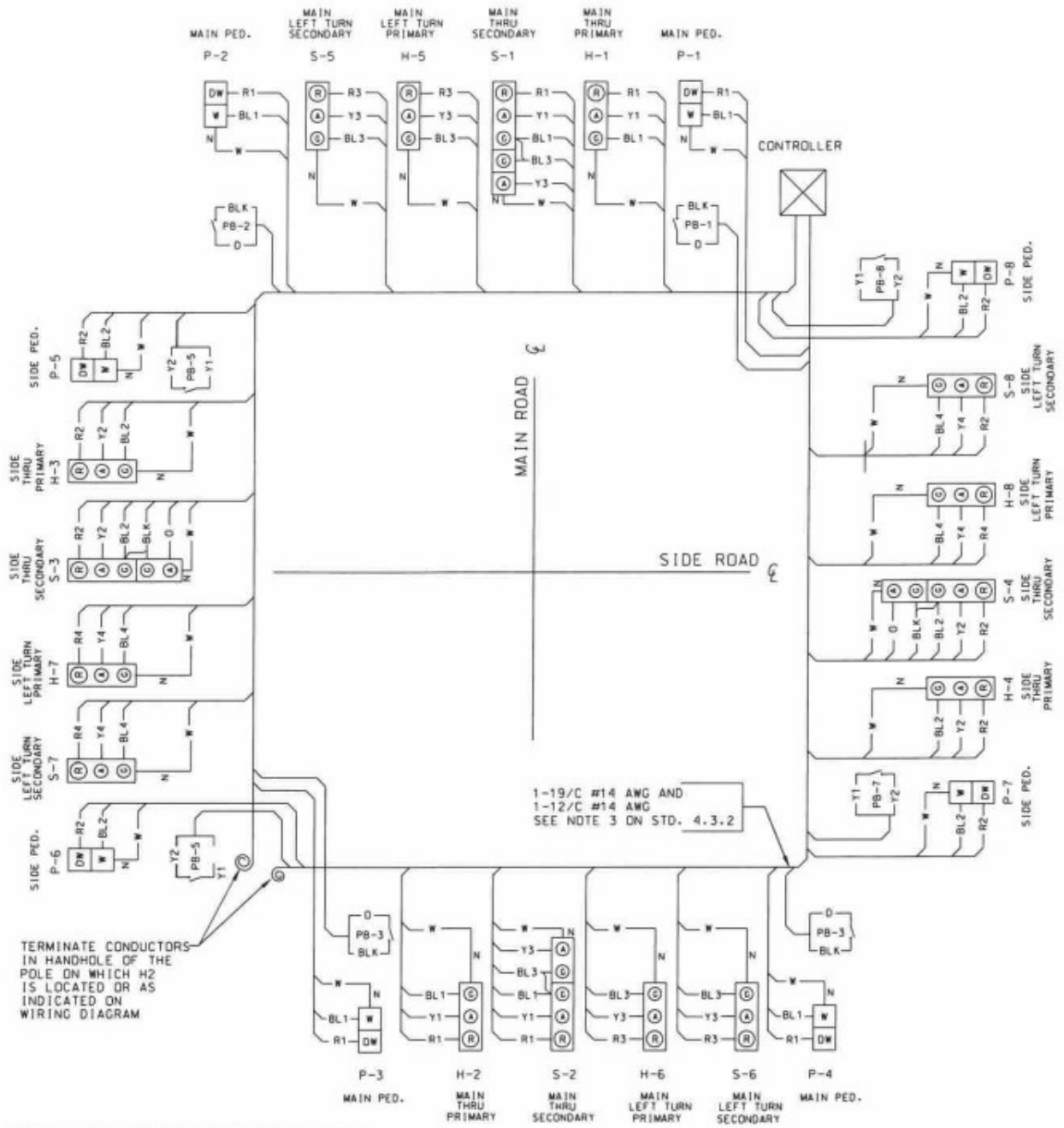
(USE ONLY WHERE LOOPS ARE EQUAL SIZE)

TOTAL LOOP INDUCTANCE $L1 + L2$

TABLE OF APPROXIMATE LOOP INDUCTANCE (MICROHENRIES)
FOR 1830 LOOPS

'N' TURNS \ 'L'	1220	1830	2440	3050	3660	4570	6100	7620	9140	10670	12190	13720	15240
1	10	10	15	15	15	20	25	30	30	40	40	50	50
2	40	40	50	60	70	80	100	110	130	150	170	180	200
3	80	100	110	130	150	170	210	250	290	330	370	410	450
4	140	170	200	230	260	300	370	450	520	600	660	730	810
5	230	270	320	360	410	470	590	700	810	920	1040	1150	1260
6	320	390	450	520	580	680	840	1000	1170	1330	1490	1650	1810

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE NOTED



ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED

NOTE:

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DWG. No. 4.3.2 AND 4.3.3.

Region of Peel
Working for you

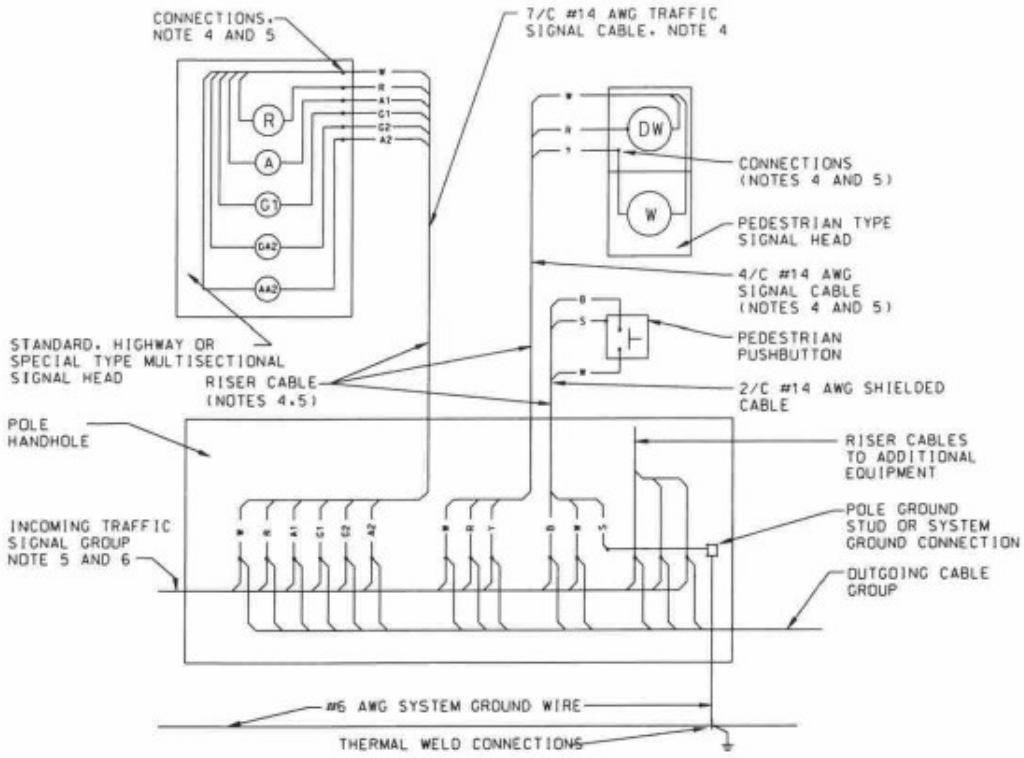
PUBLIC WORKS
STANDARD DRAWING

REV. DATE: JANUARY 2004

APPROVED BY	DRAWN BY
JA	MRC

TYPICAL TRAFFIC SIGNAL WIRING SCHEMATIC

STD. DWG. NUMBER	SCALE
4-3-1	N.T.S.



NOTES:

1. TRAFFIC SIGNAL CABLE SHALL BE RUN COMPLETELY AROUND THE INTERSECTION AND SHALL BE BROUGHT UP INTO THE HANDHOLE OF EACH POLE. ALL CONNECTIONS TO BE MADE ABOVE GROUND ELEVATION AT THE POLE HANDHOLE.
2. SIGNAL HEAD AND PUSH BUTTON CONNECTIONS SHALL BE MADE AS SHOWN IN DETAIL.
3. VEHICLE SIGNAL CABLE SHALL BE 19/C AND PEDESTRIAN SIGNAL CABLE SHALL BE 12/C.
4. UNUSED CONDUCTORS OF SIGNAL HEAD RISER CABLES (FROM THE POLE HANDHOLE) SHALL BE TERMINATED WITH INSULATED SPRING TYPE CONNECTORS. USE ONE SPARE CONDUCTOR FOR GROUND CONNECTION AS SHOWN.
5. ALL HANDHOLE CONNECTIONS AND TERMINATIONS SHALL BE MADE WITH INSULATED SPRING TYPE CONNECTORS. BUNDLE AND TAPE GROUPS OF CONNECTORS NEATLY IN THE POLE HANDHOLE. LEAVE A 1500 LOOP OF EACH CABLE COILED IN THE NEAREST HANDWELL AND A 500 LOOP IN EACH POLE HANDHOLE.
6. A #6 AWG TYPE TWU INSULATED (GREEN) SYSTEM GROUND WIRE SHALL BE RUN CONTINUOUSLY THROUGH THE DUCT SYSTEM. CONNECTIONS SHALL BE MADE TO EACH POLE GROUND STUD AND TO EACH GROUND ROD.
7. THE GREEN / AMBER DISPLAY OF A FOUR SECTION HEAD SHALL CONSIST OF A SINGLE SECTION WITH A L.E.D. GREEN / AMBER ARROW.
8. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWINGS 4-3-1 AND 4-3-3

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE NOTED

Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

REV. DATE: JANUARY 2004

TYPICAL TRAFFIC SIGNAL POLE WIRING SCHEMATIC

APPROVED BY	DRAWN BY
JA	K.S.
STD. DWG. NUMBER	SCALE
4-3-2	N.T.S.

19/C (VEH.)

1. R1 - M.S. RED
2. R2 - S.S. RED
3. R3 - M.S. L.T. RED (PROT)
4. R4 - S.S. L.T. RED (PROT)
5. R5 - SPARE
6. Y1 - M.S. AMBER
7. Y2 - S.S. AMBER
8. Y3 - M.S. L.T. AMBER (PROT)
9. Y4 - S.S. L.T. AMBER (PROT)
10. Y5 - SPARE
11. BL1 - M.S. GREEN
12. BL2 - S.S. GREEN
13. BL3 - M.S. L.T. GREEN ARROW (PROT)
14. BL4 - S.S. L.T. GREEN ARROW (PROT)
15. BL5 - SPARE
16. W1 - M.S. NEUTRAL
17. W2 - S.S. NEUTRAL
18. BLK - SPARE
19. O - SPARE

12/C (PED)

R1 - M.S. D.W.
R2 - S.S. D.W.
R3 - SPARE
Y1 - S.S. P.B. (+)
Y2 - S.S. P.B. (-)
Y3 - SPARE
BL1 - M.S. D.W.
BL2 - S.S. D.W.
BL3 - SPARE
W - NEUTRAL
BLK - M.S. P.B. (+)
O - M.S. P.B. (-)

NOTE

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWINGS 4-3-2 AND 4-3-1.

Region of Peel
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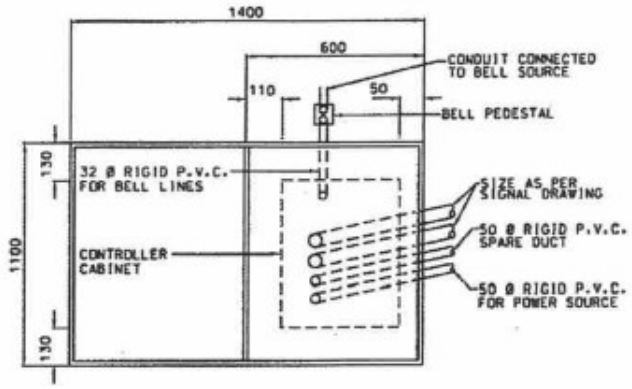
PUBLIC WORKS
STANDARD DRAWING

REV. DATE: JANUARY 2004

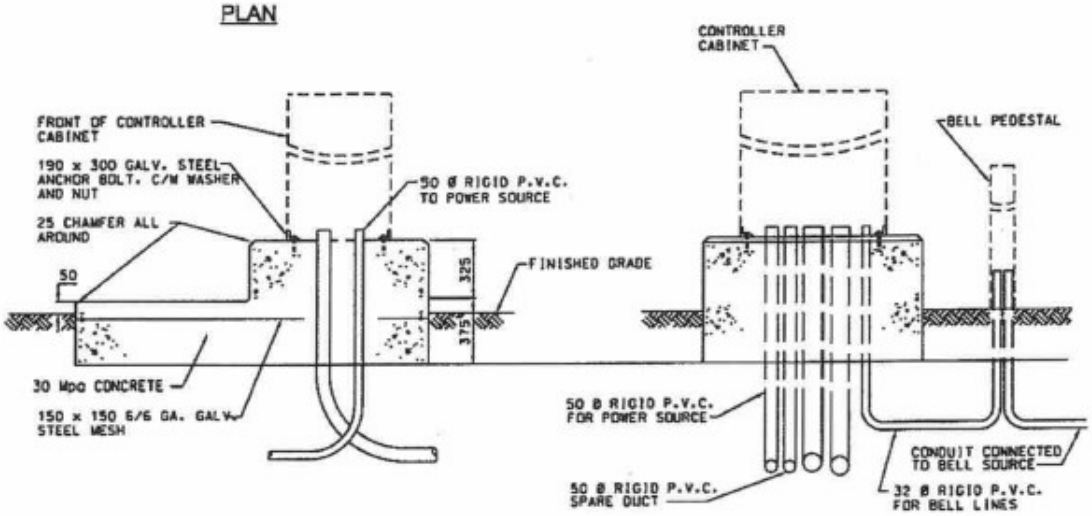
APPROVED BY	DRAWN BY
JA	K.S.

