



INVITATION TO TENDER No. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)

Tenders will be received in the Purchasing Services Office, 3rd Floor, Suite #320, East Tower, 555 West 12th Avenue, Vancouver, British Columbia, Canada, V5Z 3X7 prior to the Closing Time: 3:00:00 P.M. Vancouver Time (as defined in Note 2 below), Tuesday, September 7, 2010 and opened publicly at 11:00:00 A.M. Wednesday, September 8, 2010.

NOTES:

1. Tenders are to be submitted in sealed envelopes or packages marked with the Tenderer's Name and the ITT Title and Number.
2. The Closing Time and Vancouver Time will be conclusively deemed to be the time shown on the clock used by the City's Purchasing Services Office for this purpose.
3. The City's Purchasing Services Office is open on Business Days 8:30 A.M. to 4:30 P.M. Vancouver Time and closed Saturdays, Sundays and holidays.
4. DO NOT SUBMIT TENDERS BY FAX.

All queries related to this ITT shall be submitted
in writing to the attention of:

Harinder Kainth,
Contracting Specialist

Fax: 604.873.7057 E-mail: purchasing@vancouver.ca

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**INVITATION TO TENDER NO. PS10180
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PART A - INTRODUCTIONS**

1.0 Invitation to Tender

1.1 The City of Vancouver (the "City"), by this Invitation to Tender No. PS10180 (the "ITT"), invites Tenders for the supply and installation of approximately 3100 linear meters of 200mm and 300mm diameter ductile iron cement lined watermain. The Work includes the installation of fire hydrants, service renewals, all service connection change-overs, all valves, fittings and permanent street repairs associated with the installation of the above watermain. The Work also includes survey, layout, sawcutting of pavement, and miscellaneous testing procedures. The Work Sites are located at various streets within the City of Vancouver.

1.2 The Tender Documents are available for viewing at:

Vancouver Regional Construction Association
3636 East 4th Avenue
Vancouver, BC V5M 1M3

2.0 Information Meeting

2.1 No Information Meeting scheduled.

3.0 Administrative Requirements

3.1 It is the sole responsibility of the Tenderer to check the City's website at <http://www.vancouver.ca/fs/bid/bidopp/openbid.htm> regularly for amendments, addenda, and questions and answers related to the ITT.

3.2 All Tenders are to be completed and submitted in accordance with instructions on the front page to the ITT and as provided within Part B.

4.0 Conduct of ITT - Inquiries and Clarifications

4.1 The City's Manager - Supply Management will have conduct of this ITT, and all communications are to be directed only to the contact person(s) named on the cover page.

4.2 It is the responsibility of the Tenderer to thoroughly examine the ITT documents and satisfy itself as to the full requirements of the ITT. All inquiries are to be in written form only, faxed to 604-873-7057 or e-mailed to purchasing@vancouver.ca to the attention of the appropriate contact person shown on the cover page no later than five (5) Business Days prior to the Closing Time. If required, an addendum will be posted on the City's website.

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PART B- INSTRUCTIONS TO TENDERERS

1.0 Introduction

The Work of this project consists of the installation of approximately 3100 linear meters of 200mm and 300mm diameter ductile iron cement watermain. The Work includes the installation of fire hydrants, service renewals, all service connection change-overs, all valves, fittings and permanent street repairs associated with the installation of the above watermain. The Work also includes survey, layout, sawcutting of pavement, and miscellaneous testing procedures. The Work Sites are located at various streets within the City of Vancouver.

1(A) Definitions

Capitalized terms used in Part B - Instructions to Tenderers have the meanings ascribed to such terms in Part E - General Conditions (GC.1. - Definitions), unless such terms are specifically defined in this Part B - Instructions to Tenderers or the context of their use requires otherwise.

The defined terms in this Part B - Instructions to Tenderers include:

- 1A.1 "Certificate of Existing Insurance" means the form of certificate of existing insurance attached as Schedule "I" to Part C - Form of Tender;
- 1A.2 "Certificate of Insurance" means the form of certificate of insurance attached as Appendix "B" to Part D - Form of Agreement, as the same may be amended or replaced from time to time by the City;
- 1A.3 "City" means the City of Vancouver, a municipal corporation continued pursuant to the *Vancouver Charter*;
- 1A.4 "Closing Time" means the closing date, time and place as set out on the title page of this ITT;
- 1A.5 "Contract" or "Agreement" means a legal agreement between the City and a Tenderer by which a Tenderer, whose Tender the City has accepted, agrees and is required to perform the Work in accordance with the Tender Documents, for which the City will pay monetary remuneration to the Tenderer in accordance with the Tender Documents;
- 1A.6 "Contractor" means a Tenderer whose Tender the City has accepted and to whom the Contract has been awarded;
- 1A.7 "Form of Tender" means the Form of Tender in Part C to the ITT;

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- 1A.8 "Information and Privacy Legislation" means the *Freedom of Information and Protection of Privacy Act* (British Columbia) and all other similar legislation in effect from time to time;
- 1A.9 "Losses" means, in respect of any matter, all:
- (a) direct and indirect; as well as
 - (b) consequential,

claims, demands, proceedings, losses, damages, liabilities, deficiencies, costs and expenses (including without limitation, all legal and other professional fees and disbursements, interest, penalties and amounts paid in settlement, whether from a third person or otherwise);
- 1A.10 "Notice of Award" means a written notice from the City to a Tenderer that the City accepts the Tenderer's Tender;
- 1A.11 "Notice to Proceed" means a written notice from the City to a Tenderer to whom a Notice of Award has been delivered, directing the Tenderer to proceed with the Work in accordance with the Tender Documents;
- 1A.12 "Tender" means a tender submitted to the City in response to the ITT;
- 1A.13 "Tender Contract" means a contract between the City and any Tenderer in relation to the tender process contemplated by the ITT formed on the City's receipt of a Tender from the Tenderer in response to the ITT;
- 1A.14 "Tender Documents" mean the documents identified in Section 11.0 - Tender Documents - Part B,;
- 1A.15 "Tenderer" means any person(s) or entity(ies) submitting a Tender in response to the ITT;
- 1A.16 "Total Tender Price" has the meaning given in Part B - Section 3.0;
- 1A.17 "Work" means all the labour, materials, equipment, supplies, services and other items necessary for the execution, completion and fulfillment of the requirements of the Contract Documents to be performed and fulfilled by the Contractor; and
- 1A.18 "Work Site" means the area or areas where the Work is to be carried out.

2.0 Submission of Tenders

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- 2.1 Each Tenderer will be given one copy of the Tender Documents. In submitting a Tender, a Tenderer must complete, as required hereby, and package, seal and return to the City, the Form of Tender and Schedules thereto and at the same time furnish the City with a Bid Bond as hereinafter described.
- 2.2 Unless otherwise stipulated, Tenders should be made on the Form of Tender;
- 2.3 Tenders should be enclosed in a sealed plain envelope, clearly marked:

"INVITATION TO TENDER No. PS10180 - Watermain Supply and Installation (2B)" with the Tenderer's name in the upper left hand corner.
- 2.4 Each Tender should be signed in longhand by or on behalf of the Tenderer, with the signatory's name printed clearly and legibly directly below the signature. Tenders by partnership should be signed by at least two (2) of the partners or by an authorized representative of each of at least two (2) partners, followed by the signatories' names and designations printed clearly and legibly directly below their respective signatures. Tenders by companies should specify the full legal name of the company followed by the signatures of the duly authorized signing officer(s) and should have the company's seal affixed. Each page of the Form of Tender, including the Schedules should bear the initials of all persons who have signed the Form of Tender.
- 2.5 All blank spaces in the Form of Tender should be completed. All prices and notations should be typewritten or printed legibly in ink. Erasures, interlineations and other corrections should be initialled by all persons signing the Tender.
- 2.6 Tenderers must include as indicated on Schedule A to the Form of Tender, a breakdown of the Total Tender Price. These breakdown or, if requested, the "unit" prices will be used to calculate interim progress payments. Tenderers should ensure that the prices submitted accurately reflect the costs for each item. Tenderers may be required to justify the submitted breakdown.
- 2.7 Tenderers should submit a price for each item listed in the Form of Tender and any Schedules or other attachments thereto. Prices for items not specifically described, will be placed with the items that most fittingly describe them. Failure by the Tenderer to submit a complete breakdown may result in an incomplete Tender and may be cause for rejection.
- 2.8 Tenders will be all inclusive and will be without qualification or condition.

3.0 Total Tender Price

- 3.1 The Total Tender Price is to be entirely in Canadian currency and will consist of:

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- (a) the total of all prices for all items listed in the Form of Tender; and
- (b) all applicable taxes.

3.2 The Total Tender Price will include any and all amounts the Tenderer will accept for performing the Work and any and all costs of any kind that the Tenderer might incur in connection with the Work, including, without limitation, all costs of labour, supervision, materials, equipment, traffic control, financing, posting bonds, carrying insurance and overhead and any and all profits.

3.3 The City, in respect of any Tender, in order to meet budget limitations, or for any other reason, may choose to proceed with only some, but not all of the Work, as originally described in the Tender Documents, and as bid on in any Tender, and accept a Tender on that basis, in which case the scope of the Work will be reduced to those items identified in a Notice of Award as being the Work with which the City wishes to proceed and the Total Tender Price will be adjusted accordingly.

4.0 City Council

4.1 Any award of a Contract based on Tenders the City receives will be subject to approval by its City Council.

5.0 Contract

5.1 After approval and execution by both parties of an agreement in form and substance of the Form of Agreement set out in Part D to the ITT, the successful Tenderer will become the Contractor for the City in respect of the Work.

5.2 Ownership of the improvements constructed in the Work, when completed in accordance with the Contract, will be wholly vested in and owned by the City.

6.0 Bonds

6.1 Each Tender will be accompanied by a Consent of Surety (Schedule "F" to the Form of Tender or equivalent) duly completed by a surety company authorized and licensed to carry on business in British Columbia and having an office in British Columbia and a bond (the "Bid Bond") payable to the "City of Vancouver" in the amount of ten percent (10%) of the Total Tender Price (not a dollar amount) as a security for the due execution of an Agreement in form and substance of the Form of Agreement in Part D to the ITT and the delivery of the Bonds specified below. Bid Bond to be valid for ninety (90) days.

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6.2 The Bid Bonds of unsuccessful Tenderers will be returned to them as soon as possible after the Contract is awarded, and the Bid Bond of the Tenderer whose Tender the City accepts will be returned to it on execution of an Agreement in form and substance of the Form of Agreement in Part D to the ITT, delivery of a Performance Bond for fifty percent (50%) of the Total Tender Price and a Labour and Materials Payment Bond for 50% of the Total Tender Price and commencement of the Work. The cost of all Bond premiums will be included in the Total Tender Price.

6.3 The forms of the Bonds will be those issued by the Canadian Construction Documents Committee as follows:

Bid Bond:	CCDC 220 (latest)
Performance Bond:	CCDC 221 (latest)
Labour and Material Payment Bond:	CCDC 222 (latest)

6.4 All Bonds and the Consent of Surety must be issued by a surety company acceptable to the City, which is authorized and licensed to carry on business in British Columbia and must have an office in British Columbia and must be in a form acceptable to the City.

7.0 Insurance

7.1 The Tenderer whose Tender the City accepts will be required to maintain insurance in connection with the Work as described in the Part E - General Conditions portion of the ITT.

7.2 All Tenderers must submit with their Tenders a Certificate of Existing Insurance in the form annexed as Schedule "I" to the Form of Tender showing that they currently carry insurance as required in all respects under the Part E - General Conditions portion of the ITT or written confirmation from an insurer demonstrating conclusively that the Tenderer will be able to meet those insurance requirements in all respects.

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8.0 Worksafe BC

- 8.1 Tenderers should familiarize themselves and be prepared to comply with the WorkSafe BC ("WCB") requirements as set out in the Part E - General Conditions portion of the ITT.

9.0 Acceptance of Tenders

Notwithstanding anything to the contrary contained in the ITT or any other document, material or communication:

- 9.1 The City need not necessarily accept the Tender with the lowest bid, or any Tender, and the City reserves the right to reject any and all Tenders at any time without further explanation and to accept any Tender the City considers to be in any way advantageous to it. The City's acceptance of any Tender is contingent on its City Council approving funding for the Work and a Contract with a Tenderer. Tenders containing qualifications will be considered to be non-conforming Tenders in that they will fail to conform to the requirements of the Tender Documents and on that basis they may be disqualified or rejected. Nevertheless, the City may waive any non-compliance with the requirements of the Tender Documents, specifications or any conditions, including, without limitation, the timing of delivery of anything required by these Tender Documents, and the City, at its discretion, may consider non-conforming Tenders and accept a non-conforming Tender.
- 9.2 Where the City is of the view, in its sole discretion, that there is ambiguity or other discrepancy which cannot be discerned or resolved from examining the contents of the Tender, then whether or not such an ambiguity or discrepancy actually exists on the face of the Tender, the City may, prior to Contract award, solicit clarification from the Tenderer or accept clarification from the Tenderer on any aspect of its Tender. Such clarification may include the acceptance of any further documents or information which will then form part of the Tender. The soliciting or accepting of such clarification (whether or not solicited) by the City will be without any duty or obligation on the City to advise any other Tenderers or to allow them to vary their Total Tender Prices as a result of the acceptance of clarification from any one or more Tenderers and the City will have no liability to any other Tenderer(s) as a result of such acceptance of clarification.
- 9.3 All Tenders will remain open for the City to accept at any time for a period of ninety (90) calendar days after the Closing Time.
- 9.4 The award of a Contract will be based on the City's evaluation of the Tenders on any basis that the City considers will best serve its interests, including but

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not limited to the following criteria, as the City in its discretion may apply them:

- (a) the overall cost to the City represented by a Tender;
- (b) the reputation, ability and experience of the Tenderer, Tenderer's proposed suppliers and Subcontractors and the Tenderer's senior staff and key personnel to be assigned to the Work;
- (c) the technical credibility, financial resources and environmental responsibility of the Tenderer;
- (d) the Tenderer's proposed sources for materials to be used in the performance of the Work;
- (e) the Tenderer's scheduling of the Work in relation to the City's schedule and the Tenderer's demonstrable ability to complete the Work within the time frame required by the City;
- (f) the Tenderer's apparent understanding of the requirements of the proposed Work;
- (g) the best value to the City based on quality, service, price and any other considerations the City may conclude, in its discretion, to be material to its evaluation; and
- (h) any other considerations the City, in its discretion, may wish to take into account.

9.5 If the City considers that all Tenders are priced too high, it may reject them all.

9.6 The City, prior to awarding of any Contract, may negotiate with the Tenderer presenting the lowest priced Tender, or with any Tenderer, for changes in the Work, the materials, the specifications or any conditions, without having any duty or obligation to advise any other Tenderers or to allow them to modify their Tenders, and the City will have no liability to any Tenderer as a result of such negotiations or modifications.

9.7 The City will not be responsible for costs, expenses, losses, damages (including damages for loss of anticipated profit) or liabilities incurred by a Tenderer as a result of or arising from its submitting a Tender or the City's acceptance or non-acceptance of any Tender or any breach by the City of any Tender Contract or arising out of any Contract award that may not have been made in strict accordance with the Tender Documents.

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- 9.8 The City may award a Contract on the basis of policies and preferences not stated or otherwise than as stated in the ITT.
- 9.9 No guidelines or policies of any government, organization, entity or other body that might be apply to the ITT, the tendering process contemplated thereby or a Contract, but are not requirements of law, will give rise to any legal rights on the part of any Tenderer, the Contractor, any subcontractors or others as against the City or create any liability on the part of the City.

10.0 Site Examination

- 10.1 The Work Sites are City owned property.
- 10.2 Prior to submission of Tenders, all Tenderers, at their risk and expense, will make careful examination and investigations of and regarding all Work Sites and ensure that they fully understand to their satisfaction the means of access to and from all Work Sites, the nature and scope of the Work and the requirements for the Work as shown in the drawings, specifications and other documents annexed hereto and incorporated by reference herein and of all other things necessary to the full and proper completion of the Work and the conditions under which it will be performed, and no allowances in respect of the Total Tender Price or any portion thereof will be given subsequently to the successful Tenderer for any neglect, error, interpretation or misinterpretation in that respect.
- 10.3 The City gives no guarantees of any kind in relation to any Work Sites or geotechnical information provided in or with the Tender Documents. Tenderers must evaluate such information themselves relative to actual conditions.

11.0 Tender Documents

- 11.1 The Tender Documents are as follows:
- (a) Cover Page and Table of Contents to the ITT
 - (b) Part A - Introduction to the ITT
 - (c) Part B - Instructions to Tenderers portion of the ITT;
 - (d) Part C - Form of Tender portion of the ITT, including, without limitation, all Schedules thereto;
 - (e) Part D - Form of Agreement portion of the ITT;
 - (f) Part E - General Conditions portion of the ITT;

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- (g) Part F - Specifications portion of the ITT;
- (h) Part G - Standard Detailed Drawings portion of the ITT;
- (i) Part H - Design Drawings portion of the ITT;
- (j) Part I - Waterworks Connections Database Service Lists portion of the ITT;
- (k) Bid Bond required hereunder;
- (l) All other specifications and drawings for the Work referred to in any of the above listed documents; and
- (m) Any addenda to any Tender Documents; and

(12.0 Examination of Tender Documents)

- 12.1 Each Tenderer must examine the Tender Documents carefully and thoroughly and must satisfy itself that it fully understands them and the nature and scope of the Work, and each Tenderer will make its own assessment therefrom regarding the Work Sites and any difficulties for the Work.
- 12.2 No allowance will be given subsequently to the Contractor for any error, omission or negligence on his part or for non-compliance with the requirements of this clause.

13.0 Interpretation

- 13.1 If any Tenderer is in doubt as to the true meaning and intent of any part of any Tender Documents, then, at least five (5) working days prior to the Closing Time, the Tenderer will contact the appropriate contact person shown on the cover page in written form only, faxed to 604-873-7057 or emailed to purchasing@vancouver.ca.
- 13.2 The City will answer and publish in writing, by way of addenda to the Tender Documents, prior to the Closing Time, any requests made according to Paragraph 13.1 for clarification or interpretation of any Tender Documents. The City will not be responsible for verbal or any other explanations or interpretations thereof. To be in any way binding on the City, all such requests for clarification and interpretation must be made in writing, and the response must be confirmed in writing by way of an addendum to the Tender Documents. All addenda and other written notices so issued will become part of the Tender Documents and will be binding upon all Tenderers.

14.0 Taxes and Fees

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- 14.1 All Tenders must take into account that the Contractor will be fully responsible for the cost and payment of all permit and licence fees and all Municipal, Provincial and Federal taxes, customs duties and other assessments and charges required in connection with the Work, except as may otherwise be indicated in the Tender Documents. The City will not be liable in any way for any such costs not included in the Tender, except as may otherwise be indicated in the Tender Documents, and the successful Tenderer will indemnify the City for and save it harmless from any and all Losses incurred with respect thereto.

15.0 Product Approval

- 15.1 Wherever any Product (as defined in the Part E - General Conditions portion of the ITT) is specified or shown herein by description of proprietary items, model numbers, catalogue numbers, manufacturer, trade names or similar reference, the Tender and award of the Contract will be based upon the use of such Products. Use of such Product descriptions in the Tender Documents is intended to establish a reference by which to measure the quality of the Products required for the Work. In respect of specific situations for which two or more interchangeable Products are shown or specified in the Tender Documents, the Contractor may choose which to use.
- 15.2 For approval of Products for use in substitution for those specified in the Tender Documents, Tenderers will submit a request in writing to the Engineer at least ten (10) working days prior to the Closing Time. Requests will clearly define and describe the Product for which approval is requested and be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data or other information necessary to completely describe the Product. Any approval by the Engineer must be in the form of an addendum to the specifications in the Tender Documents issued to all persons who have received a set of the Tender Documents.
- 15.3 The City's approval for substitute Products not specified in the Tender Documents will be given only insofar as such Products, in the City's opinion, are fully interchangeable with and of equal quality to the Products specified in the Tender Documents.

16.0 Metric Measurements and Co-Ordination

- 16.1 The Work has been designed using metric dimensions. All linear dimensions have been expressed in millimetres in whole numbers (without decimal parts) and in metres with fractions thereof. The unit "mm" for millimetres has been deleted from the dimensioning of the drawings.
- 16.2 Within the Specifications, the unit symbols for all metric units are included. Also, the decimal parts have been included in the Specifications where

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Products have been "soft converted" (i.e., when the dimensions of the Product remain the same as they are at present but are expressed in metric equivalent units). Dimensions for spacing of Products have been expressed in millimetres in whole numbers in both the Specifications and Drawings.

- 16.3 As a general rule, all dimensioning of Products and equipment has been "soft converted". Exceptions to this rule are certain Products which are presently available in metric sizes and have been "hard converted"; i.e., where the Product itself is manufactured to rational metric dimensions.
- 16.4 Where "hard conversion" Products have been specified and are available they will be supplied.
- 16.5 Care is required to ensure coordination of imperial and metric Products and in dimensioning and, in this regard, the Contractor will be entirely responsible for metric co-ordination of its Work.
- 16.6 The Contractor will ensure that all persons employed in the Work know how to use the metric system of measurement, and that they use metric references and measuring devices.

17.0 Scheduling, Coordination and Completion

- 17.1 Time is of the essence for all purposes in relation to the ITT, the Contract and the Work. This requirement can be waived only by explicit written waiver by the City and any such waiver will not be a general waiver but will be effective only as explicitly stated in the written waiver.
- 17.2 The Contractor must execute the Agreement and start work under the Contract within seven (7) calendar days of the Notice to Proceed. All Work shall be completed by February 28, 2011, or such later date as the City may agree.
- 17.3 Each Tenderer will complete and submit Schedule B to the Form of Tender showing the proposed critical path construction scheduling for the Work under the Contract clearly indicating how they intend to meet the above completion date (and any completion dates required in Part E - General Conditions). This Schedule must include all major phases of the Work and indicate start and completion dates for each. The Schedule will be based on the Contractor receiving the Notice to Proceed on or before September 30, 2010 and the completion date specified above.

18.0 Excavation, Soil Support and Work Areas In Residential Neighbourhoods

The following items are brought to the Tenderer's attention:

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- 18.1 The Work Sites are in high density residential areas, in close proximity to existing residences, businesses and utilities.
- 18.2 The Work Sites will be approximately as indicated in Part H - Design Drawings.
- 18.3 In carrying out the Work, the Contractor will use all procedures necessary to minimize any Work related disturbance and inconvenience to all residents adjacent or near to the Work Sites and will strictly adhere to all construction procedures specified or referenced in the Contract Documents.
- 18.4 Before commencing any excavations in connection with the Work, the Contractor must inform the residents and businesses in each City block at which the excavations are to take place, regarding estimated start and finish times for the excavation activities.

19.0 Labour Rates

- 19.1 Tenders must include a completed copy of Schedule "E" to the Form of Tender ("Force Account Labour and Equipment Rates"), a list of all equipment to be used for the performance of the Work under the Contract, and the hourly rate for each piece of equipment which may be used for any extra work required by the City to be performed for payment on a "cost plus" basis. These equipment rates must be all inclusive (i.e. they must include the operator and all overhead and profit). The same must be submitted for all classes of labour.

20.0 Experience

- 20.1 Tenderers are required to confirm in the Tender that they have suitable experience for the Work. Each Tenderer will complete and submit with the Tender the Schedule "D" to the Form of Tender regarding similar projects completed, including, without limitation, the following information:
 - (a) a brief description of previous projects;
 - (b) locations;
 - (c) contract values;
 - (d) start and completion dates;
 - (e) completed on schedule or not;
 - (f) name and current phone number and email address of project owner and representative to be contacted as reference(s); and
 - (g) names and positions of key personnel involved in the project.