TRAFFIC SIGNAL CABLE CONDUCTOR DESIGNATION

STD. DWG. NUMBER	SCALE
4-3-3	N.T.S.



PLAN



SIDE ELEVATION

BACK ELEVATION

NOTES:

1. CONCRETE AND REINFORCING STEEL TO BE PLACED IN ACCORDANCE WITH OPSS 904 AND 906.
2. CONCRETE BASE SHALL BE LEVEL.
3. MAIN CONDUIT DIMENSION TO BE IN ACCORDANCE WITH CONTRACT SPECS.
4. ALL CONDUITS TO BE FIELD ORIENTED AS REQUIRED.
5. ANCHOR BOLTS FOR CABINET TO BE FIELD DRILLED AND CONCRETE GROUTED TO SUIT CABINET DESIGN.
6. A MINIMUM OF 75 CONCRETE TO BE PLACED OVER STEEL MESH REINFORCING.
7. CONCRETE PAD TO BE PLACED ON UNDISTURBED NATIVE GROUND OR ON FILL MATERIAL COMPACTED TO 95% PROCTOR DENSITY.
8. ALL CONDUITS TO BE CAPPED WITH A RUBBERIZED SEALANT.

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE NOTED

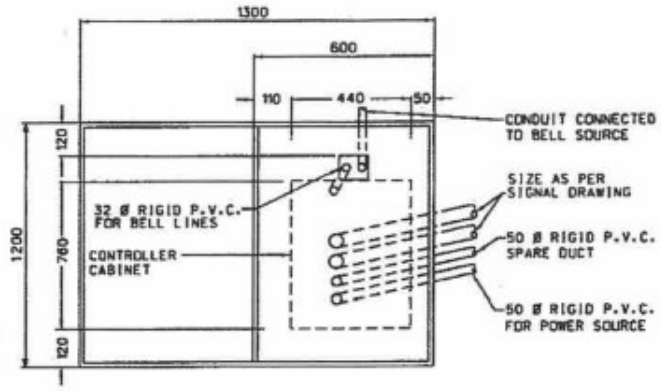
Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

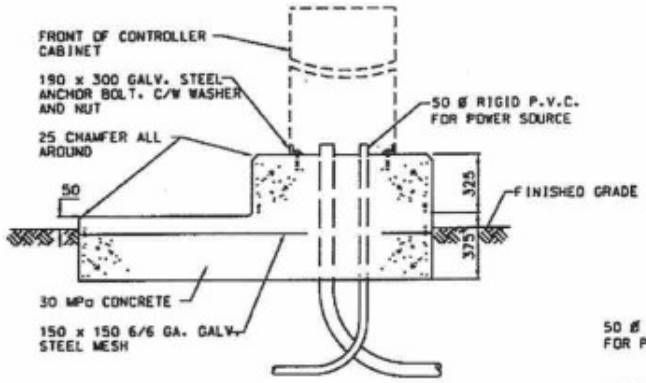
REV. DATE: MAY 2009

APPROVED BY	DRAWN BY
PEEL MATERIAL REVIEW COMMITTEE	MRC/RL
STD. DWG. NUMBER	SCALE
4-4-1	N.T.S.

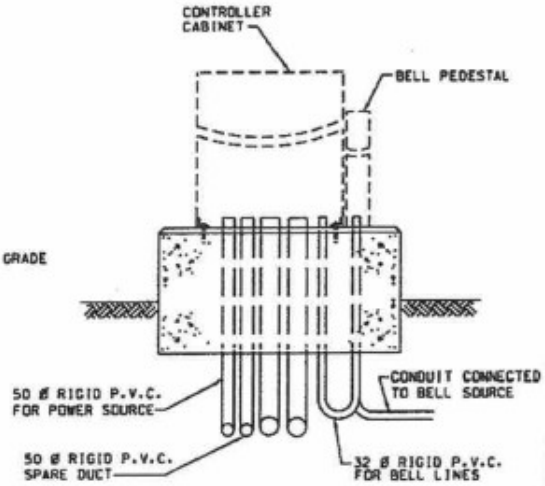
TYPICAL CONTROLLER CONCRETE PAD DETAIL



PLAN



SIDE ELEVATION



BACK ELEVATION

NOTES:

1. CONCRETE AND REINFORCING STEEL TO BE PLACED IN ACCORDANCE WITH OPSS 904 AND 905.
2. CONCRETE BASE SHALL BE LEVEL.
3. MAIN CONDUIT DIMENSION TO BE IN ACCORDANCE WITH CONTRACT SPECS.
4. ALL CONDUITS TO BE FIELD ORIENTED AS REQUIRED.
5. ANCHOR BOLTS FOR CABINET TO BE FIELD DRILLED AND CONCRETE GROUTED TO SUIT CABINET DESIGN.
6. A MINIMUM OF 75 CONCRETE TO BE PLACED OVER STEEL MESH REINFORCING.
7. CONCRETE PAD TO BE PLACED ON UNDISTURBED NATIVE GROUND OR ON FILL MATERIAL COMPACTED TO 95% PROCTOR DENSITY.
8. ALL CONDUITS TO BE CAPPED WITH A RUBBERIZED SEALANT.
9. BELL PEDESTAL TO BE SUPPLIED BY PEEL.

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE NOTED

Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

REV. DATE: MAY 2009

APPROVED BY	DRAWN BY
PEEL MATERIAL REVIEW COMMITTEE	K.S./RL
STD. DWG. NUMBER	SCALE
4-4-2	N.T.S.

TYPICAL CONTROLLER CONCRETE PAD DETAIL WITH BELL PEDESTAL

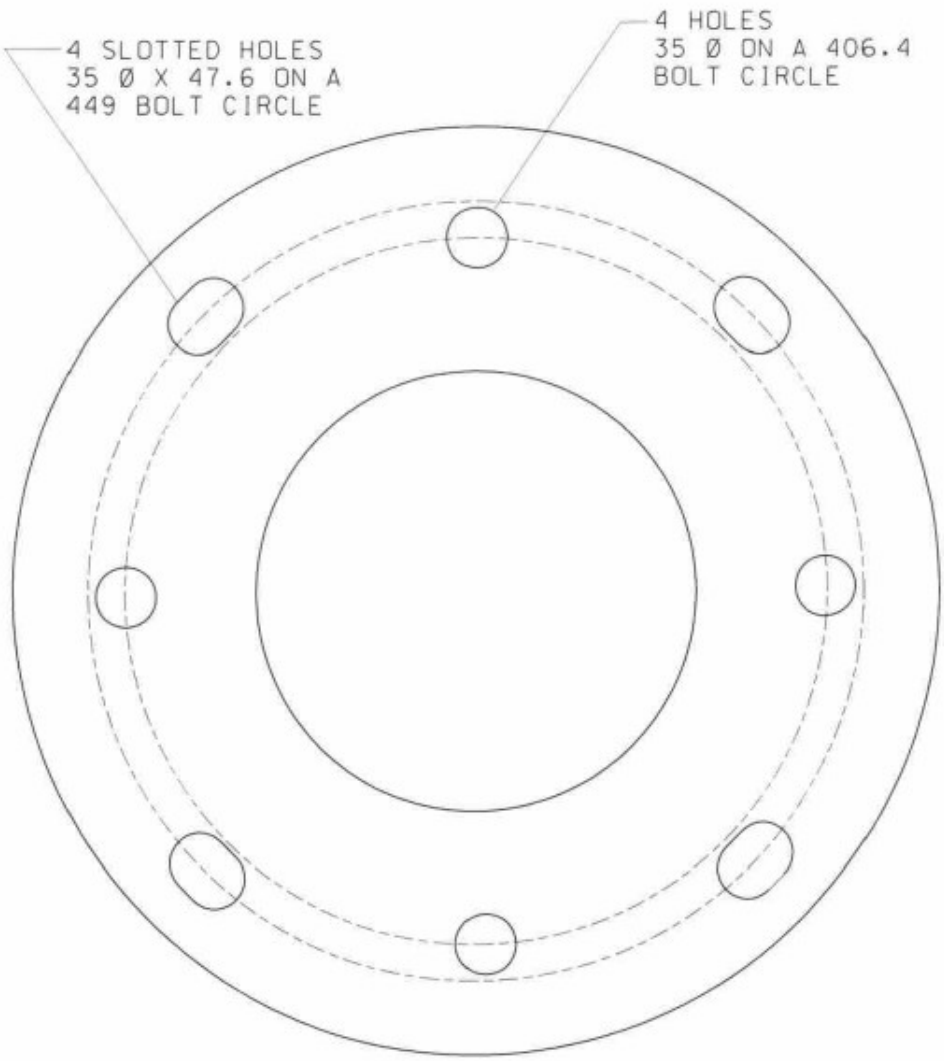
Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

REV. DATE: OCTOBER 2006

TYPICAL TRAFFIC SIGNAL EQUIPMENT MOUNTING DETAIL ON STEEL POLES

APPROVED BY	DRAWN BY
JA	TJ
STD. DWG. NUMBER	SCALE
4-5-1	N.T.S.

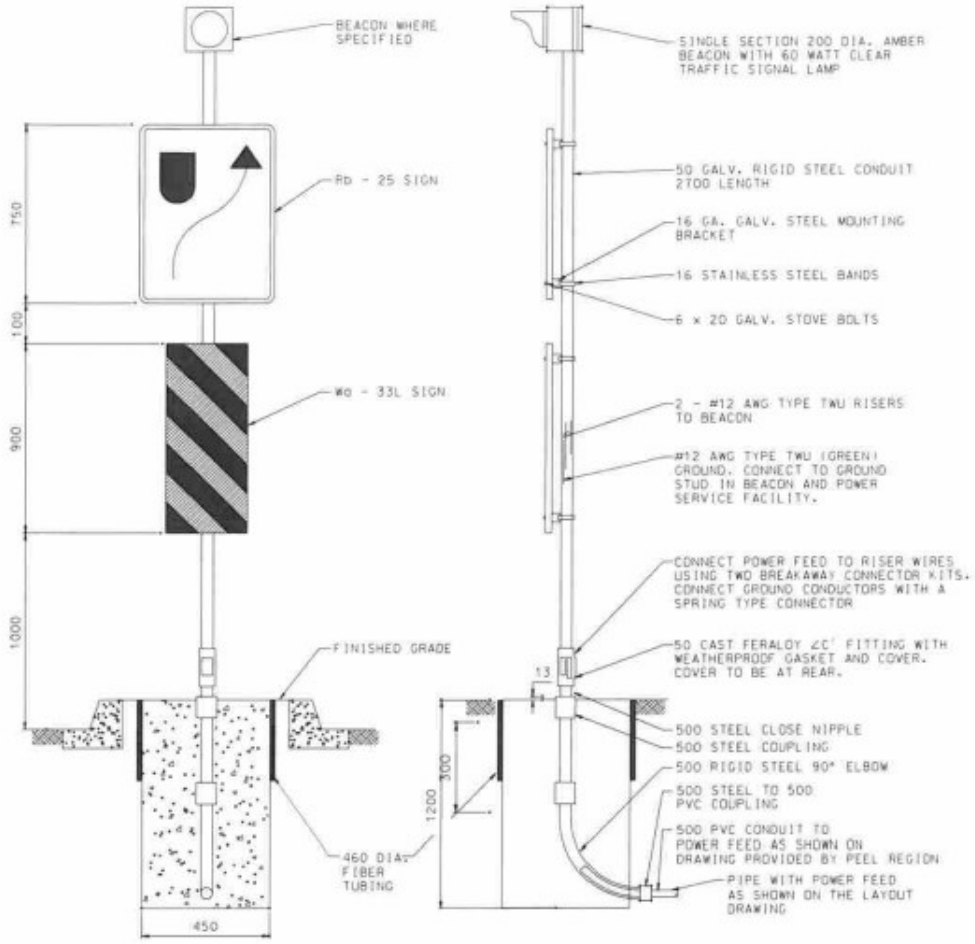


25.4 PLATE THICKNESS X 546 DIAMETER
WITH 254 DIAMETER CUTOUT
FOR CONVERTING 449 BCD (#6 BASE
SECTIONAL) TO 406 BCD (OCTAGONAL 8500)

35 kgs. NET WEIGHT

36 kgs GALVANIZED WEIGHT

Region of Peel *Working for you*	PUBLIC WORKS STANDARD DRAWING	REV. DATE: APRIL 2001
		APPROVED BY: JA / DRAWN BY: K.S.
POLE ADAPTER BASE PLATE		STD. DWG. NUMBER: 4-5-2 / SCALE: N.T.S.



FRONT ELEVATION

SIDE ELEVATION

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE NOTED

NOTES:

1. ALL SIGNS ARE INDICATED IN THE CONTRACT ITEMS FOR THIS WORK, AND THE FACES ARE TO BE 3M HIGH INTENSITY SHEETING, AS PER MTO STANDARDS OR APPROVED EQUAL.
2. POWER FEED SHALL BE 2 - #10 AWG OR 2 / #8 AWG AS REQUIRED.
3. UNLESS OTHERWISE SPECIFIED ON THE LAYOUT DRAWINGS, BOLLARDS OR SIGNS ARE TO BE CENTERED IN THE MEDIAN AND SET BACK 1500 FROM THE OUTSIDE CURB RADIUS.
4. WITH OPSS FORM 904, CLASS OF CONCRETE TO BE 30 MPa.