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21.0 List of Subcontractors and Supplies

21.1 The Tenderer will insert in the Tender, in Schedule "C" thereto, a list of proposed subcontractors, providing their names, addresses of places of business and the part of the Work to be performed and/or the equipment or materials to be supplied by each of them. Pursuant to Schedule C, the City reserves the right to object to any of the Subcontractors and Suppliers listed in a Tender. If the City objects to a listed Subcontractor and/or Supplier then the City will permit a Tenderer to, within five (5) Working days, propose a substitute Subcontractor and/or Supplier acceptable to the City. A Tenderer will not be required to make such a substitution and, if the City objects to a listed Subcontractor and/or Supplier, the Tenderer may, rather than propose a substitute Subcontractor and/or Supplier, consider its Tender rejected by the City and by written notice withdraw its Tender. The City shall, in that event, return the Tenderer's bid security.

22.0 Non-Resident Withholding Tax

22.1 If a Tender is not a resident of Canada, for Canadian taxation purposes, the Income Tax Act of Canada requires that a certain percentage of the monies otherwise payable for the Work be withheld by the City and remitted to the Receiver-General for Canada. The percentage required to be withheld and remitted varies depending among other things, on the country of residence, the provisions of any applicable treaties and the nature of the payment. Non-resident Tenderers may contact the Vancouver office of Revenue Canada, Taxation for further details. The City will receive a credit under the Contract for monies withheld and remitted.

23.0 Release, Indemnity and Limitation

23.1 Release

Each Tenderer, in submitting a Tender, hereby releases the City and all of its officials, employees and agents from any and all liability for any Losses in respect of:

- (a) any breach of any Tender Contract by the City (it being acknowledged and agreed that to the best of the parties' knowledge, the City has no obligation or duty under the Tender Contract which it could breach);
- (b) any unintentional tort of the City or its employees, officers, officials or agents occurring in connection with the ITT;
- (c) the Tenderer preparing and submitting a Tender;
- (d) the City accepting or rejecting any Tender;

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART B- INSTRUCTIONS TO TENDERERS

- (e) the manner in which a Contract award is made; and
- (f) the City awarding no Contract in connection with the ITT.

23.2 Indemnity

Each Tenderer, in submitting a Tender, agrees to indemnify the City and its officials, employees and agents for and save them harmless from any Losses any of them may suffer, incur or experience in connection with the ITT or any Tender Contract and in respect of any claim or threatened claim by any Tenderer or any of their subcontractors, subconsultants or materials or equipment suppliers alleging or pleading:

- (a) any breach of the Tender Contract by the City (it being agreed that, to the best of the parties' knowledge, the City has no obligation or duty under the Tender Contract which it could breach);
- (b) any unintentional tort of the City or its employees, officers, officials or agents occurring in connection with the ITT; and
- (c) any liability on any other basis related to the tendering process, bidding process or the Tender Contract.

23.3 Limitation of Liability

In the event that, with respect to anything relating to the tendering process, bidding process or a Tender Contract, any person having jurisdiction to decide the matter determines that the City or any of its employees, officers, officials or agents is found to have breached any duty or obligation of any kind owed to a Tenderer or its subcontractors, subconsultants or suppliers, whether at law or in equity, including, without limitation, any fundamental or material breach of a Tender Contract, or to be liable to the Tenderer or its subcontractors, subconsultants or suppliers in any other way, the City's liability therefor is limited to a maximum of One Thousand Dollars (\$1000) in Canadian currency, despite any other term or agreement to the contrary.

24.0 **Dispute Resolution**

24.1 Any dispute relating in any manner to the ITT, except disputes arising between the City and any Tenderer to whom the City has awarded the Contract, will be resolved by arbitration in accordance with the *Commercial Arbitration Act* (British Columbia), as amended, as follows:

- (a) The arbitrator will be selected by the City's Manager of Materials Management; and

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART B- INSTRUCTIONS TO TENDERERS

- (b) The place of arbitration will be within the City of Vancouver; and
- (c) Paragraph 23 above - *Release, Indemnity and Limitation* will:
 - (i) bind the arbitrator, the Tenderer and the City; and
 - (ii) survive any and all awards made by the arbitrator.

25.0 Confidentiality and Privacy

- 25.1 All Tenders, once submitted to the City, become the property of the City, which is a public body required under Information and Privacy Legislation to protect or disclose certain types of records according to certain statutory rules. All Tenders, upon submission to the City, will be received and held in confidence by the City unless and to the extent that they must be disclosed pursuant to Information and Privacy Legislation or are disclosed pursuant to the award and evaluation process adopted by the City for the ITT.

26.0 Release of Information Restricted

- 26.1 No information regarding the ITT will be disclosed between the Closing Time and the time a Contract is awarded (or decision is made not to award the Contract).

27.0 Traffic Plan

- 27.1 The Contractor will submit to the Engineer, subject to the Engineer's approval, within five (5) Working Days before commencement of the Work, a traffic management plan showing the expected traffic management areas around the Work Sites and the Contractor's plan for managing traffic in those areas at all times beginning on commencement of the Work until completion and within two (2) working days of any request by the Engineer for modifications to the Contractor's traffic management plan after commencement of the Work, a modified traffic management plan addressing all such matters as required by the Engineer.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

Tenderer's Name: _____
"Tenderer"

Mailing Address: _____

Cheque Payable/Remit to Address: _____

Telephone No.: _____ Fax No.: _____

Key Contact Person.: _____ E-mail: _____

HST Registration No.: _____ Incorporation Date: _____

City of Vancouver Business License Number: _____
(If your office is located in Vancouver or N/A if not applicable)

WorkSafeBC Account Number: _____

Dunn and Bradstreet Number: _____

1.0 Total Tender Price and Schedule

- 1.1 Having fully examined and considered the Work Site, the access thereto and all conditions affecting the Work and having carefully read and examined all of the Tender Documents, the undersigned Tenderer hereby offers to complete the Work and to furnish all plant, tools, equipment, labour, products, material and supervision necessary to perform and complete the Work for the "Total Tender Price" of:

PS10180 - Watermain Supply and Installation (2B) - (Lump sum price for all Work)
Total Tender Price: \$_____
In lawful money of Canada, including all taxes and fees.

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER**

- 1.2 The undersigned confirms that the Total Tender Price includes all Federal, Provincial and Municipal taxes, all customs and excise import duties and all WorkSafe BC fees and assessments payable in relation to the Work.
- 1.3 If the Total Tender Price as entered above and the sum of all itemized prices contained below in the Tender and all taxes applicable thereto are different, the sum of all itemized prices contained in the Tender and all taxes, duties, fees and assessments applicable thereto will be the Total Tender Price.
- 1.4 The undersigned offers to achieve completion of all of the Work on or before February 28, 2011, or such later date as both parties may agree.

2.0 Notice of Award

- 2.1 The undersigned agrees that this Tender is irrevocable and open for acceptance by the City for a period of ninety (90) calendar days from the day following the date of the Closing Time, even if the tender of another Tenderer is accepted by the City. If within this ninety (90) day period the City gives a Notice of Award accepting this Tender, the undersigned, within five (5) Working Days of the giving thereof, will deliver to the City, to its satisfaction:
- (a) a Performance Bond and a Labour and Material Payment Bond, each in the amount of fifty percent (50%) of the Total Tender Price, issued by a surety licensed to carry the business of suretyship in the province of British Columbia, and in a form acceptable to the City;
 - (b) a detailed Construction schedule, as required by the Part E - General Conditions (GC 22) ;
 - (c) a WorkSafe BC "clearance letter" indicating that the Tenderer is in WorkSafe BC compliance;
 - (d) a Certificate of Insurance showing the Tenderer has all insurance coverages and requirements in place as required under Part D - Form of Agreement - Appendix B; and
 - (e) Prime Contractor Agreement, as required by Part D - Form of Agreement - Appendix A.

3.0 Notice to Proceed

- 3.1 Upon the City receiving from the successful Tenderer the materials described above in Section 2, the City will give to the Tenderer a Notice to Proceed (the "Notice to Proceed") and the Tenderer will proceed to:

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER**

- (a) duly execute and return to the City five (5) copies of a final form Agreement in within three (3) working days; and
- (b) commence the Work within seven (7) days or such longer time as may be otherwise specified in the Notice to Proceed.

4.0 Conditions

4.1 If the City gives a Notice of Award to the undersigned Tenderer, and the undersigned:

- (a) fails or refuses to deliver the documents as specified and required by Sections 2 and 3 above; or
- (b) fails or refuses to commence the Work in accordance with the Tender Documents and the Notice to Proceed,

then such failure or refusal will be deemed to be a refusal to perform the Contract and the Work, and the City, on written notice to the undersigned Tenderer, may award the Contract to another Tenderer or person. The Tenderer agrees that, as full compensation for damages suffered by the City because of such failure or refusal on the part of the undersigned Tenderer to perform the Contract and the Work, the Tenderer's Bid Bond will be forfeited to the City in the amount equal to the lesser of:

- (c) the face value of the Bid Bond; or
- (d) the amount by which the Total Tender Price presented herein is less than the amount for which the City contracts with another Tenderer or other person to perform the Work.

4.2 The undersigned acknowledges and agrees that the lowest submitted Tender will not necessarily be accepted, and that the City reserves the right to reject this Tender at any time without further explanation or to accept any Tender considered advantageous to the City.

4.3 The Schedules attached to this Form of Tender form a part of it.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

5.0 Addenda

- 5.1 The undersigned hereby acknowledges that it has reviewed and thoroughly understands the following Addenda :

(ADDENDA, IF ANY)

6.0 Certification

- 6.1 The undersigned hereby certify that this Tender complies in all respects with the requirements of the Tender Documents.

7.0 Labour

- 7.1 The above stated Total Tender Price is based on the Work being performed by union/non-union labour. (Delete or cross out "union" or "non-union" as applicable).

SIGNED and SEALED this ____ day of _____, 2010 by the duly authorized officers of the Tenderer:

Tenderer's Legal Name or Registered Corporate Name and Address:
(Seal)

per: _____

per: _____

Witness' Name, Signature, and Address where Tenderer is a Proprietorship or Partnership:

(Address)

(Name and Signature)

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE A
SCHEDULE OF QUANTITIES AND UNIT PRICES

The following amounts are the Tenderer's lump sum and unit prices for the corresponding items listed below. The lump sums prices, unit prices and the subtotal price shown below include all labour, materials, services and other inputs, overhead and profit for and all fees and taxes payable in respect of the Work, except HST. The HST will be shown separately.

The Tenderer acknowledges that the City may delete any of the items in this Schedule A in order to meet budget limitations and award a Contract for only the remaining items.

ITEM A	DESCRIPTION	UNIT	UNIT PRICE	TOTAL PRICE (excluding HST)
LUMP SUM ITEMS				
1a.	Cypress St. - W. 44 th Ave. to W. 49 th Ave. Watermain Installation	Lump	Lump	\$
1b.	Cypress St. - W. 44 th Ave. to W. 49 th Ave. Surface Restoration	Lump	Lump	\$
2a.	W. 45 th Ave. - E. Boulevard to Cypress St. Watermain Installation	Lump	Lump	\$
2b.	W. 45 th Ave. - E. Boulevard to Cypress St. Surface Restoration	Lump	Lump	\$
3a.	Cartier St. - W. 41 st Ave. to W. 45 th Ave. Watermain Installation	Lump	Lump	\$
3b.	Cartier St. - W. 41 st Ave. to W. 45 th Ave. Surface Restoration	Lump	Lump	\$
4a.	Anthlone St. - W. 41 st Ave. to 45 th Ave. Watermain Installation	Lump	Lump	\$
4b.	Anthlone St. - W. 41 st Ave. to W. 45 th Ave. Surface Restoration	Lump	Lump	\$
5a.	W. 45 th Ave. - Granville St. to Hudson St. Watermain Installation	Lump	Lump	\$
5b.	W. 45 th Ave. - Granville St. to Hudson St. Surface Restoration	Lump	Lump	\$

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

6a.	W. 46 th Ave. - Granville St. to Hudson St. Watermain Installation	Lump	Lump	\$
6b.	W. 46 th Ave. - Granville St. to Hudson St. Surface Restoration	Lump	Lump	\$
7a.	W. 47 th Ave. - Granville St. to Hudson St. Watermain Installation	Lump	Lump	\$
7b.	W. 47 th Ave. - Granville St. to Hudson St. Surface Restoration	Lump	Lump	\$
8a.	W. 48 th Ave. - Granville St. to Hudson St. Watermain Installation	Lump	Lump	\$
8b.	W. 48 th Ave. - Granville St. to Hudson St. Surface Restoration	Lump	Lump	\$
SUBTOTAL ITEM A <i>(excluding HST)</i>				\$

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE A cont'd
SCHEDULE OF QUANTITIES AND UNIT PRICES

ITEM B	DESCRIPTION	UNIT	EST QUANTITY	UNIT PRICE	TOTAL PRICE (excluding HST)
UNIT PRICE ITEMS					
1.	Hydrant Extension Installation up to 600mm in depth	ea	12	\$	\$
2.	Overexcavation/Additional Excavation	m ³	550	\$	\$
3.	Rock Removal	m ³	100	\$	\$
4.	Removal of Existing Service Curb Stop Riser Pipe that contain Asbestos	ea	50	\$	\$
5.	Sawcutting Asphalt Pavement deeper than 150mm up to 225mm depth	m	2000	\$	\$
6.	Sawcutting Asphalt Pavement deeper than 150mm up to 300mm depth	m	2000	\$	\$
7.	Sawcutting Concrete Pavement deeper than 150mm up to 225mm depth	m	4500	\$	\$
8.	Sawcutting Concrete Pavement deeper than 150mm up to 300mm	m	4500	\$	\$
SUBTOTAL ITEM B <i>(excluding HST)</i>					\$

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE A cont'd
SCHEDULE OF QUANTITIES AND UNIT PRICES

ITEM C	DESCRIPTION	UNIT	EST QUANTITY	UNIT PRICE	TOTAL PRICE (excluding HST)
ADDITIONS AND DELETIONS					
1.	Small Service Replacement including Surface Restoration. Valve Riser Caps supplied by City.				
a)	½" Copper	ea	1	\$	\$
b)	¾" Copper	ea	10	\$	\$
c)	1" Copper	ea	1	\$	\$
d)	1 ½" Copper	ea	5	\$	\$
e)	2" Copper	ea	5	\$	\$
2.	Small Service Change over including Surface Restoration.				
a)	½" Copper	ea	1	\$	\$
b)	¾" Copper	ea	10	\$	\$
c)	1" Copper	ea	1	\$	\$
d)	1 ½" Copper	ea	5	\$	\$
e)	2" Copper	ea	5	\$	\$
3.	Removal and disposal of existing watermain up to 300mm diameter, including sawcutting, excavation, up to 1.5m depth, backfilling and surface restoration and temporary water servicing.	m	250	\$	\$
SUBTOTAL ITEM C (excluding HST)					\$

SCHEDULE A cont'd

Name of Tenderer

Initials of Authorized Signatory

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE OF QUANTITIES AND UNIT PRICES

ITEM D	DESCRIPTION	UNIT	EST QUANTITY	UNIT PRICE	TOTAL PRICE (excluding HST)
UNIT PRICE ITEMS					
1.	Additional Paving including Sawcutting up to 150mm depth, Removal of Existing Asphalt and Base and Preparation of New Base				
a)	Additional Paving (Part G - Standard Detail Drawing - DWG.P1), Portland Cement Concrete Surface, 250mm Concrete Road)	m ²	50	\$	\$
b)	Additional Paving (Part G - Standard Detail Drawing DWG. P2), Asphalt Concrete Surface, 50mm Asphalt, 175mm Concrete Base)	m ²	50	\$	\$
c)	Additional Paving (Part G - Standard Detail Drawing DWG. P3), Light Duty Residential, Asphalt Surfaced Roads	m ²	150	\$	\$
d)	Additional Paving (Part G - Standard Detail Drawing DWG. P4), Asphalt Surface Roads, 50mm Asphalt with minimum 90mm AC Base)	m ²	50	\$	\$
e)	Additional Paving (Part G - Standard Detail Drawing P6)	m ²	200	\$	\$
2	Polyethelene Encasement	m	500	\$	\$
SUBTOTAL ITEM D (excluding HST)					\$

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE A cont'd
SCHEDULE OF QUANTITIES AND UNIT PRICES

1	TENDER AMOUNT (Item A + Item B + Item C + Item D) <i>(excluding HST)</i>	\$
2	HST	\$
3	TOTAL TENDER PRICE (1 + 2)	\$

(Transfer Total Tender Price to page FT1 - Section 1.0)

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE B
PRELIMINARY CONSTRUCTION SCHEDULE

Milestone Dates:

- (1) Work Start Date - approximately, seven (7) days from issuance of "Notice to Proceed", or such later date as the City may specify.
- (2) Work should be completed on or before February 28, 2011 or such later date as the City may agree.
- (3) Detailed Construction Schedule to be completed by Tenderer:

Work Description	Oct. 2010	Nov. 2010	Dec. 2010	Jan. 2011	Feb. 2011
Cypress - W. 44 th Ave. to W. 49 th Ave					
W. 45 th Ave. - E. Boulevard to Cypress					
Cartier St. - W. 41 st to W. 45 th Ave.					
Anthlone St. W. 41 st to W. 45 th Ave.					
W. 45 th Ave. - Granville to Hudson					
W. 46 th Ave - Granville to Hudson					
W. 47 th Ave. - Granville to Hudson					
W. 48 th Ave. - Granville to Hudson					

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE C
SUBCONTRACTORS and SUPPLIERS

1.0 Subcontractors

The Tenderer will list below all subcontractors it intends to use in its performance of the Work, and what parts of the Work each subcontractor will be undertaking (the "Subcontractors").

The Tenderer, if awarded the Contract, will engage the listed Subcontractors only, and no others in their stead, without prior written authorization of the City.

The Tenderer, if awarded the Contract, will ensure that every Subcontractor is bound by a legal agreement with the same terms and conditions of the Contract.

Tenderers are to provide the following information about the Subcontractors:

- (a) Describe how the Tenderer's operation is structured with respect to Subcontractors.

If no Subcontractors will be used, indicate "Not Applicable".

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE C cont'd
SUBCONTRACTORS and SUPPLIERS

SUB-CONTRACTORS - #1

Subcontractor's Name and Address:	
Describe the type of Work to be performed by Subcontractor:	
Description of Prior Relevant Project:	
Location of Prior Relevant Project:	
Contract Value:	
Start and Completion Date:	
Completed on Schedule?	Yes/No (circle correct answer)
Name of General Contractor:	
Name and Telephone Number of Project Reference:	

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE C cont'd
SUBCONTRACTORS and SUPPLIERS

SUB-CONTRACTORS - #2

Subcontractor's Name and Address:	
Describe the type of Work to be performed by Subcontractor:	
Description of Prior Relevant Project:	
Location of Prior Relevant Project:	
Contract Value:	
Start and Completion Date:	
Completed on Schedule?	Yes/No (circle correct answer)
Name of General Contractor:	
Name and Telephone Number of Project Reference:	

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE C cont'd
SUBCONTRACTORS and SUPPLIERS

SUB-CONTRACTORS - #3

Subcontractor's Name and Address:	
Describe the type of Work to be performed by Subcontractor:	
Description of Prior Relevant Project:	
Location of Prior Relevant Project:	
Contract Value:	
Start and Completion Date:	
Completed on Schedule?	Yes/No (circle correct answer)
Name of General Contractor:	
Name and Telephone Number of Project Reference:	

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE C cont'd
SUBCONTRACTORS and SUPPLIERS

2.0 Suppliers

The Tenderer will list here all major suppliers and manufacturers it intends to use on in performing the Work.

SUPPLIER	MANUFACTURER	ADDRESS	ITEM

Additional pages may be attached to Schedule C. Each such additional page must be clearly marked "PS10180, Part C - Form of Tender - Schedule C", and must be signed by the Tenderer.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE D
TENDERER'S RELATED EXPERIENCE

The Tenderer will describe its related experience by describing similar work it has undertaken previously, as follows:

DESCRIPTION OF PROJECT:

LOCATION OF PROJECT:

CONTRACT VALUE (Canadian Funds): \$

START AND COMPLETION DATES:

COMPLETED ON SCHEDULE? Yes/No
(Circle correct response)

NAME OF CONTRACT OWNER:

NAME OF PROJECT REFERENCE:

CURRENT TELEPHONE NUMBER AND
EMAIL OF PROJECT REFERENCE:

NAMES OF KEY PERSONNEL AND
SUBCONTRACTORS:

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE D cont'd
TENDERER'S RELATED EXPERIENCE

DESCRIPTION OF PROJECT:

LOCATION OF PROJECT:

CONTRACT VALUE (Canadian Funds): \$

START AND COMPLETION DATES:

COMPLETED ON SCHEDULE? Yes/No
(Circle correct response)

NAME OF CONTRACT OWNER:

NAME OF PROJECT REFERENCE:

CURRENT TELEPHONE NUMBER AND
EMAIL OF PROJECT REFERENCE:

NAMES OF KEY PERSONNEL AND
SUBCONTRACTORS:

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE D cont'd
TENDERER'S RELATED EXPERIENCE

DESCRIPTION OF PROJECT:

LOCATION OF PROJECT:

CONTRACT VALUE (Canadian Funds): \$

START AND COMPLETION DATES:

COMPLETED ON SCHEDULE? Yes/No
(Circle correct response)

NAME OF CONTRACT OWNER:

NAME OF PROJECT REFERENCE:

CURRENT TELEPHONE NUMBER AND
EMAIL OF PROJECT REFERENCE:

NAMES OF KEY PERSONNEL AND
SUBCONTRACTORS:

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE E
FORCE ACCOUNT LABOUR RATES AND EQUIPMENT RATES

(See Section 19.0 of Part B - Instructions to Tenderers)

1.0 Force Account Labour Rates

Tenderers should provide labour rates in the table below for all labour categories that will be involved in the Work. The labour rates will remain firm for the term of the Contract and will be used by the Owner for the purpose of evaluating and valuing changes in the Work in the case of lump sum, or in case of force account valuation. The rates provided below are all inclusive and include without limitation, wages, taxes and assessments and benefits payable in accordance with Applicable Laws, mobilization and demobilization, supervision, administration, small tool allowance including small tool rental, overhead and profit.

For the purposes of the above, small tools are considered to be any tool worth \$2,000.00 or less in new value. All other tools should be listed as equipment in the table under item 2 below.

Overtime hourly rates are applicable only at prior written request of the Engineer (as defined in the Form of Agreement) and only for labour expended after 5:00 pm on Working Days or on any day other than a Working Day.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

LABOUR CLASSIFICATION	REGULAR RATE (/hr)	OVERTIME RATE (/hr)

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER**

2.0 Force Account Equipment Rates

Tenderers should provide equipment rates for all equipment that will be involved in the Work. The equipment rates will remain firm for the term of the Contract and will be used by the Owner for the purpose of evaluating and valuing changes in the Work in the case of lump sum, or in case of force account valuation. The rates provided below are all inclusive and include without limitation, fuel, lubrication, service, maintenance, depreciation, mobilization and demobilization, overhead and profit.

It is acknowledged by the Contractor that if any portion of an hour is spent in performing the Work on a force account basis, a pro rata portion of the force account rate shall only be charged.