Region of Peel
Working for you

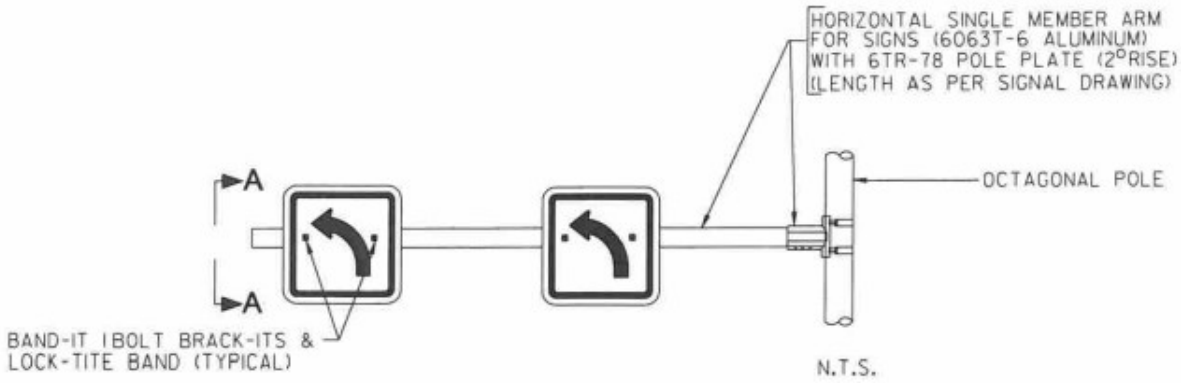
PUBLIC WORKS
STANDARD DRAWING

REV. DATE: JANUARY 2003

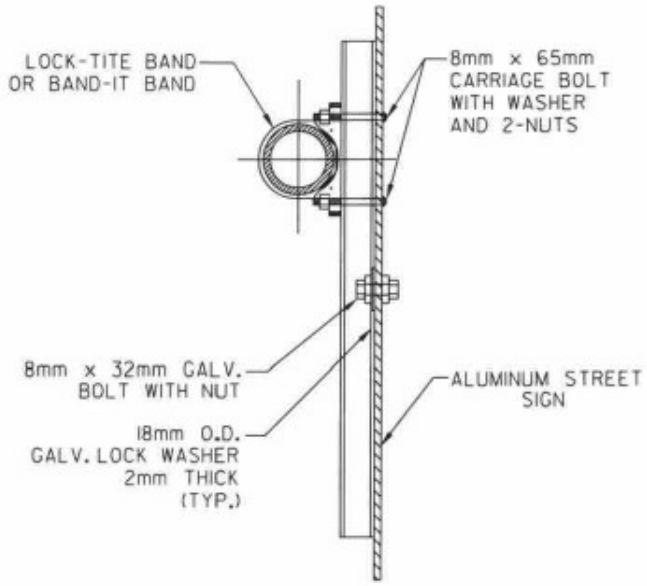
APPROVED BY	DRAWN BY
JA	MRC

KEEP RIGHT SIGN
WITH BEACON

STD. DWG. NUMBER	SCALE
4-6-1	N.T.S.

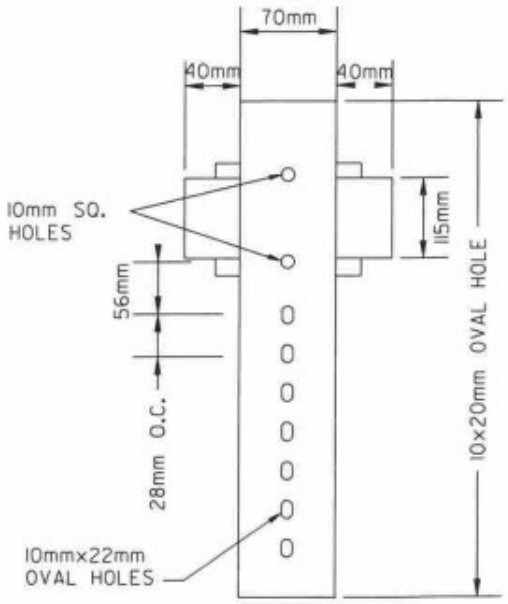


N.T.S.



SECTION A-A

N.T.S.



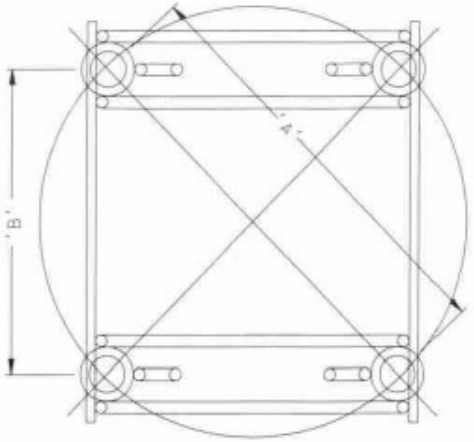
FRONT VIEW

N.T.S.

NOTE

1. POLE PLATE BOLTS TO BE ADJUSTED SO THAT HORIZONTAL PORTION OF ARM IS LEVEL.
2. MOUNTING HOLES FOR BRACKET & SIGN TO BE FIELD DRILLED.
3. PLACE APPROXIMATE 5° VERTICAL TILT ON SIGN.

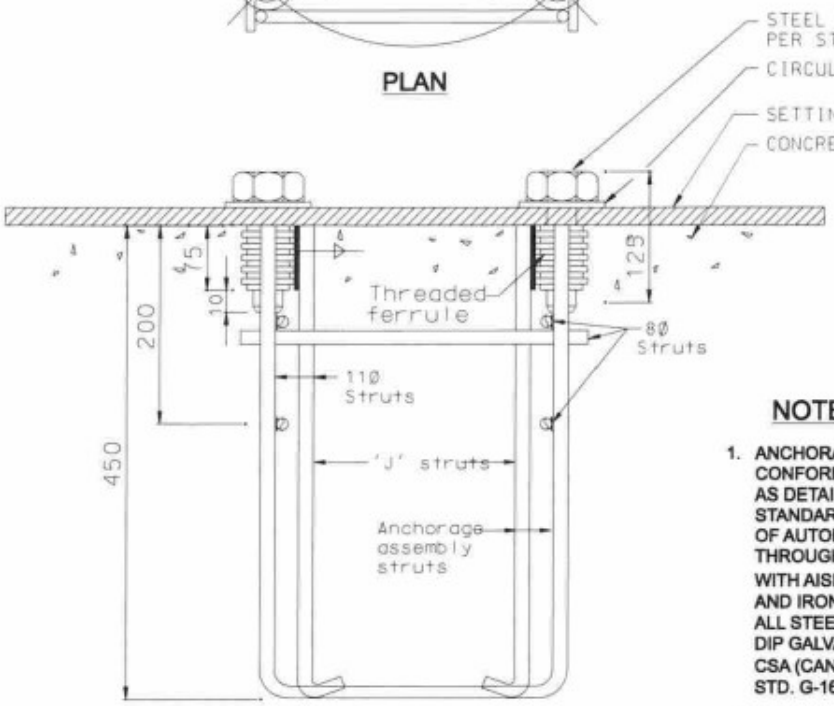
Region of Peel *Working for you* — PUBLIC WORKS STANDARD DRAWING	REV. DATE: JANUARY 2003
OVERHEAD LANE CONTROL SIGN SUPPORT	APPROVED BY: JA; DRAWN BY: K.S.; STD. DWG. NUMBER: 4-6-2; SCALE: N.T.S.



PLAN

BOLT TABLE

POLE LENGTH mm	BOLT CIRCLE 'A' mm	BOLT SQUARE 'B' mm	BOLT DIA. mm
PEDESTAL	406	287	32
4600	254	180	22
6100	406	287	32
7300	406	287	32
10700	406	287	32
13700	406	287	32



ELEVATION

NOTES:

1. ANCHORAGE ASSEMBLY STRUTS SHALL CONFORM TO GRADE SAE 1030-C STEEL AS DETAILED IN ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE) / SAE (SOCIETY OF AUTOMOTIVE ENGINEERS) J403H. THREADED THROUGH STEEL FERRULES SHALL COMPLY WITH AISI (AMERICAN INSTITUTE OF STEEL AND IRON) C12L14, ROTOPROBED BAR. ALL STEEL COMPONENTS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH CSA (CANADIAN STANDARDS ASSOCIATION) STD. G-164M.
2. BOLTS SHALL BE COATED WITH WHITE NON-STAINING GREASE PRIOR TO POURING CONCRETE.
3. A SETTING TEMPLATE SHALL BE PROVIDED FOR ACCURATE POSITIONING OF THE ANCHOR WITHIN THE FORM.
4. STEEL HEX. BOLTS (FULLY THREADED) AND HARDENED STEEL WASHERS SHALL BE IN ACCORDANCE WITH ASTM SPEC. A-325 AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH CSA STD. G-164M.
5. CONCRETE FOUNDATION FOR ANCHORAGE ASSEMBLY TO BE IN ACCORDANCE WITH STD. 4-7-2

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE NOTED

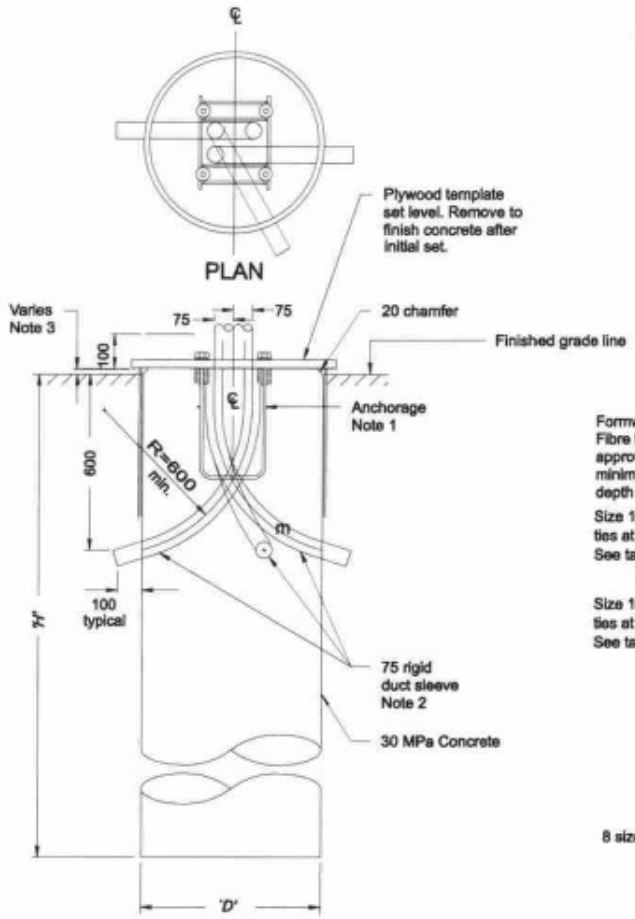
Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

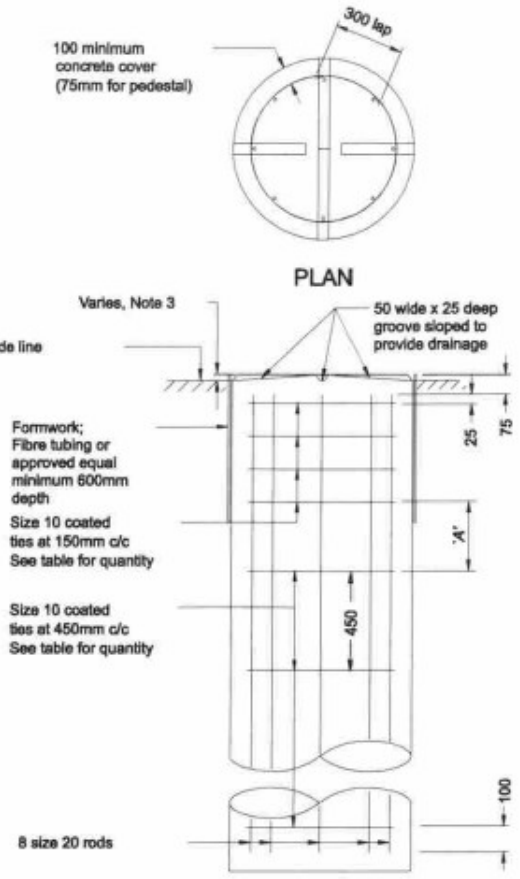
REV. DATE: MARCH 1997

ANCHORAGE ASSEMBLY FOR CONCRETE FOOTING

APPROVED BY	DRAWN BY
JA	MRC
STD. DWG. NUMBER	SCALE
4-7-1	N.T.S.