EQUIPMENT CLASSIFICATION	HOURLY RATE	SPECIFY MAKE & MODEL

3.0 Materials and Supplies

In the event that additional materials and supplies are required for work adjusted and or claimed pursuant to Part E - GC. 47, the Contractor will be reimbursed (after duly invoicing the City) at cost plus a mark up of fifteen percent (15%) to compensate the Contractor for all overhead and profit.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE F
CONSENT OF SURETY

PROJECT

Should it be required, we the undersigned Surety Company do hereby consent and agree to become bound as sureties in an approved Contract Performance Bond and Labour and Material Payment Bond each in the amount of fifty percent (50%) of the awarded Total Tender Price for the fulfillment of the Contract and for the performance of the Work as described in the Contract Documents, which may be awarded to _____ at the Total Tender Price set forth in the attached Tender, which Performance Bond and Labour and Material Payment Bond we understand are to be filed with the City of Vancouver within five (5) Working Days from the date the Notice of Award is given by the City to the Contractor.

We hereby further declare that the undersigned Surety Company is legally entitled to do business in the Province of British Columbia and that it has a net worth over and above its present liabilities and the amounts herein set forth, together.

The Common Seal of _____
was hereto affixed in the
presence of:

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE G
PROPOSED KEY PROJECT PERSONNEL

The following are the Key Project Personnel we propose to use for the Work:

		Name
Project Superintendent:		
Project Manager:		
Construction Safety Officer:		
Foreman:		

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE H
EXCAVATION SUPPORT SYSTEM DETAILS

The Tenderer shall provide support system details for any excavations greater than 1.2m as shown in Part F, Specifications and provide confirmation that the proposed support system has "WorkSafeBC" approval.

Additional pages may be attached to this page and/or separate numbered documents such as specifications, descriptive literature and drawings may be submitted with this Schedule. Each such additional page and/or separate document must be clearly marked "PS10180 - Part C - Form of Tender - Schedule H", and must be signed by the Tenderer.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE "I"



**CERTIFICATE OF EXISTING INSURANCE
TO BE COMPLETED AND APPENDED TO THE PROPOSAL/TENDER**

Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4
and certifies that the insurance policy (policies) as listed herein has/have been issued to the Named Insured and is/are in full force and effect.

NAMED INSURED *(must be the same name as the proponent/bidder and is either an individual or a legally incorporated company)*

BUSINESS TRADE NAME or DOING BUSINESS AS

BUSINESS ADDRESS

DESCRIPTION OF OPERATION

3. **PROPERTY INSURANCE (All Risks Coverage including Earthquake and Flood)**

INSURER _____	Insured Values (Replacement Cost) -
TYPE OF COVERAGE _____	Building and Tenants' Improvements \$ _____
POLICY NUMBER _____	Contents and Equipment \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____

4. **COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)**

Including the following extensions:	INSURER _____
✓ Personal Injury	POLICY NUMBER _____
✓ Property Damage including Loss of Use	POLICY PERIOD From _____ to _____
✓ Products and Completed Operations	Limits of Liability (Bodily Injury and Property Damage Inclusive) -
✓ Cross Liability or Severability of Interest	Per Occurrence \$ _____
✓ Employees as Additional Insureds	Aggregate \$ _____
✓ Blanket Contractual Liability	All Risk Tenants' Legal Liability \$ _____
✓ Non-Owned Auto Liability	Deductible Per Occurrence \$ _____

5. **AUTOMOBILE LIABILITY INSURANCE** for operation of owned and/or leased vehicles

INSURER _____	Limits of Liability -
POLICY NUMBER _____	Combined Single Limit \$ _____
POLICY PERIOD From _____ to _____	<i>If vehicles are insured by ICBC, complete and provide Form APV-47.</i>

6. ☐ **UMBRELLA OR** ☐ **EXCESS LIABILITY INSURANCE** **Limits of Liability (Bodily Injury and Property Damage Inclusive) -**

INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Self-Insured Retention \$ _____

7. **PROFESSIONAL LIABILITY INSURANCE**

INSURER _____	Limits of Liability
POLICY NUMBER _____	Per Occurrence/Claim \$ _____
POLICY PERIOD From _____ to _____	Aggregate \$ _____
	Deductible Per Occurrence/Claim \$ _____

If the policy is in a "CLAIMS MADE" form, please specify the applicable Retroactive Date:

8. **OTHER INSURANCE**

TYPE OF INSURANCE _____	Limits of Liability
INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____
TYPE OF INSURANCE _____	Limits of Liability
INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE

Dated _____
PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART C - FORM OF TENDER

SCHEDULE J
TENDERER'S CHECKLIST

Before submitting your Tender, check the following points:

1. Has your Tender been signed, witnessed and sealed?
2. Have all pages of the Form of Tender been *initialed*?
3. Have you enclosed your Bid Bond?
4. Have you enclosed the Consent of Surety, signed and sealed by your proposed Surety?
5. Have you completed and provided all documentation required in all Schedules in the Form of Tender?
6. Have you completed the blanks in the Form of Tender to signify that all addenda issued have been taken into account in the preparation of the Tender?
7. Have you shown in the Form of Tender the time for completion of the Work?
8. Have you listed all your Subcontractors?
9. Have you listed your experience in similar work and provided contact information for references?
10. Have you listed your key staff?
11. Are the documents complete?
12. Have you completed Paragraph 7 of the Form of Tender regarding labour?
13. Have you included a letter from your insurer and reviewed with your insurer the insurance requirements in Section GC 53 of the Part E - General Conditions portion of the Tender Documents?
14. Have you included a Certificate of Existing Insurance in the form of Schedule I, Part C - Form of Tender?

NOTE: This Checklist is provided as an aid to the Tenderer. However, it is each Tenderer's sole responsibility to ensure the completeness of his/her Tender.

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT**

FORM OF AGREEMENT

This AGREEMENT (including all Appendices hereto, this "Agreement") is made as of the ____ day of _____, 2010.

BETWEEN:

CITY OF VANCOUVER,
having an office at 453 West 12th Avenue,
Vancouver, British Columbia, V5Y 1V4

(the "City")

OF THE FIRST PART

AND:

(Name of person, firm, or company)

(the "Contractor")

OF THE SECOND PART

WHEREAS:

- A. In August 2010, the City issued an Invitation to Tender (reference ITT No. PS10180) for the supply and installation of ductile iron cement lined watermain, which includes installation of fire hydrants, service renewals, all service connection change-overs, all valves, and fittings and permanent street repairs in the City of Vancouver, called "Watermain Supply and Installation (2B)";
- B. In response thereto, the Contractor submitted a Tender to the City (the "Tender");
- C. By resolution of its City Council made on [month/day/2010] the City approved the Tender; and
- D. On that basis, the City and the Contractor have agreed that the Contractor will perform for the Work specified in the Contract Documents in accordance therewith (the agreement and undertaking of the parties set forth in the Contract Documents is hereinafter called the "Contract")..

THEREFORE, in consideration of the promises exchanged herein, the parties agree as follows:

ARTICLE I - INTERPRETATION

Capitalized terms and words used in this Agreement and the other Contract Documents, which are not otherwise defined herein or therein, as the case may be, have the meanings designated in Part E - General Conditions portion of the Tender Documents.

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT**

ARTICLE II - ROLE OF THE ENGINEER

The City hereby designates and appoints Michael Irvine (hereinafter referred to as the "Engineer" to act as its sole and exclusive agent for the purpose of managing and administering for the City the performance of the Work by the Contractor in accordance with the Contract. The Contractor must coordinate the Work with the Engineer. The Contractor must coordinate the Work with the Engineer. The Contractor will have no cause for any claim against the City whatsoever with respect to delays or other interruption of the Work by City employees or due to the above requirement to coordinate the Work with the Engineer.

Unless otherwise notified in writing by the City to the Contractor, the agency of the Engineer will continue for the entire duration of the Contract including the period of any guarantees or warranties given by or through the Contractor. In the event of the revocation in writing of the agency of the Engineer by the City, the Engineer will have no further authority under the Contract, except as may be specifically designated in writing by the City and agreed to in writing by the Engineer, and all references to the Engineer in the Contract will thereafter be deemed to be a reference to the City or to such other person designated in writing to the Contractor. The Engineer may from time to time delegate to a representative the performance of or the authority to perform the duties, responsibilities, rights and obligations of the City in respect of which the Engineer has been designated and appointed its sole and exclusive agent.

Despite any other term of the Contract, where the Contractor must submit to the Engineer for approval a drawing or other information which indicates a method or technique by which the Contractor will carry out a certain aspect of the Work, the Engineer's approval of such drawing or other information will be deemed only to be an acknowledgement by the Engineer that such drawing or other information appears to be consistent with the requirements of the Contract. Under no circumstances will the Engineer's approval of the drawing or other information be, or be interpreted as, the City's or Engineer's approval or endorsement of the method or technique described in the drawing or other information and under no circumstances will the Engineer's approval of the drawing or other information modify or limit in any way the Contractor's total, complete and unconditional responsibility for design, engineering and proper implementation of the appropriate methods and techniques necessary to successfully carry out the Work specified in the Contract.

ARTICLE III - PERFORMANCE OF THE CONTRACT

The Contractor hereby agrees and undertakes to perform the Work, and will furnish all materials, equipment, Products, labour and services and supervision necessary to carry out the Work, and to carry out all of its other obligations, in a professional and workmanlike manner in accordance with all applicable laws and regulations, and as contemplated by and in accordance with the Contract. The City in turn agrees and undertakes to perform its obligations under the Contract in accordance with the applicable requirements thereof.

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT**

ARTICLE IV - CONTRACT DOCUMENTS

The following is a list of the documents that contain the terms and conditions of the agreement between the parties (the "Contract Documents"). This list is subject to subsequent amendments in accordance with the provisions of the Contract Documents.

- (a) This Agreement, as executed;
- (b) Notice of Award delivered to Contractor;
- (c) Notice to Proceed delivered to Contractor;
- (d) Part B - Instructions to Tenderers portion of the Tender Documents;
- (e) Part C - Form of Tender portion of the Tender Documents, including, without limitation, all Schedules thereto, as completed by Tenderer;
- (f) Appendix "A" to Part D Form of Agreement - Prime Contractor Agreement Form portion of the Tender Documents;
- (g) Appendix "B" to Part D - Form of Agreement - Certificate of Insurance
- (h) Part E - General Conditions portion of the Tender Documents;
- (i) Part F - Specifications portion of the Tender Documents;
- (j) Part G - Standard Detailed Drawings portion of the Tender Documents;
- (k) Part H - Design Drawings portion of the Tender Documents;
- (l) Part I - Waterworks Connection Database Service Lists;
- (m) Performance Bond required under the Tender Documents;
- (n) Labour and Materials Payment Bond required under the Tender Documents; and
- (o) Any addenda to any of the above documents, or any other document(s) that become incorporated into and part of the Contract Documents.

The Contract Documents are complementary to each other, and what is called for by any one will be as binding as if called for by all. The intent and spirit of the Contract Documents is that the Contractor is required to complete the Work in every detail within the times and for the purposes designated, and that the Contractor must furnish and do any and everything necessary for such purposes notwithstanding any omission from the Contract Documents. In the event of a discrepancy or contradiction between a term or condition in one Contract Document with another Contract Document, Part E - GC. 2 will apply.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT

ARTICLE V - SCHEDULE OF WORK

The Contractor will commence the Work in accordance with the Notice to Proceed. The Contractor will proceed with the Work diligently, will perform the Work in accordance with the construction schedules as required by the Contract Documents and achieve Total Performance of the Work by February 28, 2011 (the "Contract Performance Deadline"), subject to the provisions of the Contract Documents for adjustments to the Contract Performance Deadline.

Time is of the essence in the Contract.

ARTICLE VI - PAYMENT

Subject to additions and deductions for variations in the Work and to quantities utilized as may be agreed upon in writing, and to the provisions of the Contract, the City will pay the Contractor as remuneration for the performance of the Work a maximum total of [write out amount in full] (\$0000.00), including, without limitation, all taxes and permit and license fees, subject to applicable adjustment as and when the British Columbia Harmonized Sales Tax comes into effect (the "Contract Amount").

Applications for Payment:

- (a) During its performance of the Work, the Contractor may apply to the Engineer, in form approved by the Engineer, on or before the last day of every month, for payment for Work performed and materials supplied at or to the Work Site to the date of the application, provided that the Engineer may at any time require as a condition of payment the submission of documentation set out in Part E - GC. 60.
- (b) On Substantial Performance being certified in accordance with the procedures set out in the Part E -GC. 60 and the value of the certified deficiencies being agreed upon, the Contractor may make application to the Engineer for the balance of all monies then owing to the Contractor under the Contract, submitting also such documentation as is required under the Part E - GC.60, subject to the deficiency holdback contemplated by paragraph (h) below.
- (c) On correction and completion of all deficiencies listed on the Certificate of Substantial Performance, the Contractor will apply to the Engineer for final payment, accompanied by the documentation required by Part E - GC. 60.

The City's payment to the Contractor for any Work under this Agreement will not be construed as an acceptance of the Work as having been performed in accordance with the Contract.

The City's issuance of a Certificate of Total Performance will constitute a waiver by the Contractor of all claims under the Contract, except those previously made in writing and still unsettled, if any, and specified by the Contractor in his application for final payment pursuant to paragraph (c) above.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT

The City will make payments to the Contractor as follows for Work performed:

- (d) On or before the fifth day of the month following the Contractor's application for payment, the Engineer will adjust, if necessary, and certify the Contractor's progress estimate. Where the Engineer makes any changes to the amount submitted by the Contractor for payment, the Contractor will be notified in writing within five (5) Working Days and will be given the opportunity to defend his application without delay.
- (e) Within thirty (30) calendar days of the date the City receives any Engineer certified application for payment, the City will make payment to the Contractor up to the value of the completed Work as certified by the Engineer, less any holdback required under the *Builders Lien Act* equal to ten percent (10%) of such certified value and less the aggregate of any previous payments all in accordance with the Contract and with the *Builders Lien Act*.
- (f) The City, in addition to any other holdbacks as provided by the Contract Documents, will be entitled to deduct and retain from payments otherwise due to the Contractor for Work performed, a maintenance security holdback ("Maintenance Security") in the amount of five percent (5%) of the Contract Amount to cover the cost of corrections to the Work that may be required under the Part E - GC. 51. If the Contractor does not perform its Warranty obligations as required by the Contract, and the City incurs costs as a result, the City may deduct such costs from the Maintenance Security. If the Maintenance Security is insufficient to fully reimburse the City for such costs, the Contractor will pay the City the full amount of any shortfall promptly upon demand. The balance of the Maintenance Security remaining at the end of the Warranty Period, if any, will be paid without interest to the Contractor. The Contractor may substitute a letter of credit for the Maintenance Security, in the amount of the Maintenance Security held back and required under the Contract, in a form and from a financial institution acceptable to the City.
- (g) Where the Engineer has issued a Certificate of Substantial Performance in respect of any of the Work performed by subcontractors, and where fifty-five (55) calendar days have elapsed since the issuance of the certificate without any claims of builders lien being filed which arose under the subcontract, the City will release to the Contractor any *Builders Lien Act* holdback amount retained for such subcontract work.
- (h) After fifty-five (55) calendar days have elapsed from the date of issuance of a Certificate of Substantial Performance in accordance with Part E - GC. 60 and upon the Engineer's satisfaction that no encumbrance, lawful claim or lien exists, the City, within a further ten (10) calendar days, will make payment to the Contractor of all monies due under the Contract at the date of Substantial Performance of the Work, including the release of any remaining *Builders Lien Act* holdback amounts, provided, however, that the Contractor hereby authorizes the City to retain as a deficiency holdback at least twice the estimated value of any certified deficiencies (the "Deficiencies Security"), and to apply any builders lien holdback monies then held by the City towards such Deficiencies Security, and if that amount is insufficient, to immediately provide the City with an additional cash payment

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT**

equivalent to the shortfall. The Contractor may substitute a letter of credit for the Deficiencies Security, in the amount of the Deficiencies Security held back and required under the Contract, in a form and from a financial institution acceptable to the City.

- (i) Subject to all other provisions of the Contract, upon the issuance of a Certificate of Total Performance, the City will make a final payment of all monies owing to the Contractor under the Contract.
- (j) Where payment is not made in accordance with the payment provisions above, the overdue amount will bear interest at the lending rate of the Bank of Montreal for its prime commercial customers and such interest will be calculated from and after the date upon which such payment is due and will accrue until the date of payment of the overdue amount, together with accrued interest. This interest obligation on the part of the City will be the sole remedy of the Contractor for any late payment under the Contract.
- (k) Notwithstanding anything to the contrary in this Article VI - Payment, the Contractor must not make application for payment, and the City is not obliged to make payment, for Work done until each section of watermain, as described in Part C - Form of Tender has been installed, pressure tested, disinfected, services have been changed over and the old watermain has been abandoned, all in accordance with the Contract.

ARTICLE VII - DAMAGES FOR DELAYS

Liquidated Damages for Late Completion.

If the Contractor fails to complete the Work by the Contract Performance Deadline as set out in Article V above, as may be modified pursuant to the provisions of the Contract, then the City may deduct from any monies owing to the Contractor for the Work:

- (a) as a genuine pre-estimate of the City's increased costs for delay of sequential construction tasks, an amount of CDN three hundred dollars (\$300.00) per day or pro rata portion for each calendar day that completion of the Work is delayed after the Contract Performance Deadline; plus
- (b) all direct out-of-pocket costs, such as, without limitation, costs for safety or security measures taken or equipment rented, reasonably incurred by the City as a result of such delay.

If monies owing to the Contractor are less than the total amount of liquidated damages owed by the Contractor to the City under paragraph (a) above, then any such shortfall will be due and owing to the City from the Contractor immediately on written notice from the City therefore and upon Substantial Performance of the Work.

ARTICLE VIII - NOTICES

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT**

- (a) Subject to Part E - GC. 17, all notices, instructions, orders or other communications given in writing by the City to the Contractor will be addressed as set forth below:

Name: _____

Address: _____

City: _____

Postal Code: _____

Fax Number: _____

Attention: _____

- (b) All notices, requests, claims or other communications by the Contractor to the City will be in writing and will be given by personal delivery or by registered mail addressed as set forth below:

CITY OF VANCOUVER
453 West 12th Avenue
Vancouver, British Columbia
V5Y 1V4

Attention: Michael Irvine, Water Design Branch, Engineering Services

Any such notice given to the City by registered mail will be deemed to have been delivered on the second Working Day following the mailing thereof; provided, however, that should there be between the time of the mailing and the actual receipt of the notice, a mail strike, slowdown or other labour dispute which might affect delivery of such notice, then such notice will only be effective if and when actually delivered.

ARTICLE IX - SUCCESSORS AND ASSIGNS

The Agreement will be binding upon and will ensure to the benefit of the successors and assigns of the respective parties hereto.

IN WITNESS WHEREOF the parties hereto have set their hands and seals as of the day and year first above written.

CITY OF VANCOUVER

BY:

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART D - FORM OF AGREEMENT

Print Name and Title

CONTRACTOR

BY: _____ C/S
Authorized Signatory

Print Name and Title

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
APPENDIX A - PRIME CONTRACTOR AGREEMENT

1.0 DEFINITIONS

- a) **"OH&S Regulation"** means the Occupational Health & Safety Regulation (British Columbia Regulation 296/97) enacted pursuant to the WCA, and any successor legislation, all as such Regulation is amended or re-enacted from time to time;
- b) **"Owner"** means City of Vancouver;
- c) **"Place of the Work"** means the work site at the locations shown on Part H - Design Drawings;
- d) **"Prime Contractor"** means the Contractor, who is designated pursuant to Article 3 below by the Owner to be the Prime Contractor for the Project with respect to occupational health and safety for the purposes of WCB Legislation;
- e) **"Project"** means the watermain and supply installation project, as contemplated by the Contract Documents, and includes all the Work;
- f) **"WCA"** means the *Workers Compensation Act*, R.S.B.C. 1996, Chapter 492, and any successor legislation, as such Act is amended or re-enacted from time to time;
- g) **"WCB"** means the Worker's Compensation Board of British Columbia; and
- h) **"WCB Legislation"** means the WCA and all regulations thereto including the OH&S Regulation, and all rules, regulations and requirements of WorkSafeBC, and any successor legislation, rules, regulations and requirements, all as amended or re-enacted from time to time; and
- i) **"WorkSafeBC"** means the British Columbia Provincial governmental organization by that name which is responsible, inter alia, for promoting workplace health and safety for the workers and employers of British Columbia, and for working with the affected parties to provide return-to-work rehabilitation, compensation, health care benefits and a range of other services, in the event of work-related injuries or diseases suffered by workers in British Columbia.

All other capitalized terms used in this Prime Contractor Agreement have the meanings given to them in the Contract Documents of which this Prime Contractor Agreement is a part, as applicable.

2.0 PRIME CONTRACTOR'S RESPONSIBILITIES

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
APPENDIX A - PRIME CONTRACTOR AGREEMENT

Proof of Qualification to act as Prime Contractor

- The Prime Contractor is to provide a current copy of its WorkSafeBC "Clearance Letter", a signed copy of this Prime Contractor Agreement and all other documents requested by the Owner prior to commencement of the Work.
- The Prime Contractor is to notify the Owner of any changes of status with WorkSafeBC or the WCB during the course of the Project.

After the Prime Contractor has been designated and before Work has commenced, the Prime Contractor shall:

- Conduct all necessary and appropriate inquiries of all relevant Owner staff and records in order to verify in writing to the Owner that the Owner has given to the Contractor all information known to the Owner that is necessary to identify and eliminate or control hazards to the health and safety of persons at the Place of the Work.
- Conduct a pre-contract hazard assessment and carefully review, and plan to address, all hazards identified in that assessment.
- Inform all other employers whose employees are providing services for the Project at the Place of the Work, that it is the Prime Contractor.
- Establish and maintain a system or process to ensure all employers, employees and visitors at/to the Place of the Work comply with the WCA, the OH&S Regulation and the requirements of WorkSafeBC. The Prime Contractor will thus be responsible for site orientation and hazard communication.
- Review and complete a "Pre-Job Meeting Form" if the Owner requests.
- For construction projects, post the Notice of Project on the Place of the Work and deliver a copy to WorkSafeBC at least twenty-four (24) hours before construction commences.
- Comply with Section 20.2 of the OH&S Regulation in respect of the Notice of Project.
- Identify and set expectations for each subcontractor's safety contact.
- Coordinate all safety-related activities, from site orientations to safety committee meetings and toolbox talks, to inspections and incident reviews.
- Inform employers and workers of the workplace hazards associated with the Place of the Work.
- At the Place of the Work, provide the information listed in Section 20.3(4) of the OH&S Regulation.
- In all other respects strictly comply with, and strictly enforce compliance by others, as applicable, with, the WCA, the OH&S Regulation, the requirements of WorkSafeBC, the safety policies and procedures of the Owner and the terms and conditions of the Contract Documents applicable.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
APPENDIX A - PRIME CONTRACTOR AGREEMENT

Throughout the term of the Project, the Prime Contractor shall:

- Ensure that all hazards are promptly and appropriately identified and addressed.
- Ensure the health and safety of the workers on the Project.
- Maintain a current list of persons that each sub-trade (employer) has designated to be responsible for that employer's health and safety activities.
- Ensure provision of first aid equipment and services as required by the OH&S Regulation.
- Coordinate all occupational health and safety activities for the Project.
- Prepare, and communicate to all workers on the Place of the Work, an emergency response plan, taking into account the number of people onsite, the people who work outside regular hours and the types of emergencies that may arise. This plan should also describe subcontractor and individual worker responsibilities (e.g. responding to a fire) and provide for any necessary training and equipment, including first aid supplies as work processes change over the course of the Project, this emergency response plan must be updated as appropriate.
- Make and maintain detailed notes and reports in respect of the initial site safety meeting, safety committee meetings, reviews of contractors' safety systems, inspection and incident investigations, first aid records and orientation and training.
- On any site where workers of two (2) or more employers are working at the same time and the combined workforce is greater than five (5), identify and designate a "Qualified Coordinator" to coordinate health and safety activities.
- In all other respects strictly comply with, and strictly enforce compliance by others, as applicable, with, the WCA, the OH&S Regulation, the requirements of WorkSafeBC, the safety policies and procedures of the Owner and the terms and conditions of the Contract Documents applicable.