ELEVATION
DIMENSIONS



ELEVATION
REINFORCEMENT
(Note 4)

POLE TYPE	POLE LENGTH mm	MINIMUM BURIAL DEPTH 'H' mm	'D' mm	ROD LENGTH mm	'A' mm	NO. OF TIES AT 150 c/c	NO. OF TIES AT 450 c/c	BOLT CIRCLE DIAMETER mm
PEDESTAL		1200	600	1000	425	0	3	406
8315	4600	1400	600	1200	375	4	1	254
* 8520	6100	2150	760	1950	475	4	2	406
8620	6100	2200	760	2000	75	4	3	406
8524	7300	2300	760	2100	85	4	3	406
8624	7300	2400	760	2200	275	4	3	406
8535	10700	2850	760	2650	275	4	4	406
8545	13700	2950	760	2750	375	4	4	406

* WHERE CENTER ISLAND MEDIANS CAN NOT SURPORT A 760MM BASE A 600MM BASE MAYBE USED WITH A 8520 POLE.
USE OF A 600MM BASE IS TO BE APPROVED BY A TRAFFIC SIGNALS AND SYSTEM REPRESENTATIVE

NOTES:

1. FOR ANCHORAGE ASSEMBLY, SEE STANDARD DRAWING 4-7-1
2. MINIMUM OF TWO SLEEVES REQUIRED FOR EACH CONCRETE FOOTING FOR THREE SLEEVE REQUIREMENTS, SEE LAYOUT DRAWING / WIRING DIAGRAM.
3. TOP OF FOOTING TO BE INSTALLED AT 25 ABOVE FINISHED GRADE.
4. REINFORCING STEEL IS SHOWN IN SOLID LINES FOR CLARITY.

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE NOTED

Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

REV. DATE: MAY 2008

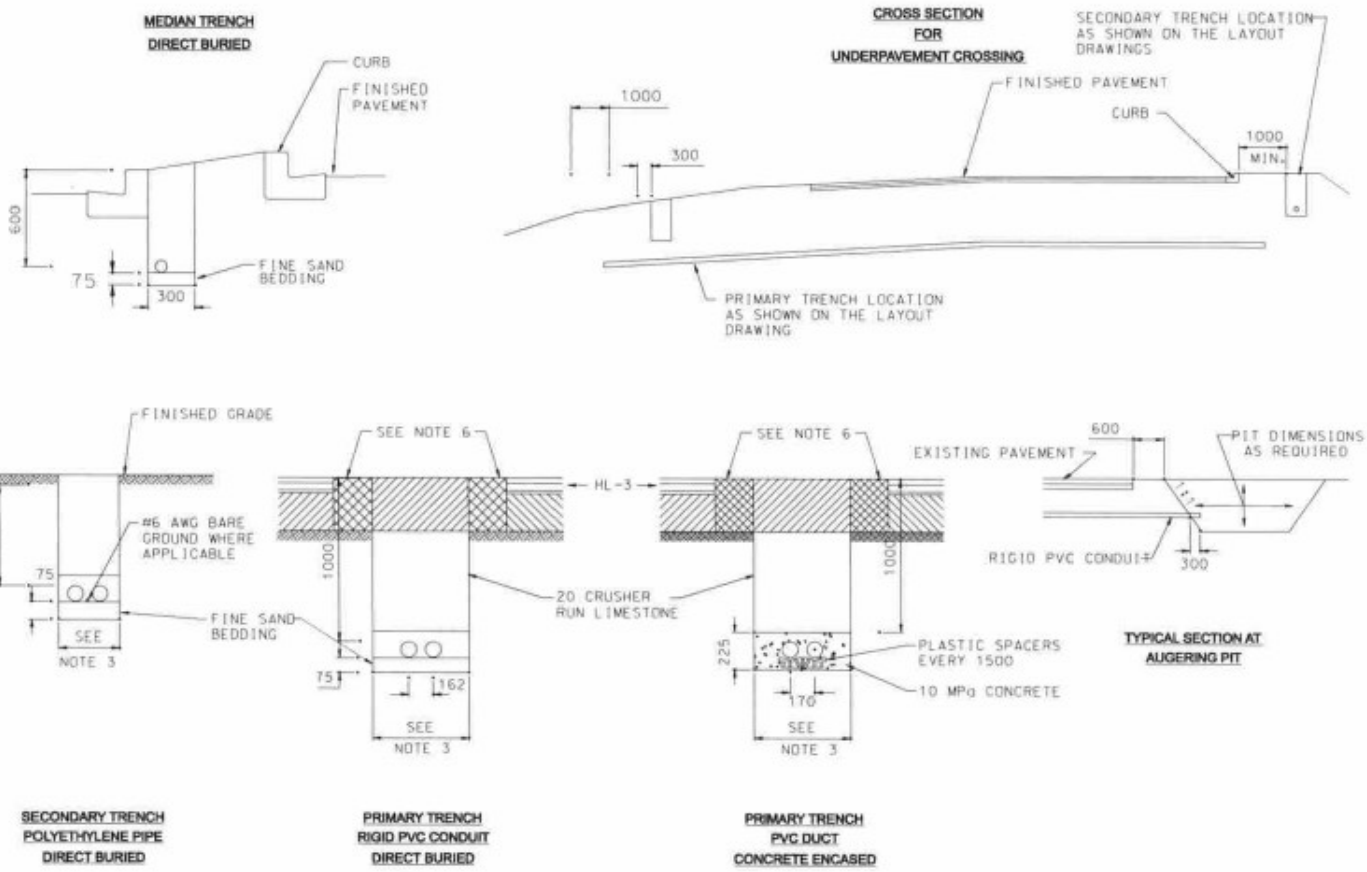
CONCRETE FOOTING FOR BASE MOUNTED POLES

APPROVED BY	DRAWN BY
PEEL MATERIAL REVIEW COMMITTEE	TJ
STD. DWG. NUMBER	SCALE
4-7-2	N.T.S.

Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

TYPICAL UNDERGROUND CONDUIT DETAILS

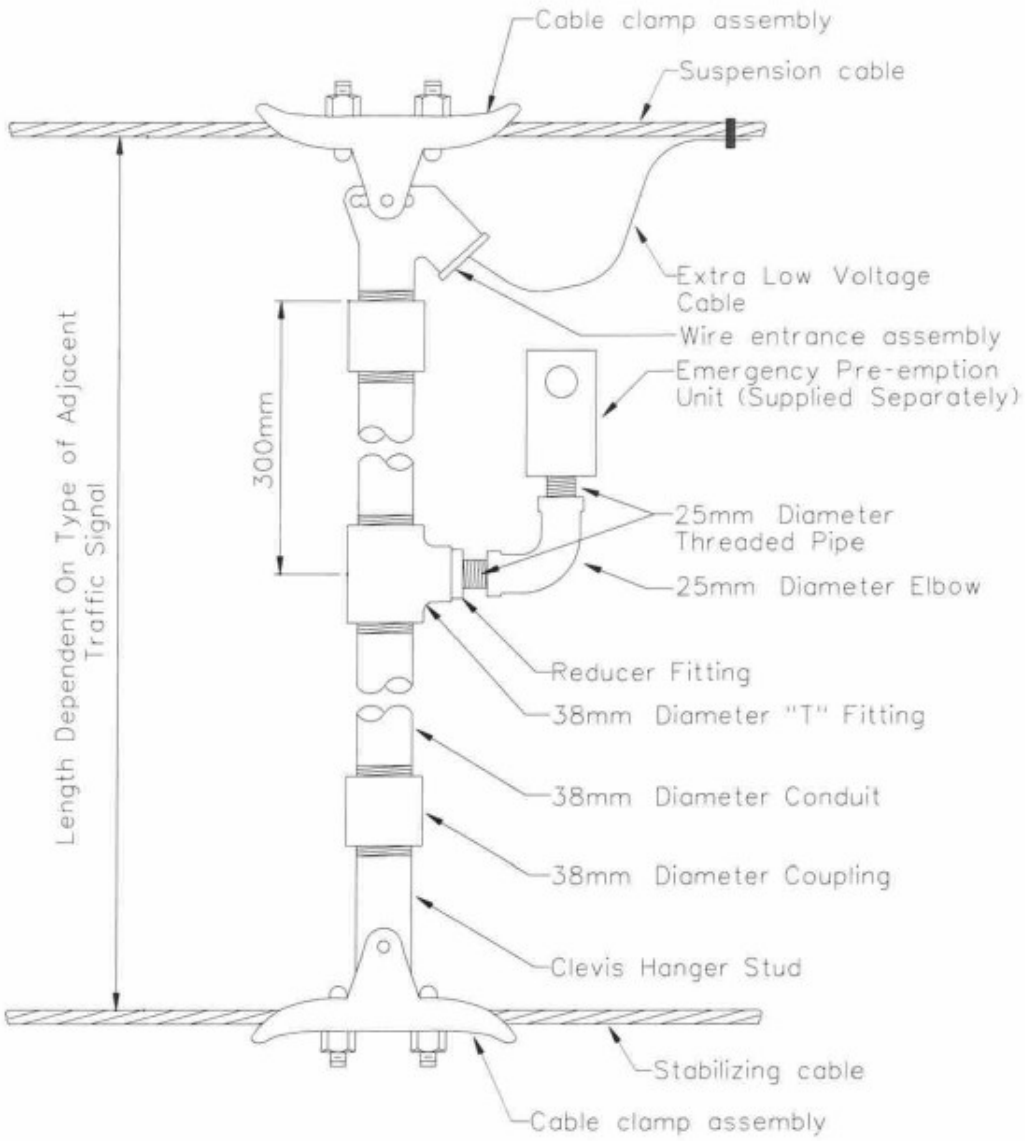


NOTES:

1. ALL WORK WITHIN THE RIGHT-OF-WAY SHALL CONFORM TO THE CONDITIONS STIPULATED IN THE REGION'S ROAD OCCUPANCY PERMIT.
2. FOR CONNECTION TO ELECTRICAL MAINTENANCE CHAMBERS SEE APPLICABLE OPS DRAWINGS.
3. TRENCHES SHALL BE 300 WIDE AND 1000 DEEP WITH VERTICAL WALLS. SAW CUT ASPHALT FULL DEPTH TO GRANULAR BASE PRIOR TO REMOVAL.
4. IN STONEY OR ROCKY GROUND, INSTALL SAND BEDDING AS SHOWN.
5. ALL RIGID CONDUITS OR DUCTS SHALL HAVE A 60 YELLOW NYLON FISH ROPE PULLED WITH CABLES OR LEFT IN SPARE DUCTS FOR FUTURE USE.
6. PRIOR TO BACKFILLING TRENCH, REMOVE ASPHALT FULL DEPTH BY SAW CUTTING ADDITIONAL 300 WIDTH ON EACH SIDE OF THE TRENCH AND RECOMPACTING DISTURBED AREA.
7. CONDUIT SIZE AND TYPE AS PER LAYOUT DRAWINGS AND DOCUMENTS.

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE NOTED

REV. DATE: MARCH 1997	APPROVED BY	DRAWN BY
	JA	MRC
STD. DWG. NUMBER	SCALE	
4-8-1	N.T.S.	



NOTE

1. Assembly to be mounted on span cables, over top of roadway within 1.0m of traffic signal as per signal layout.
2. This standard to be used in conjunction with OPSD-2540.01 and OPSD-2540.02.
3. All hardware fittings shall be cast aluminum with stainless steel mounting hardware.

Region of Peel
Working for you

PUBLIC WORKS
STANDARD DRAWING

REV. DATE: JUNE 2004

APPROVED BY	DRAWN BY
JA	K.S.
STD. DWG. NUMBER	SCALE
4-9-1	N.T.S.

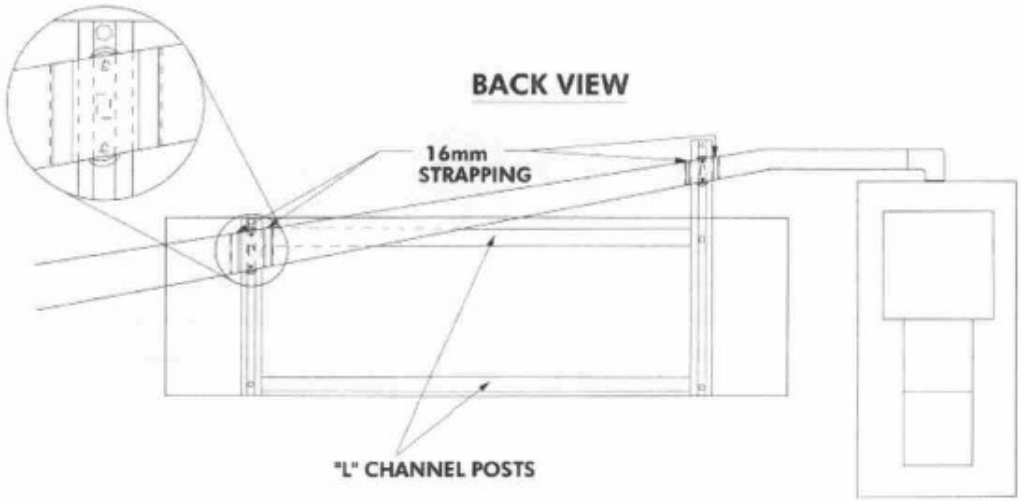
EMERGENCY FIRE PRE-EMPTION MOUNTING BRACKET ON SPAN CABLE

FRONT VIEW

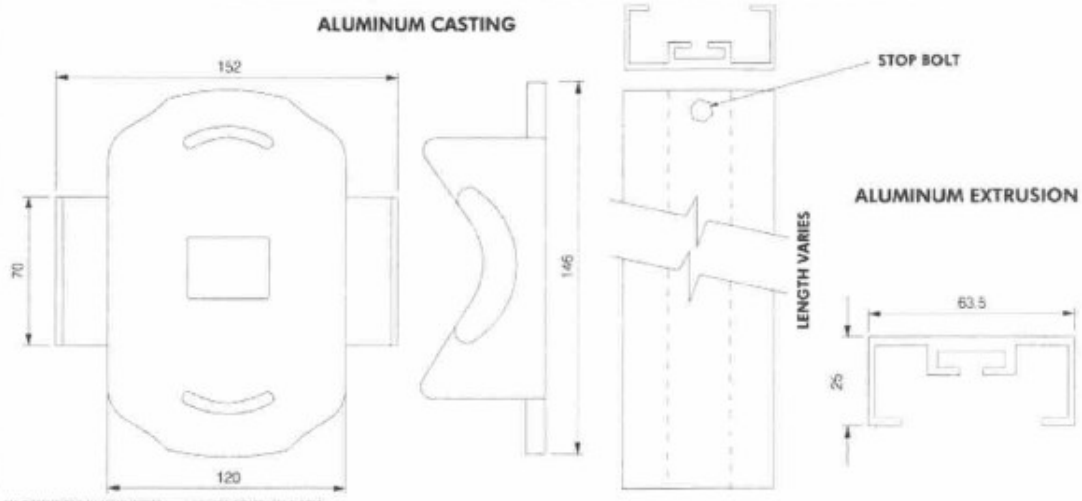
NOTES:

1. STREET NAME LETTERING MUST BE 305mm HELVETICA AND 152mm HELVETICA FOR THE STREET NAME SUFFIX
2. INTERSECTIONS WITH SPLIT NAMES MUST USE 152mm HELVETICA LETTERING AND ARROWS TO DESIGNATE THE STREET LOCATION
3. OVERSIZED STREET NAME SIGNS WITH THE ALUMINUM SIGN BRACKET UNIT WILL BE ASSEMBLED BY THE CITY OF BRAMPTON TRAFFIC SIGN SHOP
4. A BUCKET TRUCK OR A PLATFORM LIFT MACHINE WILL BE REQUIRED FOR THE INSTALLATION OF THE OVERSIZED STREET NAME SIGNS
5. OVERSIZED STREET NAME SIGNS MUST BE INSTALLED ON HEAVY DUTY OCTAGONAL SIGNAL POLES
6. THE ALUMINUM SIGN BRACKET USES 9.5mm STAINLESS STEEL BOLTS ON 114mm CENTRES
7. THE ALUMINUM SIGN BRACKET ALLOWS FOR 15 DEGREES OF VERTICAL ADJUSTMENT
8. "L" CHANNEL POST ARE INSTALLED ON THE BACK OF SIGN FOR SUPPORT
9. THE BID SHALL INCLUDE ALL LABOUR, EQUIPMENT AND MATERIALS REQUIRED TO INSTALL THE EQUIPMENT SPECIFIED, INCLUDING ALL HARDWARE AND ADJUSTMENT REQUIRED. THE CONTRACTOR SHALL INSTALL EITHER A 16mm GRADE 5 BOLT OR A 19mm BOLT FOR THE MAST ARM SHOE.
10. TO BE USED FOR ARTERIAL ROADS

BACK VIEW



ALUMINUM SIGN BRACKET EXTRUSION & CASTING



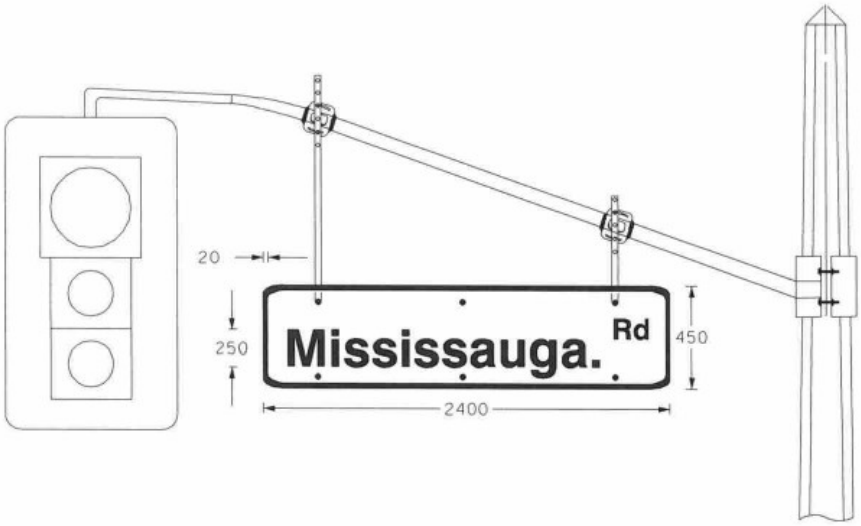
ALL DIMENSIONS IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED

CITY OF BRAMPTON
WORKS and TRANSPORTATION DEPARTMENT

TYPICAL OVERSIZED STREET NAME SIGN INSTALLATION
&
ALUMINUM SIGN BRACKET EXTRUSION & CASTING

REVISION:	2	REV. DATE:	07-05-30
DATE:	03-11-03		
CHECKED:			
APPROVED:			
SCALE:	N.T.S.	DWG. No.	445

METRIC
ALL DIMENSIONS IN MILLIMETRES

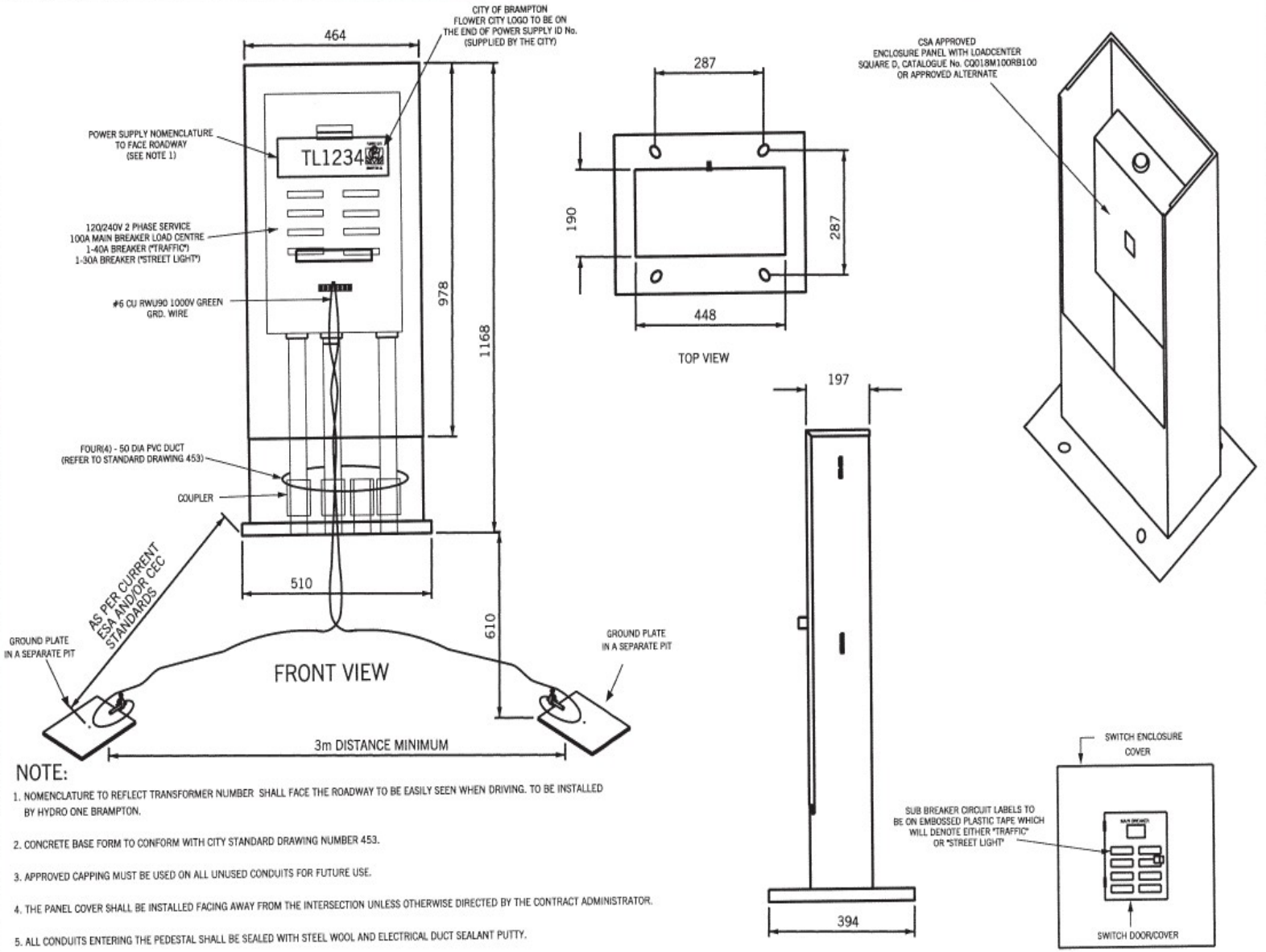


1. OVERSIZED STREET NAME SIGNS
BLANKS TO BE 45cm x 240cm AT A THICKNESS OF 0.081 ALUMINUM THE BLANKS TO HAVE BLUE ENGINEERING SCOTCHLITE BACKGROUND WITH A 2cm WHITE BORDER. THE FONT TO BE USED IS HELVETICA MEDIUM. FOR LETTERING USE GREY HIGH INTENSITY SHEETING. THE SIZE OF THE FONT IS 25cm (FOR STREETS WITH TWO DIFFERENT NAMES USE THE MAXIMUM SIZE FONT TO FIT). THE BRACKETS TO BE USED TO INSTALL MUST BE PURCHASED FROM SENTINAL POLES IN MISSISSAUGA.

MISSISSAUGA
Transportation and Works

STANDARD
OVERSIZED STREET
NAME SIGNS AT
SIGNALIZED INTERSECTIONS

EFF. DATE	2002-01-01	SCALE	N.T.S.
REV.		STANDARD No.	2430.150



NOTE:

1. NOMENCLATURE TO REFLECT TRANSFORMER NUMBER SHALL FACE THE ROADWAY TO BE EASILY SEEN WHEN DRIVING. TO BE INSTALLED BY HYDRO ONE BRAMPTON.
2. CONCRETE BASE FORM TO CONFORM WITH CITY STANDARD DRAWING NUMBER 453.
3. APPROVED CAPPING MUST BE USED ON ALL UNUSED CONDUITS FOR FUTURE USE.
4. THE PANEL COVER SHALL BE INSTALLED FACING AWAY FROM THE INTERSECTION UNLESS OTHERWISE DIRECTED BY THE CONTRACT ADMINISTRATOR.
5. ALL CONDUITS ENTERING THE PEDESTAL SHALL BE SEALED WITH STEEL WOOL AND ELECTRICAL DUCT SEALANT PUTTY.

REVISION:	REV. DATE: 2013-11-15
DATE: 2013-11-04	
CHECKED:	
APPROVED:	
SCALE: N.T.S.	DWG. No. 438

CITY OF BRAMPTON
WORKS and TRANSPORTATION DEPARTMENT

TRAFFIC SIGNAL PEDESTAL
120/240 VAC - 100 Amp

THE REGIONAL MUNICIPALITY OF PEEL

STANDARD SPECIFICATION

FOR

CONCRETE NOISE BARRIER WALLS

July 2009

STANDARD SPECIFICATION
FOR
PRECAST CONCRETE NOISE BARRIER WALLS

PART 1: GENERAL

1.1 General

This specification shall be read in conjunction with other related Contract Document requirements including the General Conditions, Information for tenders and Special Provisions.

1.2 Scope

This Specification covers the requirements for materials, design, fabrication and construction of noise barrier wall systems utilizing precast concrete panels.

1.3 Definitions

Whenever used in this Specification, the following terms shall have meanings as defined herunder:

Municipality shall mean the Municipal jurisdiction of the abutting road. Or in the case of a wall adjacent to a railway it shall mean the local Municipal jurisdiction:

Peel Noise Wall Technical Committee shall mean the committee established by the Region of Peel, City of Mississauga and the City of Brampton for the purpose of developing, administering, and maintaining uniform standards and specifications applicable to the design and construction of noise barrier walls in all three Municipal jurisdictions.

Supplier shall mean the manufacturer of the precast concrete wall components;

Project Proponent shall mean Subdivision or Site Plan Developer obligated under a Development Agreement with the Municipality to construct a noise barrier wall on his property.

Engineer or Consulting Engineer shall mean the Consulting Engineer or the Consulting Engineering firm engaged by the Supplier or Project Proponent to design and certify the precast concrete noise barrier wall. The Consulting Engineer shall have documented experience in the design and construction review of Structural Engineering Projects:

Contractor shall mean the party undertaking the installation of the precast concrete noise barrier walls.

1.4 Reference Standards, Specifications and Codes

This Specification refers to the following Standards, Specifications and Codes:

CSA-A23.1-94:	Concrete Materials and Methods of Concrete Construction
CSA-A23.2-94:	Methods of Test for Concrete
CSA-A23.3-94:	Design of Concrete Structures
CSA-A23.4-94:	Precast Concrete – Materials and Construction
CSA-S16.1-94:	Limit States Design of Steel Structures
CSA-G40.21-91:	Structural Quality Steels
CSA-G164-92	Hot Dipped Galvanizing of Irregularity Shaped Articles:
Ontario Highway Bridge Design Code (OHBDC). 1991	
Ontario Building Code, 1990	
OPSS 1352:	Precast Concrete Barriers
OPSS 1442:	Epoxy Coated Steel Reinforcement for Concrete

1.5 Pre-Qualification of Suppliers

The supply of Precast concrete components will be limited only to Suppliers who are pre-qualified by the *Peel Noise Wall Technical Committee*. In order for the Supplier to be considered for pre-qualification, the Supplier shall submit to the Peel Noise Wall technical Committee the following documentation:

The Supplier's name and address, including the manufacturing plant location(s);
A resume of the Supplier's experience in manufacturing precast concrete wall panels and a listing of completed projects in the region of Peel;
The trade name of the product:
A general statement as to the composition of the product and method of production;
Detailed Material Specifications;
Quality control program detailing procedures for manufacture, inspection, testing, shipping and handling;
A Report from an independent Testing Company signed and sealed by a Professional Engineer licensed by the Professional Engineers of Ontario and dated within six (6) months of the submission date, certifying that samples tested from a normal production lot compiled with the requirements specified in Section 2.2 of this Specification.