Prime Contractor's Qualified Coordinator, if applicable, (Construction Only) responsibilities:

- Comply with all requirements listed in Section 20.3(3) of the OH&S Regulation and on page 13 of the Owner's Multiple Employer Workplace/Contractor Coordination Program (2003).
- Coordinate all health and safety activities for the Project.
- Post workplace drawings showing where first aid is located, the emergency transportation system for injured workers and evacuation marshalling points.
- Ensure that regular workplace safety meetings are held and documented.

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
APPENDIX A - PRIME CONTRACTOR AGREEMENT

- Know who all other contractors' "Qualified Persons" are.
- Ensure that all workers at the Place of the Work are informed of workplace hazards, from both the pre-contract hazard assessment and from ongoing work activities of all employers at the Place of the Work, and ensure that hazards are properly and punctually addressed throughout the duration of the Project.

3.0 DESIGNATION AS PRIME CONTRACTOR

By signing this Prime Contractor Agreement, the undersigned Contractor accepts all responsibilities of a **Prime Contractor** as outlined in the City's Multiple-Employer Workplace/Contractor Coordination Program (2003), (Part Three, Division 3, Section 118) and the WCB OH&S Regulation.

As a Contractor signing this Prime Contractor Agreement with the City, the undersigned company agrees that the company and its management staff, supervisory staff and workers will comply with the Workers' Compensation Board (WCB) Occupational Health and Safety Regulation and the Workers Compensation Act (Part 3, Division 3, Section 118).

Any violation of a requirement of WCB Legislation by the Prime Contractor may be considered a breach of the Contractor's Contract with the Owner resulting in possible termination or suspension of the Contract and/or any other actions deemed appropriate at the discretion of the City.

Any penalties, sanctions or additional costs levied against the Owner, as a result of an action or inaction of the Prime Contractor in its capacity as such, are the sole responsibility of the Prime Contractor, as set out in the Contract.

I, the undersigned, acknowledge that I have read and understand the information above. By signing this Prime Contract Agreement, I agree as an authorized representative of the Contractor to accept all responsibilities of the **Prime Contractor** for this Project.

Date

Contract #

Name of Contractor

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
APPENDIX A - PRIME CONTRACTOR AGREEMENT

Qualified Coordinator's Name

(Construction Only)

Signature of Authorized
Representative

Print Name and Title

**INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
APPENDIX B - PROJECT SPECIFIC INSURANCE**



**CERTIFICATE OF INSURANCE
Project Specific Insurance**

Section 7 a) – City staff to select the required # of days Written Notice before sending out for completion
Section 2 through 7 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4
and certifies that the insurance policies as listed herein have been issued to the Named Insured(s) and are in full force and effect as of the effective date of the agreement described below.
2. **NAMED INSURED:** *[must be the same name as the Permittee/Licensee or Party(ies) to Contract and is/are either an individual(s) or a legally incorporated company(ies)]*

MAILING ADDRESS: _____

LOCATION ADDRESS: _____

DESCRIPTION OF PROJECT/CONTRACT: _____

3. **PROPERTY INSURANCE – ALL RISK COURSE OF CONSTRUCTION (Builder's Risk Form) /INSTALLATION FLOATER**
- Providing All Risk Coverage including Earthquake and Flood up to full replacement cost of the Project/Contract described above
 - Naming the City of Vancouver as an Insured and containing a Loss Payee Clause in favour of the City of Vancouver stating that proceeds of any claims against the Insurer be made payable to City of Vancouver as its interest may appear

INSURER: _____	INSURED VALUES: (Full Replacement Cost value of Project)
TYPE OF COVERAGE: _____	Limit: \$ _____
POLICY NUMBER: _____	Deductible Per Loss: \$ _____
POLICY PERIOD: From _____ to _____	

4. **WRAP UP LIABILITY INSURANCE** (Occurrence Form) in the Joint Named Insureds of the Owner, City of Vancouver, Architects, Engineers, Consultants, Sub-consultants, Contractors, and Subcontractors, including their officials, officers, employees, agents, and all participants engaged in or connected with the above Project/Contract, including the following extensions:

- | | |
|---|---|
| <ul style="list-style-type: none"><input checked="" type="checkbox"/> Personal Injury<input checked="" type="checkbox"/> Cross Liability or Severability of Interest<input checked="" type="checkbox"/> Employees as Additional Insureds<input checked="" type="checkbox"/> Blanket Contractual Liability<input checked="" type="checkbox"/> Broad Form Products and Completed Operations<input checked="" type="checkbox"/> Broad Form Property Damage including Loss of Use<input checked="" type="checkbox"/> Non-Owned Auto Liability | Check Additional Extensions where applicable and included: <ul style="list-style-type: none"><input type="checkbox"/> Work below ground level over 3 metres<input type="checkbox"/> Excavation, shoring, underpinning, pile driving or caisson<input type="checkbox"/> Demolition, removal or weakening of support of property<input type="checkbox"/> Blasting<input type="checkbox"/> Operation of hoist or attached machinery<input type="checkbox"/> 24 months Completed Operations<input type="checkbox"/> 36 months Completed Operations |
|---|---|

INSURER: _____ POLICYNUMBER: _____

POLICY PERIOD: From _____ To _____

LIMITS OF LIABILITY: (Bodily Injury and Property Damage Inclusive):

Per Occurrence: \$ _____ Aggregate: \$ _____ Deductible _____ Per _____ Occurrence: \$ _____

5. **AUTOMOBILE LIABILITY INSURANCE for operation of owned and/or leased vehicles**

INSURER: _____	LIMITS OF LIABILITY:
POLICY NUMBER: _____	Combined Single Limit: \$ _____
POLICY PERIOD: From _____ to _____	<i>If vehicles are insured by ICBC, complete and provide Form APV-47.</i>

6. **OTHER INSURANCE (e.g. Contractors' Equipment) – Please specify Name of Insurer(s), Policy Number, Policy Period, and Limit**

7. **POLICY PROVISIONS:**

Where required by the governing contract, agreement, lease, permit or license, it is understood and agreed that:

- a) *SIXTY (60) days written notice of cancellation or material change resulting in reduction of coverage with respect to any of the policies listed herein, either in part or in whole, will be given by the Insurer(s) to the Holder of this Certificate; the exception is cancellation for non-payment of premiums in which case the applicable statutory conditions will apply;*
- b) *All property insurance policies must contain a provision in which the Insurer(s), upon payment of a claim will waive all rights of subrogation against the City of Vancouver, its officials, officers, employees or agents;*
- c) *The insurance policy (policies) listed herein shall be primary with respect to the above described project/contract. Any insurance or self-insurance maintained by the City of Vancouver shall be in excess of this insurance and shall not contribute to it.*

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE

PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER

Dated: _____

INVITATION TO TENDER NO. PS10180
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GC.1. DEFINITIONS

Where used in the Form of Agreement (including its Schedule), Invitation to Tender, Instructions to Tenderers, Form of Tender (including the Schedules), Bonds, General Conditions, Specifications and Drawings, Addenda (if any) or any other documents forming part of the Contract, unless a clear and contrary intention appears therein, the following terms have the respective meanings ascribed to them below:

- a) **"Bid Bond"** is defined in Part B - Instructions to Tenderers Section 6.0;
- b) **"Certificate of Substantial Performance"** means, subject always to Article VI of Part D - Form of Agreement or Agreement and to the warranty under GC.51, the certificate issued by the Engineer indicating that Substantial Performance of the Work has been achieved;
- c) **"Certificate of Total Performance"** means, subject always to Article VI of Part D - Form of Agreement and to the Warranty under GC.51, a certificate issued by the Engineer accepting the Contractor's certification that the entire Work has been performed by the Contractor to the requirements of the Contract;
- d) **"City"** means the City of Vancouver as a municipal corporation continued pursuant to the *Vancouver Charter*;
- e) **"Contract Amount"** is defined in Article VI of Part D - Form of Agreement or Agreement;
- f) **"Contract Documents"** is defined in Article IV of the Form of Agreement or Agreement;
- g) **"Contract Performance Deadline"** means February 28, 2011;
- h) **"Contractor"** or a pronoun in place thereof, means the person or persons who have undertaken to carry out and perform the Work pursuant to the Contract;
- i) **"Detailed Design Drawings"** means drawings, plans, sketches and/or details provided by the Engineer that are specific to the Works.
- j) **"Drawings"** means all plans, profiles, drawings, sketches or copies thereof exhibited, used or prepared for or in connection with the Work embraced under the Contract, including the Detailed Design Drawings and the Standard Design Drawings;
- k) **"Engineer"** means the Engineer as defined in Article II of the Form of Agreement or Agreement or his/her delegate, who may be an employee of the City or an independent engineer engaged by the City on its behalf;

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- (l) **"Form of Agreement or Agreement"** means the agreement in final form entered into between the Contractor and the City in form and substance of the Form of Agreement forming part of the Tender Documents, including its Appendices;
- m) **"Form of Tender"** means the form of tender forming part of the Tender Documents, including its Schedules "A" through "I";
- n) **"Invitation to Tender"** means the invitation to tender for PS10180 Watermain Supply and Installation (2B) work in the City of Vancouver, together with all its attachments, schedules, supplements and amendments;
- o) **"Instructions to Tenderers"** means Part B - Instructions To Tenderers forming part of the Tender Documents;
- p) **"General Conditions"** means Part E - General Conditions and **"GC ____"** means the particular general condition identified by number;
- q) **"Labour and Material Payment Bond"** is defined in Section 6.0 of Part B - Instructions to Tenderers.
- r) **"Notice of Award"** is defined in Section 2.0 of Part C - Form of Tender;
- s) **"Notice to Proceed"** is defined in Section 3.0 of Part C - Form of Tender;
- t) **"OH&S Regulation"** means *Occupational Health & Safety Regulation* (BC Regulation 296/97, as amended by BC Regulation 185/99) enacted pursuant to the *Workers Compensation Act* (British Columbia), as such Regulation is amended or re-enacted from time to time;
- u) **"Other Contractors"** means any person, firm or corporation employed by or having a contract with the City and/or associated parties otherwise than through the Contractor;
- v) **"Performance Bond"** is defined in Section 6.0 of Part B - Instructions to Tenderers.
- w) **"Plant"** means every temporary or accessory means necessary or required to carry on or complete the Work and extra work, in the time and manner herein provided including, without limiting the generality of the foregoing, all tools, fixed and moveable machinery, engines, motor vehicles, trucks, compressors, all temporary structures such as workshops, sheds, storehouses, shoring forms, trestles and hoardings and all other appliances, apparatus or equipment of every sort, kind and description whatsoever;
- x) **"Prime Contractor"** means the Contractor, as that term is defined in section 118(1) of the WCA, and used in the WCA, the OH&S Regulation and by WorkSafeBC;

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- y) **"Prime Contractor Agreement"** means the agreement to be entered into between the City and the Contractor in the form and contents of Appendix A to Part D - Form of Agreement;
- z) **"Products"** means material (including but not limited to backfill), machinery, equipment and fixtures incorporated or to be incorporated in the Work as required by the Contract;
- aa) **"Standard Design Drawings"** means drawings from the City's Engineering Standards. These drawings may include but not be limited to drawings, sketches, and/or plans from the City's Streets, Sewers, Utilities, Water Works or other City department standards.
- bb) **"Subcontractor"** means the person or persons with whom the Contractor has made an agreement to perform a portion or portions of the Work or to supply materials or equipment therefor;
- cc) **"Substantial Performance"** means the stage of completion of all of the Work, as certified by the Engineer, when:
- the Work is ready for use or is being used for its intended purpose; and
 - the total of incomplete, defective and deficient Work can be completed at an estimated cost of no more than 3% of the Contract Amount.
- dd) **"Surety"** means the company which executes a bond required by the Contract to be furnished to the City;
- ee) **"Tables"** means information provided in a tabular format within the Specifications.
- ff) **"Tender Documents"** is defined in Section 11.- of Part B - Instructions to Tenderers.
- gg) **"Total Performance"** means when all the Work, including all deficiencies but excluding any correction of completed Work that appears during the Warranty Period or other on-going warranty or guarantee as provided by the Contract, has been performed as required by the Contract, as certified by the Engineer;
- hh) **"Warranty"** and **"Warranty Period"** are defined in GC. 51;
- ii) **"Waterworks Connection Database Service Lists"** means information from the City's database showing location and material of existing water services.