Upon review of the documentation as submitted, the *Peel Noise Wall Technical Committee* will pre-qualify the Supplier, or, if the documentation is considered not to be satisfactory the *Peel Noise Wall Technical Committee* will advise the Supplier of the deficiencies. Pre-qualification of the supplier does not imply subsequent acceptance of the product which shall be subject to project specific testing as outlined in Section 2.3 herein. Unless otherwise notified, Supplier's pre-qualification status will be renewed on an annual basis by the *Peel Noise Wall Committee*. If the Supplier's pre-qualified status is not renewed the supplier may re-apply for pre-qualification

1.6 Submittals

The following documents shall be submitted to the Municipality for approval for each noise barrier wall project:

(i) Shop drawings, signed and sealed by a Professional Engineer licensed by the Professional Engineers of Ontario (with documented experience in Structural Engineering Design), showing details of noise barrier wall components including materials specifications and reinforcing:

(ii) Structural drawings(s), signed and sealed by a Professional Engineer licensed by the Professional Engineers of Ontario (with documented experience in Structural Engineering Design), showing foundation entails and specifying design criteria, climatic design loads, as well as applicable geotechnical data used in the design.

(iii) Layout plan and wall elevations showing proposed colours and patterns.

Note: A Geotechnical Report on foundation conditions specific to the wall location including recommendations on soil bearing and lateral resistance will be made available to the Supplier.

1.7 Quality Assurance

Inspection and testing for quality assurance during manufacture and installation shall comply with the requirements specified in Section 2.3.2 and 3.2 herein.

1.8 Delivery, Handling, Storage and Protection

Handle, transport and store wall components to meet specified requirements of CSA Standard A23.4 and to prevent damage, soiling and staining.

2 PART 2: PRODUCTS

2.1 Design Requirements

2.1.1 Acoustic Characteristics

The acoustic properties of the wall panels shall comply with the requirements of the approved Noise Study, if applicable, and unless otherwise specified, the density of the wall panels shall not be less than 20 kg/m^2.

2.1.2 Aesthetic Requirements:

The following requirements shall apply:

(i) No material other than concrete shall be visible on the public street side of the wall;

(ii) Except for steel posts (where used), no material other than concrete shall be visible on the non-public street side of the wall:

(iii) A patterned finish shall be provided on both sides of the wall panels;

(iv) All exposed concrete components shall be manufactured with an impregnated colour except where accents are permitted in natural grey.

2.1.3 Structural Design Criteria

Noise barrier wall systems shall be designed as a slender structure in accordance with the requirements of Clause 5-7 of the Ontario Highway Bridge Design Code (OHBDC) and to support the applicable dead loads, wind and ice accretion loads. Climatic design data shall be in accordance with Appendix A2-1 of OHBDC with a reference wind pressure based on a 25 year return period. Wind pressures shall be calculated in accordance with Appendix A2-2 of OHBDC.

Structural Design of noise barrier walls shall comply with CSA Standards A23-1, A23.4 and S16.1 as applicable. The design of foundations shall comply with Section 4.2 of the Ontario Building Code.

Particular care shall be given to the design and detailing of the end bearing supports for the lowest wall panels. Where steel posts are utilized, a galvanized steel bracket shall be provided. Where precast concrete posts are utilized, a galvanized steel

bracket shall be provided or the footing concrete shall be extended (formed and reinforced to provide a satisfactory bearing surface) to the appropriate elevation.

The recommendations of the Geotechnical Report shall be adhered to in the design of foundations. In particular, the extent of compaction and future consolidation of earth embankments or berms shall be considered. Where footings are to be installed in an embankment condition, the embedment depth shall be increased to reflect the reduction in lateral restraint as determined by the Geotechnical Engineer, as well as the bearing capacity of the fill.

2.2 Material Specifications

2.2.1 Concrete for Precast Panels and Posts

Materials and production of concrete shall comply with CSA Standards A23.1 and A23.4, Specific requirements for this specification shall be as follows:

Class of concrete:	35 MPa at 28 days (minimum)
Course Aggregate: (crushed stone)	20 mm nominal maximum size
Water Cement Ratio:	0.4 (maximum)
Air Content:	5 to 8%
Resistance to Salt Scaling:	Loss of Mass not to exceed 0.8 Kg/m2 from the surface after 50 cycels of freezing and thawing when tested in accordance with OPSS 1352.
Water Absorption:	5% (when tested in accordance with CSA A23.2
Concrete to Reinforcing Steel Bond Stress:	Mpa (Ultimate)

2.2.2 Concrete for Foundation

Materials and production of concrete shall comply with CSA A23.1. Specific requirements for this Specification shall be as follows:

Class of Concrete	30 Mpa at 28 days (minimum)
Water Cement Ratio:	0.5 (maximum)
Air Content:	5 to 8%

2.2.3 Reinforcing Steel

Reinforcing steel shall conform to the requirements of CSA Standard G30.12 for grades 350 and 400 and to CSA Standard G30.16 for grade 400W. Reinforcing steel shall be epoxy coated for precast concrete panels, conforming to OPSS 1442. Epoxy coated reinforcing steel shall be supplied from an approved

source listed in the current version of the Ontario Ministry of Transportation Designated Sources Manual DSM #9.65.70.

2.2.4 Structural Steel

Structural Steel materials, design and fabrication shall conform to CAN/CSA Standard G40.21-92 Grade 300W and CAN/CSA-S16.1 All members shall be hot dipped galvanized conforming to CAN/CSA-G164.

2.3 Manufacture and Testing of Precast Concrete Components

2.3.1 Manufacture of Precast Concrete Components

Manufacture of precast concrete components shall conform to CSA A23.4. Concrete cover to reinforcing steel shall be 50 mm (tolerance of ± 5 mm) in other locations. The concrete cover may be reduced to 30mm (tolerance of ± 5 mm) on the non-road side provided the slides of the pre-cast concrete components are appropriately marked so that the correct placement orientation can be easily verified on site. The method of demarcation shall be agreed to with the Municipality before manufacturing is commenced.

2.3.2 Inspection and Testing of Precast Concrete Components

Precast concrete components manufactured for use on a Municipal project shall be inspected and tested by an Independent Testing Company engaged by the Municipality. Precast concrete components manufactured for use on a non-Municipal project (e.g. Subdivision) shall be inspected and tested by an Independent Testing Company engaged by the Project Proponent. The selection of sample components for testing shall be made by the Independent Testing Company in conjunction with a representative of the Municipality. Random samples shall be taken from manufactured components in the plant and/or from components delivered on site. The precast concrete Supplier will be responsible for notifying the Municipality when the components are ready for inspection and the Supplier shall provide free and ready access to facilitate the inspection and testing to be carried out.

The tests to be carried out shall include but shall not be limited to:

Comprehensive strength
Absorption and Density:
Air Void Content:
Concrete Cover:
Dimensions, straightness and finish:
Bond Stress (concrete to reinforcing).

The report of the Testing Company shall be signed and sealed by a professional Engineer licensed by the Professional Engineers of Ontario.

If any precast components fail to meet the requirements of this Specification, all units represented by the failed test(s) shall be deemed rejected unless results of additional testing prove to be satisfactory as determined by the Municipality. Acceptance by the Municipality of satisfactory test results does not relieve the Supplier of his responsibility for performance of the product under the Guarantee.

3 PART 3: EXECUTION

3.1 Site Preparation and Grading

3.1.1 Prior to installation of the wall, the surrounding area shall be graded to within 50mm of the specified final grade. Where the subgrade has been filled, certification of acceptability by a Geotechnical Engineer shall be submitted to the Municipality for approval before wall installation is commenced.

3.1.2 Final grading shall be completed to provide a minimum of cover of 50mm to the base of the wall panels. The earth and/or pavement shall be sloped away from the wall at a minimum slope of 2% and a maximum of 25% for a distance of 500mm. All earth fill shall be compacted to a minimum of 95% Standard Proctor Density.

3.1.3 Where stepping is required to accommodate changes in vertical alignment, the stepping shall occur at the posts and the difference in elevation shall be graded at a maximum of 3;1 with the higher elevation extending a minimum of 150 mm beyond the post to ensure that there are no gaps under the wall.

3.2 Foundations

3.2.1 Concrete for drilled footings shall be cast against undisturbed soil except for the top 600 mm which shall be formed by sonotube.

If the other than drilled footings are used, the footings shall be formed for a minimum height of 1200mm, and the excavation shall be subsequently backfilled with granular materials compacted to 98% Standard Protocol Density.

Where required, mass concrete (15 MPa) shall be used to raise the base of the footing to the required level. The tops of all footings shall be sloped away from the post to avoid ponding of water except for the bearing area of the wall panels which shall be constructed as designed and shown on the approved drawing(s).

3.2.2 The founding elevations of the foundations shall be verified by the Geotechnical Engineer based on an inspection of the site conditions before concrete is placed and shall in all cases provide frost protection to the approved finished grade in conformity with the Ontario Building Code. A written Report shall be provided by the Geotechnical Engineer confirming the acceptability of the foundation bearing conditions.

3.2.3 Concrete used in the foundation shall be tested by an Independent Testing Company engaged by the Consulting Engineer or Municipality for

compliance with the Specification. A copy of the Test Report(s) shall be provided to the Municipality.

If the test results fail to meet the requirements of the Specification, the work represented by the failed test(s) shall be deemed rejected unless the results of additional testing prove to be satisfactory as determined by the Municipality.

3.2.4 The concrete in the footings shall be allowed to cure for a minimum of 7 days before the wall panels are installed. Acceptability of a 7 day concrete test shall be obtained before wall panel erection commences.

3.3 Erection of Walls

3.3.1 The walls shall be constructed to the height and alignment as approved by the Municipality. The constructed height shall be within 50mm of the specified height5, and posts and wall panels shall be level and plumb within tolerance of 6mm in 1m.

3.3.2 Where stepping is required to accommodate grade changes, the steps between panels shall be at even increments and shall be not less than 50mm nor greater than 150 mm, except as authorized by the Municipality.

3.3.3 The lowest wall panel or beam shall bear on level bearing surface designed for applicable shear forces, and as shown on the shop drawings. The use of galvanized steel shims for levelling shall only be used with the approval of the Engineer. If shims are used, a non-shrink grout (Masterflow 713 by Master Builders or approved equal) may be required to provide an acceptable bearing condition as determined by the Municipality.

3.3.4 All components shall have a snug fit with a permitted lateral tolerance of 3mm and a 10 mm longitude tolerance between panels and posts.

3.3.5 Components which are damaged upon delivery on site, during installation, or are otherwise visibly defective shall not be used and shall be disposed of offsite.

3.3.6 All field welds shall conform to CSA Standards W47.1 and W59.

3.3.7 Galvanized surfaces which are damaged shall be cleaned and painted with an organic zinc-rich paint conforming to the requirements of CGSB Standard 1-GP181-M and to match the colour of the surrounding surfaces.

3.4 Clean Up

3.4.1 Soil, concrete, or other materials shall be removed from the exposed wall surfaces to the satisfaction of the Municipality.

3.4.2 The site shall be cleared of all debris resulting from the wall insulation.

3.5 Certification of the Wall Installation and Performance Acceptance

3.5.1 Prior to performance Acceptance, the Consulting Engineer shall submit the following documentation to the Municipality.

One (1) set of As-Built prints marked up to show changes made during construction;

A digital file in Microstation format and Mylar copies of the As-Constructed drawings (as stipulated by the Municipality);

Copies of Field Test Reports including foundation, compaction, and concrete testing;

Certification letter, certifying that the wall has been constructed in accordance with approved drawings

3.5.2 Upon Receipt of the documentation referred to in 3.5.1, the Municipality will inspect the work and, if acceptable grant Performance Acceptance subject to the reflection of any deficiencies identified by the Municipality.

3.6 Guarantee a Maintenance Period

3.6.1 The wall shall be guaranteed for a period of three (3) years from the date of Performance Acceptance. At the termination of the Maintenance Period an inspection will be carried out by the Consulting Engineer and the Municipality. Any wall components which exhibit defects that are likely to affect the longevity of the wall (such as cracking, spalling or other visible defects) shall be replaced. The tolerance for plumbness and levelness shall be 8mm per metre.

3.6.2 Defects identified by the Consulting Engineer and /or Municipality shall be rectified to the satisfaction of the Municipality prior to Final Acceptance being issued

THE REGIONAL MUNICIPALITY OF PEEL

BASIS OF PAYMENT

FOR WATERMAINS

The Regional Municipality of Peel
Basis of Payment
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The Regional Municipality of Peel
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Payment for each item shall be made at the unit price indicated in the Schedule of Unit Prices in the Form of Tender for the supply of all necessary materials, equipment, tools, labour and supervision to complete the item as specified and shown on drawings. The tendered unit price shall include the following:

PW.1. EXCAVATION

1.1. Trench Excavation

- Field location and protection of existing utilities in advance of the excavation including existing water services.
- Careful removal, storage and replacement of obstructions including culverts, headwalls, catchbasins, fences, curbs, interlocking stones, and shrubbery
- Excavation, removal and disposal of surplus excavated material off site
- Shoring, dewatering
- Placing and compacting approved native backfill material
- Temporary restoration of surfaces to carry traffic and pedestrians
- Protection of existing road surface
- Meet all requirements of the Region of Peel, local municipality and M.T.O. pertaining to Road Cut Permits conditions
- Co-ordination of works with local residents to minimize disruption to access and water supply.

The payment for this work will be made under applicable items in the subsequent sections.

1.2. Asphalt/Concrete Removal

- Excavation, removal and disposal of asphalt or concrete pavement off-site.
- Temporary restoration of surfaces to carry traffic and pedestrians.

The measurement for payment shall be in square metres over the area excavated at a depth as shown on boreholes in enclosed soil report.

PW.2. CONSTRUCTION OF WATERMAIN

- Excavation and asphalt removal as per Section PW.1
- Supply and installation of watermain material including bends, tees and other fittings, concrete blocking and tie rods or retainer gland where required
- Supply and installation of protecto-caps for cathodic protection of direct buried bolts
- Supply and installation of 14 gauge TWh solid copper plastic coated tracer wire with PVC and concrete pipe or polywrap for ductile iron pipe
- Placing, cutting and jointing of pipe and fittings
- Constructing restrainers and concrete thrust blocks at fittings
- Installation of all required temporary plugs and blow-offs for pressure testing
- Backfilling with excavated native material
- Testing and flushing

Unless otherwise specified pay quantity shall be based on the horizontal laying length measured over the centre line of pipe, through all main line valves, fittings and shall include the length of installation through chambers.

PW.3. BEDDING AND BACKFILL

3.1. Granular Bedding and Backfill

- Supplying, placing and compacting granular bedding and backfill material (screenings for pressure pipe)
- Supplying, placing and compacting granular “D” bedding as per Regional Standard Drawings
- Supplying, placing and compacting imported granular `B' backfill material meeting requirements of OPSS 314 to one metre behind curb or sidewalk and under all driveways.

3.2. Concrete Bedding

- Supporting pipe with concrete blocking
- Supply, placing and compacting 15 MPa concrete bedding
- Concrete to attain 75% of final cured strength prior to backfilling

3.3. Unshrinkable Backfill

- Supply, placing, and compacting and vibrating 0.4 MPa unshrinkable backfill
- Covering backfilled excavation with steel plates in paved areas, driveways and areas used by vehicles and wood planks or other approved material in areas used by pedestrians
- Maintenance of cover until temporarily restored
- Temporary restoration of surfaces to carry traffic and pedestrians

Pay quantity shall be based on the horizontal measurement made in metres from limit to limit of bedding or backfill installed.

PW.4. CREEK CROSSING

- Excavation as per Section PW.1
- Constructing sedimentation works as per detail(s) on contract drawings
- Flow control works
- Follow all conditions as specified in the Contract Documents.

This work is over and above the watermain installation and the measurement for this item shall be the horizontal length of the creek measured from top of bank to top of bank.

PW.5. BORING/TUNNELLING WITH STEEL LINER

- Excavation as per PW.1
- Constructing boring/tunnelling shaft and exit shaft
- Boring/tunnelling and installation of steel liner
- Grouting of pipe
- Backfilling of shafts with granular material in travelled portion of roadway

This work is over and above the watermain installation and the pay quanitity for the completed tunnel/bore section shall be based on the measured length along the centre line of tunnel/bore from inside face to inside face of shafts.

PW.6. MAIN LINE VALVES

- Excavation as per Section PW.1
- All fittings and pipe necessary for connection to the watermain
- Installation of valves and accessories and any other equipment specified:

a) Gate Valves and Valve Boxes

- Installation of gate valve and valve box. Valve stem extension where required as per Region of Peel Standard Drawings.

- Restraints for PVC pipe as per Region of Peel Standard Drawings

b) Butterfly Valves and Chambers

- Construction and installation of chambers according to Region of Peel Standard Drawings

- Supply and installation of valves, fittings and any other equipment specified in chambers as per Region of Peel Standard Drawings

- Supply, placing and compacting granular bedding and backfill

c) Air Valve and Chamber

- Construction or installation of chambers and concrete supports as per Region of Peel Standard Drawings

- Supply and installation of air valve, accessories and all necessary fittings

- Supply, placing and compacting granular bedding and backfill

d) Drain Valve and Chamber

- Supply and installation of drain valve and accessories

- Construction of chamber as per Region of Peel Standard Drawings

- Supply, placing and compacting granular bedding and backfill

Pay quantity for all valves shall be for the number of complete units installed

PW.7. SAFETY PLATFORM

- Installation of Safety Platform as per Standard Drawings

Pay quantity shall be for the number of units installed.

PW.8. HYDRANTS

8.1. New Hydrant Installation

- Excavation as per Section PW.1
- Granular bedding
- Placing, cutting and joining of pipe riser
- Installation of anchor tee or flanged outlet, gate valve, valve box, hydrant, restraints and thrust blocking as per Std. Dwgs. 1-6-1 or 1-6-2.
- Supply, placing and compacting granular bedding and backfill

Pay quantity shall be for the number of units installed.

8.2. Remove and Relocate Existing Hydrant

This item covers all work necessary to remove and re-install the existing hydrant at the location shown on contract drawings as per Region of Peel standards, as well as Standard Drawing 1-6-1 or 1-6-2.

The Vendor will be required to disconnect, remove and relocate the existing hydrant indicated on the contract drawing. The voids resulting from the hydrant removed shall be back-filled and compacted in 150 mm layers to 100% Standard Proctor Density. Hydrant flanges to be set above proposed grades as per Region of Peel Standards, and shall include extensions as required to complete the work.

8.3. Hydrant Branch Pipe

- Installation of 150 mm diameter hydrant branch pipe from the main to the hydrant

Measurement of pipe installed for pay quantity shall be in metres from the centre line of the main to the centre line of the hydrant

8.4. Hydrant Extension

- Excavation as per Section PW.1
- Removal of the hydrant body above the "break away flange," installation of stem extension and body extension piece of length required, and reassembling of hydrant
- Supply, placing and compacting granular backfill

Pay quantity shall be for the number of extensions installed for each length.

PW.9. BY-PASS CONNECTIONS

- Excavation as per Section PW.1
- Supply and place granular bedding
- Supply and installation of tees or outlets and jointing of pipe
- Supply and installation of valve and box or chamber, fittings and pipe as specified
- Construction of thrust blocking, installation of restrainers
- Supplying, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

Pay quantity shall be based on the lump sum for each connection.

PW.10. PERMANENT BLOW-OFF

- Excavation as per Section PW.1

- Installation of blow-off as per Standard Drawings

- Supply, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

Pay quantity shall be for the number of units installed

PW.11. WATER SERVICE CONNECTIONS

11.1. Connections by Open Cut

- Excavation as per Section PW.1

- Installation of main stop, curb stop and construction of service connection as per Standard Drawings

- Coupling of new pipe with the existing service at property limit

- Supply, placing and compacting granular `B' backfill for entire service connection to one metre behind curb or sidewalk and under all driveways

11.2. Connection by Boring

- Excavating of shafts as per Section PW.1

- Installation of water service by boring

- Installing main stop and curb stop as per Standard Drawing

- Coupling of new pipe with the existing service at property limit

- Supply, backfilling and compacting shafts with granular backfill in travelled portion of the roadway

11.3. Extend and Transfer Existing Water Service to New Watermain

- Excavation as per Section PW.1

- Installing and connecting new pipe to main stop and to the existing pipe
- Supply, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

11.4. Cut and Transfer of Water Service

- Excavation as per Section PW.1
- Cutting and connecting existing pipe to main stop
- Supply, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

Pay quantity for all water service connections shall be for the number of units installed for each respective size, unless otherwise specified.

11.5. Large Water Service Connections

- Excavation as per Section PW.1
- Installation of the required pipe, anchor tee or flanged tee, the valve off the watermain, streetline valve and necessary bends
- Coupling of the new pipe with the existing service at the property limit
- Supply, place and compact granular “B” backfill

The tendered unit price shall include all excavation, supply, place and compact granular “B” backfill, the supply and installation of all materials to complete the connection, including the required pipe, anchor tee or flanged tee, the valve off the watermain, streetline valve and the necessary bends. The Vendor shall note that it may be necessary to install these connections during off-peak hours.

11.6. Search for Services

- The unit price bid shall be the full payment for all labour and equipment costs involved in accurately locating water services, where the Agency was unable to stake out the water services.

Pay quantity shall be based on the number of hours spent looking for each unlocatable service and shall not include the normal locating/uncovering of water services for excavation, removals and installations.

11.7. Repair of Broken Water Service Improperly Staked-Out

- The unit price bid shall be the full payment for all materials, labour and equipment costs (including delays) required to repair improperly staked-out 25mm or smaller water services.

Pay quantity shall be based on the number of services repaired.

PW.12. SWABBING

- A minimum of two (2) swabs to be launched and passed through each new pipe and hydrant to render all parts of the new main clean (as per W5.2 of Vol 2.2)

Pay quantity shall be lump sum for the entire project.

PW.13. CONNECTION OF NEW MAIN TO EXISTING MAIN

a) Tapping the Existing Watermain

- Excavation as per Section PW.1
- Locating existing watermain
- Supply and installation of tapping sleeve and valve. The Contractor shall arrange for Regional forces to perform the tap and the cost of the tap shall be included in the Contractor's tender price (refer to W.4.16)
- Connection of new main to the new tapping sleeve and valve
- Supply, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

b) Perpendicular Connection

- Excavation as per Section PW.1

- Locating existing watermain
- Cutting of the existing main, installation of tee, pipe to suit and coupling(s) as required
- Construction of restrainers and thrust blocking
- Installation of connecting pipe and fittings
- Supply, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

c) End-to-End Connection

- Excavation as per Section PW.1
- Locating and exposure of the existing main end
- Removal and disposal off site of thrust blocking, plug or cap
- Cutting and fitting of pipe
- Installation of connecting pipe, fittings, clamps
- Supply, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

d) Closure Connection

- Excavation as per Section PW.1
- Locating and exposure of the existing main end
- Removal and disposal of thrust blocking off site
- Removal of plug or cap
- Installation of closure
- Supply, placing and compacting granular backfill to one metre behind curb or sidewalk and under all driveways

Pay quantity shall be based on the lump sum for each connection.

PW.14. REMOVAL OF HYDRANTS

- Excavation as per Section PW.1. Disconnection and removal of hydrant together with the "boot"
- Fill stub remaining in ground with grout for partial removal above the boot, where authorized by Project Manager.
- Backfilling with native excavated material
- Restoration of site to match or better than existing condition
- Delivery of hydrant to the Region's yards

Project Location In	**Yard**
City of Mississauga	3515 Wolfedale Road, Mississauga
City of Brampton and Town of Caledon	2 Copper Road, Brampton

Pay quantity shall be for the actual number of units removed and returned

PW.15. REMOVAL OF VALVE BOXES

- Removal and disposal off site of valve boxes over valves of abandoned watermain and removed hydrants and fill bottom portion of valve box with unshrinkable fill
- Supply, placing and compacting granular backfill in travelled portion of the roadway

Pay quantity shall be for the actual number of units removed including supply and place unshrinkable backfill.

PW.16. ABANDON EXISTING VALVE CHAMBERS

- Cutting and removal of existing pavement
- Removal of frame and cover

- Filling chamber with 0.4 MPa unshrinkable fill

Pay quantity will be for the actual number of units abandoned.

PW.17. PLUGGING OF EXISTING WATERMAIN

- Excavation as per Section PW.1
- Cutting and removal of existing pipe
- Installation of plug or blind flange
- Construction of thrust blocking
- Supply, placing and compacting granular backfill in the travelled portion of the roadway

Pay quantity shall be for the number of units installed.

PW.18. DRAIN AND PLUG ABANDONED WATERMAIN

- Cutting and removal of existing pavement
- Draining of existing watermain at all low points
- Installation of plug at all open ends of abandoned watermain
- Supply, placing and compacting granular backfill in the travelled portion of the roadway.

Pay quantity shall be the actual number of low points where the watermain is drained.

PW.19. BOULDER REMOVAL

- For the purpose of this contract, a boulder shall be considered as any singular, monolithic, hard object with a volume greater than 0.5m³. All objects smaller than 0.5m³ shall be considered as normal excavation under Volume 2 item PW1 and no extra payment will be considered.

The unit price bid shall be full payment for all material, labour and equipment to cover the cost of excavation and disposal off site as well as any delays caused by boulders. This item is to be used for localized conditions only. General soils conditions are illustrated in the soils report and the contractor's equipment must be of suitable size, power and ability to work effectively in these types of soils.

PW.20. TEST HOLES

- The unit price bid shall be payment in full for all costs involved in accurately locating underground utilities, when instructed to do so by the Project Manager, for the purposes of design or re-design of services. This item does not include the normal locating/uncovering of utilities for excavations, removals and installations.

Payment shall be based on the number of approved test holes dug by the Vendor.

THE REGIONAL MUNICIPALITY

OF PEEL

BASIS OF PAYMENT

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SANITARY SEWER CONSTRUCTION

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Payment for each item shall be made at the unit price indicated in the Schedule of Unit Prices in the Form of Tender for the supply of all necessary materials, equipment, tools, labour and supervision to complete the item as specified and shown on drawings. The tendered unit price shall include the following:

PS.1. EXCAVATION

1.1. Trench Excavation

- Field locations and protection of existing utilities in advance of the excavation including water services.
- Careful removal, storage and replacement of obstructions including culverts, headwalls, catchbasins, fences, curbs, interlocking stones and shrubbery.
- Excavation, removal and disposal of surplus excavated materials off site.
- Shoring and dewatering.
- Placing and compacting approved native backfill material
- Temporary restoration of surfaces to carry traffic and pedestrians.
- Protection of existing road surface.
- Meet all requirements of Region of Peel, local municipality and Ministry of Transportation of Ontario (MTO) pertaining to Road Cut Permits conditions.
- Co-ordination of works with local residents to minimize disruption to access.

The payment for this work will be made under applicable items in the subsequent sections.

1.2. Asphalt/Concrete Removal

- Excavation, removal and disposal of asphalt or concrete pavement off-site.
- Temporary restoration of surfaces to carry traffic and pedestrians.

The measurement for payment shall be in square metres over the area excavated at a depth as shown on boreholes in enclosed soil report.

PS.2. CONSTRUCTION OF SANITARY SEWER

- Excavation and asphalt removal as per Section PS.1.
- Maintaining sewage flow in existing sewers, or by-passing by means of pumping where required
- Removal and disposal of the existing sewer where applicable.
- Supplying, grading and compacting granular bedding. Granular bedding shall conform to HL8 dry mix gradation requirements.
- Supply, installation and jointing of pipes and fittings.
- Backfilling with excavated native material, where granular backfill is not required and has not been specified

Pay quantity shall be based on the horizontal length measured over the centre line of the pipe from centre to centre of maintenance holes unless otherwise specified.

PS.3. BACKFILL

3.1. Granular Backfill

- Supplying, placing and compacting imported granular `B' backfill materials meeting requirements of OPSS 314.

3.2. Unshrinkable Backfill

- Supply, placing and vibrating 0.4 MPa unshrinkable backfill.
- Covering backfilled excavation with steel plates in paved areas, driveways and areas used by vehicles and wood planks or other approved material in areas used by pedestrians.
- Maintenance of cover until temporarily restored.
- Temporary restoration of surfaces to carry traffic and pedestrians.

Pay quantity shall be based on the horizontal length measured in metres over the centre line of the pipe where granular or unshrinkable backfill was installed.

PS.4. BORING/TUNNELLING WITH STEEL LINER

- Excavation as per Section PS.1.
- Construction of boring/tunnelling shaft and exit shaft.
- Supply boring/tunnelling and installation of steel liner.
- Grouting of pipe.
- Supply and backfilling of shafts with granular material in travelled portion of roadway

This work is over and above the sewer installation and the pay quantity for the completed tunnel/bore section shall be based on the measured length

along the centre line of tunnel/bore from inside face to inside face of shafts, unless otherwise specified.

PS.5. MAINTENANCE HOLES

- Excavation as per Section PS.1.
- Removal and disposal off site of the existing maintenance hole(s) including drop structure and its bedding material, where required.
- Supply and installation of precast maintenance holes and connection of all pipes as per the construction drawings and the Region of Peel Standard Drawings.
- Supply of concrete and construction of benching as per Region of Peel Standard Drawings.
- Supply and installation of maintenance hole frame and covers.
- Supplying all other equipment and materials required to complete the maintenance holes.
- Drop structure where specified in the contract drawings.
- Supply and install safety platform on all maintenance holes greater than five metre depth (Regional Standard Drawing 3-2-1).
- Supply, placing and compacting granular “B” backfill.

Pay quantity shall be per each maintenance hole as listed in the Form of Tender.

PS.6. CONNECT NEW PIPE TO EXISTING MAINTENANCE HOLES CONNECT EXISTING SEWER PIPE TO NEW MAINTENANCE HOLE

- Excavation as per Section PS.1.
- Breaking out, removal and disposal off site of existing benching.
- Maintaining sewage flow at all times.

- Cut an opening in the maintenance hole.
- Insert sewer pipe into maintenance hole and grout the pipe in place.
- Rebenching maintenance hole to design as shown on drawings.
- Supply, placing and compacting granular “B” backfill.

This work is over and above the sewer installation and the pay quantity shall be based on a lump sum per connection.

PS.7. SEWER SERVICE CONNECTIONS

a) Open Cut Method

- Excavation as per Section PS.1.
- Removal and disposal of existing services where applicable.
- Supply, placing and compaction of HL8 dry stone granular bedding material.
- Supply, placing, jointing of pipe.
- Supply, placing and compacting granular `B' backfill to one metre behind curb or sidewalk and under all driveways.

Pay quantity shall be for the number of units installed.

b) Boring Under Trees or Other Conflicting Obstructions

- Constructing boring shafts as per Section PS.1.
- Boring and installation of service connection in accordance with Standard Drawings.
- Supply, placing and compacting granular `B' backfill to one metre behind curb or sidewalk and under all driveways.

Pay quantity shall be over and above the sanitary service installation based on the number of locations where boring was required.

PS.8. REMOVE EXISTING MAINTENANCE HOLE

- Excavation as per section PS.1
- Removal and disposal of the existing maintenance hole off site
- Supply, placing and compacting granular `B' backfill to one metre behind curb or sidewalk and under all driveways.

Pay quantity shall be based on the number of units removed.

PS.9. ABANDON EXISTING MAINTENANCE HOLE

- Excavation as per Section PS.1.
- Supply and plug the pipes in the maintenance holes with concrete.
- Removal of maintenance hole to a minimum depth of 0.6 metres below grade or as indicated on the drawing and disposal off site.
- Disposal of frame and cover off site.
- Placing and compacting sand or screenings inside the maintenance hole.
- Supply, placing and compacting granular backfill in the travelled portion of the roadway.

Pay quantity shall be based on a lump sum for each maintenance hole abandoned.

PS.10. ABANDON EXISTING SEWER

- Excavation as per Section PS.1.
- Blocking off sewer ends.
- Supply and filling the abandoned pipe with unshrinkable grout up to the obvert at the highest point in the sewer line.

Pay quantity shall be based on the horizontal length measured over the centre line of pipe from centre to centre of maintenance hole or from centre of maintenance hole to the dead end.

PS.11. T.V. INSPECTION

- Mobilization of all necessary equipment on site.
- Flushing of sewers and disposal of dirt, grease, silt and debris. Inspection of sewers by a competent sub-contractor that has been approved by the Region of Peel.
- Submission of report in written form and on DVD as per Region of Peel Standard Specifications for sanitary sewers.
- Submission of video tape as per Region of Peel Standard Specifications for sanitary sewers.

Pay quantity will be based on the horizontal length measured over the center line of the pipe from center to center of maintenance hole.

PS.12. BOULDER REMOVAL

- For the purpose of this document, a boulder shall be considered as any singular, monolithic, hard object with a volume greater than 0.5m^3. All objects smaller than 0.5m^3 shall be considered as normal excavation under Volume 2 item PW1 and no extra payment will be considered.

  The unit price bid shall be full payment for all material, labour and equipment to cover the cost of excavation and disposal off site as well as any delays caused by boulders. This item is to be used for localized conditions only. General soils conditions are illustrated in the soils report and the contractor's equipment must be of suitable size, power and ability to work effectively in these types of soils.

PS.13. TEST HOLES

- The unit price bid shall be payment in full for all costs involved in accurately locating underground utilities, when instructed to do so by

the Project Manager, for the purposes of design or re-design of services. This item does not include the normal locating/uncovering of utilities for excavations, removals and installations.

Payment shall be based on the number of approved test holes dug or factored by the Vendor.

PS.14. FILTRATION TESTING

Payment shall be paid for as specified in the contract documents.

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Payment at the contract price for the appropriate items for the reinstatement following the installation of sanitary sewers, forcemains, watermains, service connections, and their associated appurtenances shall include full compensation for all labour, equipment and materials for complete restoration, except as otherwise provided under the other tender items for reinstatement and as follows:

PR.1 ASPHALT RESTORATION

a) Granular `A'

- Preparation of trench by removal and disposal of surplus granular off-site and grading and compacting trench to 100% Standard Proctor Density.
- Supply and place Granular `A' material to specified depths and compaction to 100% Standard Proctor Density.

b) Asphalt Driveway

- Sawcutting each side of the trench as per detail on the Contract Drawings
- Removal and disposal of asphalt off site
- Placing and compacting HL3A asphalt to match the depth of existing asphalt (or to provide a minimum of 50 mm)

c) Asphalt Pavement

- Removal and disposal of cold mix asphalt and any excess Granular “A” material
- Supply, place and compact specified depth of HL8 asphalt
- Application of tack coat as per manufacturer's specifications
- Supply, place and compact specified depth of machine laid HL3 asphalt
- Sweeping and washing of road from edge to edge of pavement with power sweeper and water

The measurement for payment shall be in square metres over the area that has been placed at the specified depth. Areas that do not meet the specified depth shall be excluded from the measurement.

d) Removal and Disposal of Extra Existing Asphalt

- Removal and disposal off site of existing asphalt
- Preparation of subgrade prior to final restoration

Note: Prior to preparation for the installation of HL8 asphalt, a site meeting will be held to determine the removal of extra asphalt, which will include the following:

The existing asphalt between the face of the curb (or the edge of pavement) to the trench wall, which is 1.3m or less;

Other locations as authorized by the Region's Project Manager.

The existing asphalt will not be removed until the areas have been measured by the Region's Inspector and Vendor.

PR.2 SODDING AND SEEDING

a) Sod and Topsoil

- Preparation of site
- Supply and placing 100 mm of imported topsoil
- Fine grading to meet elevations as per contract drawings or match existing grades less the thickness of the sod to be placed
- Supply and placing No. 1 nursery sod complete as per OPSS 571 in locations as directed by the Engineer.
- Elevations of new sod are to match the existing adjacent sod elevations.

Payment shall be per square metre of sod measured in place by the Engineer. Sod that requires replacement as a result of sloppy or negligent workmanship shall not be included in the payment

measurement. Contractor shall obtain written authorization from the Engineer after completion of topsoil, but prior to sodding.

b) Watering

- Both initial and maintenance watering for a minimum of 30 days or until the sod has taken root.
- Warranty of 30 days from date sod laid.

Measurement for payment shall be in cubic metres of water applied to the sod.

c) Seeding and Mulching

- Preparation of site
- Supply and placing 100 mm of imported topsoil
- Fine grading to meet elevations as per contract drawings or match existing grades
- Supply and placing of seeding and mulching complete as per OPSS 572 in locations as directed by the Engineer.

Measurement for payment shall be in square metres following the contours of the ground. Contractor shall obtain written authorization from the Engineer after completion of topsoil, but prior to seeding.

PR.3 COLD MIX

- Removal and disposal of any excess granular material
- Supply, placing and compaction of 50 mm cold mix asphalt
- Maintaining the cold mix asphalt in good condition prior to the placement of Hot Mix Asphalt
- Removal and disposal of cold mix asphalt off site

Measurement for payment shall be made in square metres from limit to limit of restoration as determined by the Engineer.

PR.4 COLD PLANING

- Grinding a strip 40 mm deep at the edge of the watermain/sewer trench as per detail on contract drawing or as directed by the Engineer

- Measurement for payment shall be in square metres of area cold planed as directed by the Engineer.

PR.5 SAWCUT EXISTING ASPHALT

- Sawcut existing roadway asphalt full depth (up to 200 mm thickness) along the side of the main sewer or water trench.

- If there are discrepancies in pavement thickness which are verified by the inspector, the Vendor may receive payment for the extra sawcutting based on the prorated price under this item:

$$\frac{\text{Unit Price}}{200\ \text{mm}} = \text{unit cost/mm}$$

Payment shall be based on the measured length in linear metres along the sawcut.

PR.6 CONCRETE SIDEWALK/WALKWAY

- Sawcut and removal of a complete section of sidewalk and disposal off site.

- Preparation of Granular Base (see PR.8)

- Constructing sidewalk to match existing (sidewalk to meet the requirements of the local municipality).

- Protect sidewalk until concrete has cured

Payment shall be based on the measured area of new sidewalk in square metres.

PR.7 CONCRETE CURB

- Sawcut curb on each side of trench or damaged area to undisturbed ground, minimum 300 mm
- Removal and disposal of concrete curb off site
- Preparation of granular base (see PR.8)
- Constructing curb, including supply and place concrete, to match existing and meet the requirements of the local municipality
- Protecting concrete curb until cured

Payment shall be based on the measured length in metres of new curb.

PR.8 CONCRETE DRIVEWAY

- Sawcutting, removal and disposal of concrete between road edge or curb and the first expansion joint beyond the work area
- Preparation of granular base as required to match existing driveway with respect to grade, alignment and width
- Compaction of granular base to 100% Standard Proctor Density
- Constructing driveway to match existing depth or 130 mm minimum
- Supply and place concrete to meet the requirements of the local municipality
- Protecting driveway until cured

Payment shall be based on the measured area of new driveway in square metres.

PR.9 INTERLOCKING BRICK DRIVEWAY

- Removal and temporary storage of existing interlocking paving stones prior to excavation
- Supply, place and compact 150 mm of limestone screening base
- Reinstatement of existing interlocking paving stones to match existing or better condition

Payment shall be based on the measured area reinstated in square metres.

PR.10 ROAD CLEANING AND CALIUM CHLORIDE

PR.10.1 Wash Road with Water

- Water shall be applied by means of approved equipment capable of uniform distribution and with proper control.
- Water must not be applied at a rate that will saturate the granular base and/or sub-grade.

Payment shall be based on the measurement of water applied by an accurate meter or by means of a tank of predetermined volume in cubic metres.

PR.10.2 Calcium Chloride

- Supply and place calcium chloride by use of an approved spreader at a rate and at times as directed by the Engineer.

Payment shall be based on the actual volume applied measured by the tonne.

Note: The Vendor is reminded that it is the Vendor's responsibility to prevent any hazardous conditions from arising, such as tracking of calcium chloride onto adjacent pavement.