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- jj) “WCA” means the *Workers Compensation Act* (British Columbia), including without limitation, all regulations enacted pursuant to it, as such Act or regulations are amended or re-enacted from time to time;
- kk) “Work” or “Works” means (unless the context requires a different meaning) the whole of the Work as described in the Form of Tender, including all materials, matters, Products and things required to be done or supplied therefore, and all work(s) mentioned or referred to in the Contract Documents, including all extra or additional work or materials, matters or things which may be ordered by the City of the Engineer as herein provided;
- ll) “Work Site” means the place or places where the Work under the Contract is to be carried out, erected, built or constructed;
- mm) “Working Day” means any day other than a Saturday, Sunday or “holiday” as defined in the *Interpretation Act* (British Columbia); and
- nn) “WorkSafeBC” means the Provincial body which is responsible for administering and implementing the WCA, and the OH&S Regulation, and includes the Workers’ Compensation Board.

GC.2. INTERPRETATION

In the Contract, the masculine includes the feminine and bodies corporate, and each includes the others. Also, any reference to the singular includes the plural where appropriate.

Drawings and Specifications are intended to be complementary. Should any difference exist between the Drawings and Specifications, or should any errors or inconsistency occur in any or between any of the Drawings and Specifications, the Contractor, before proceeding, must bring them to the attention of the Engineer.

The Engineer will furnish from time to time such detail drawings and information as the Engineer may consider necessary for the Contractor’s guidance. These detail drawings will take precedence over the Drawings initially forming part of the Tender documents, and will be considered as explanatory of them and not as indicating changes in the Work.

On all Drawings, figures take precedence over scaled dimensions. Scaling of dimensions, if done, is done at the Contractor’s own risk. Despite the above, in the event of any inconsistency between the Drawings and Specifications or between any other Contract Documents or within any Contract Documents which could be construed as creating an ambiguity in the amount of Work involved, the cost or amount of Product being supplied, the Contract Amount being lower or higher, or any other similar discrepancy or inconsistency, the discrepancy or conflict will be resolved as follows:

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- the portion of the Contract Documents most favourable to the City will be deemed to be correct;
- the more specific provision will take precedence over the less specific;
- the more stringent in respect of the Contractor will take precedence over less stringent; and
- the more expensive item will take precedence over the less expensive.

GC.3. PERSONAL EXAMINATION

The Contractor is required to examine carefully the Work Site, and the Drawings, Tables, Specifications and other Contract Documents. The Contractor must satisfy itself as to the character, quality and quantity of work to be performed, materials to be furnished, and as to the requirements of the Drawings, Tables, Specifications and other Contract Documents. The Drawings, Tables, Specifications and other Contract Documents show or describe conditions as they are believed by the Engineer to exist, but it is not to be inferred that all of the conditions as shown thereon are actually existent, nor will the City or any of its respective officers be liable for any loss sustained by the Contractor as a result of any variance between the conditions as stated in the Drawings, Tables, Specifications or other Contract Documents and the actual conditions revealed during the progress of the Work, or otherwise.

The submission of a tender will be prima facie evidence that the Contractor has made such an examination. The Contractor agrees that the Contractor has satisfied itself by the Contractor's own investigation and research regarding all conditions, that the Contractor's conclusion to enter into the proposed contract is based upon such investigation and that the Contractor will make no claim against the City or the Engineer because any of the estimates, tests or representations of any kind affecting the Work made by any officer or agent of the City or the Engineer may prove to be in any respect erroneous. The Contractor assumes the risk of unforeseen conditions and agrees to complete the Work under whatever circumstances that may develop. Any information shown or described in the Drawings, Tables, Specifications or any other Contract Documents as to the soil or material borings or tests of existing material is not guaranteed, and no claim for extra work or damages will be considered if it is found during construction that the actual soil or material conditions vary from those indicated.

GC.4. CONTRACT AMOUNT

Bids must include all Federal, Provincial and Municipal fees and other taxes, rates and assessments. The Contractor will be solely responsible for the collection and remittance, as required by applicable law, of all such taxes. The Contractor

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agrees that the City will not be liable in any manner therefor if the Contractor fails to do so, and the Contractor agrees to indemnify and save harmless at all times the City against all claims which are made with respect thereto. If any such taxes, rates, assessments and fees so paid are refundable, such refunds must be paid to the City and will be the exclusive property of the City, unless otherwise agreed.

The Contractor must include in the Contract Amount all cash allowances mentioned in the Specifications, if any, which allowances must be expended in whole or in part as the Engineer directs, the Contract Amount being adjusted in conformity therewith. The Contract Amount includes such sums for expenses and profit on account of such cash allowances as the Contractor requires.

GC.5. PERFORMANCE BOND

The Contractor, together with a surety company acceptable to the City, which is authorized and licensed to carry on business in British Columbia and has an office in British Columbia, will be required to enter into a performance bond in a form satisfactory to the Engineer for a sum equal to fifty percent (50%) of the Contract Amount as surety for the due and proper performance of the Contract including Warranty. The expense of the performance bond will be borne by the Contractor.

GC.6. LABOUR AND MATERIALS PAYMENT BOND

The Contractor, together with a surety company acceptable to the City, which is authorized and licensed to carry on business in British Columbia and has an office in British Columbia, will be required to enter into a labour and materials bond in a form satisfactory to the Engineer for a sum equal to fifty percent (50%) of the Contract Amount as surety for the due and proper payment for material and labour used in carrying out the Contract. The expense of the labour and materials bond will be borne by the Contractor.

GC.7. WorkSafeBC COMPLIANCE AND CONTRACTOR TO BE PRIME CONTRACTOR

- a) Payment of WCA and WorkSafeBC Assessments - The Contractor agrees that it will at its own expense procure and carry or cause to be procured and carried and paid for, all WCA and WorkSafeBC required coverage for itself and all workers, employees, servants and others engaged in or upon any Work or service which is the subject of the Contract. The Contractor agrees that the City has the unfettered right to set off the amount of the unpaid premiums and assessments for such WCA and WorkSafeBC required coverage against any monies owing by the City to the Contractor. The City will have the right to withhold payment under the Contract until all WCA and WorkSafeBC required premiums, assessments or penalties in respect of work done or service performed in fulfilling the Contract have been paid in full.

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- b) **Designation of Contractor as Prime Contractor** - The City now designates the Contractor as the Prime Contractor, and the Contractor now acknowledges and agrees to its designation as the Prime Contractor, for the purposes of WorkSafeBC and the WCA.
- c) **Prime Contractor's Obligations** - Without in any way limiting the Contractor's obligations under WorkSafeBC and the WCA, and by way of example only, the Contractor will:
 - i) appoint and provide a qualified coordinator for the purpose of ensuring the coordination of health and safety activities for the Site;
 - ii) provide and receive and respond to all information required to be given, received or relayed by the Contractor (both as an employer and as the Prime Contractor) pursuant to WorkSafeBC requirements and the WCA; and
 - iii) within five (5) Working Days of the City giving the Notice of Award to the Contractor, sign and deliver to the City, the "Prime Contractor Agreement" in the form attached.
- d) **General WorkSafeBC Obligations** - In addition to, and not in lieu of, the Contractor's obligations as the Prime Contractor, the Contractor will have a safety program acceptable to WorkSafeBC and in strict compliance with the WCA, and will ensure that all City, WorkSafeBC and WCA safety policies, rules and regulations are observed during performance of the Contract, not only by the Contractor but by all Subcontractors, workers, material suppliers and others engaged in the performance of the Contract.
- e) **Notice of Project** - At least twenty-four (24) hours prior to commencement of construction, the Contractor will:
 - (i) complete and file a "Notice of Project" with WorkSafeBC in compliance with Section 20.2 of the OH&S Regulation;
 - (ii) post the Notice of Project at the Site; and
 - (iii) will provide a copy of the Notice of Project to the City and confirm in writing that (i) and (ii) above have been complied with.
- f) **Initial Proof of WorkSafeBC Registration/Good Standing** - Within five (5) Working Days of the City giving the Notice of Award to the Contractor, the Contractor will provide the City with the Contractor's and all Subcontractor's WorkSafeBC/WCA registration numbers.
- g) **Subsequent Proof of WorkSafeBC Registration/Good Standing** - Prior to execution of the Contract and prior to commencing the Work, the Contractor must provide a letter from WorkSafeBC confirming the Contractor's and all

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Subcontractors' registrations and that all assessments have been paid to the date thereof by each. Throughout the term of the Contract the Contractor must and the Contractor must require that all Subcontractors maintain such coverage and pay such assessments as will protect them, the City and the Engineer from claims under the WCA. Concurrently with making any application for payment under the Contract, the Contractor will provide the City with written confirmation that the Contractor and all Subcontractors are registered in good standing with WorkSafeBC and under the WCA, and that all assessments have been paid to date of application for payment.

- h) **Pre-Contract Hazard Assessment** - The Contractor may or may not have received, as part of the Contract Documents, a "Pre-Contract Hazard Assessment" prepared by or for the City pursuant to the City's statutory obligations under Section 119 of the WCA as an "owner of a workplace". Despite the City's statutory obligations, the Contractor as Prime Contractor now acknowledges and agrees that it may not rely on any such "Pre-Contract Hazard Assessment" and now agrees to assume by the terms of the Contract full responsibility for carrying out the City's obligations under Section 119 of the WCA, including without limitation and by way of example only, conducting all due diligence inquiries of all applicable City staff and departments in order to ascertain what, if any, information is known or has been recorded by City staff about the Site that is necessary to identify and eliminate or control hazards to the health or safety of persons at the Site. The City now agrees to make all reasonable efforts to assist the Contractor in obtaining timely access to City staff and City records for this purpose. Within five (5) Working Days of the City giving the Notice of Award to the Contractor, the Contractor will start conducting such due diligence inquiries and must complete and deliver written confirmation of the completion of such inquiries to the Engineer prior to the City being obligated to issue the Notice to Proceed.
- i) **Special Indemnity Against WorkSafeBC Non-Compliance** - The Contractor will indemnify the City and hold harmless the City from all manner of claims, demands, costs, losses, penalties and proceedings arising out of or in any way related to:

 - i) unpaid WorkSafeBC/WCA assessments of the Contractor or any other employer for whom the Contractor is responsible under the Contract;
 - ii) the acts or omissions of any person engaged directly or indirectly by the Contractor in the performance of Work or other services under the Contract, or for whom the Contractor is liable pursuant to the Contractor's obligations as the Prime Contractor, and which acts or omissions are or are alleged by WorkSafeBC to constitute a breach of the WCA, the OH&S Regulation, or any other requirements of WorkSafeBC, including any and all fines and penalties levied by WorkSafeBC; or

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- iii) any breach of the Contractor's obligations under this General Condition.
- j) **Prime Contractor Agreement Form** - The Contractor must complete and sign and deliver the Prime Contractor Agreement in the form set out in Appendix A to Part D - Form of Agreement prior to commencing any work on the Site.
- k) **Safety Regulation Enforcement** - Should the Engineer witness the Contractor or an agent of the Contractor in violation of the WCA or WorkSafeBC safety regulations, the Contractor will be notified verbally. If the violation of the WCA or WorkSafeBC safety regulations continues, the Engineer will notify the Contractor of the violation in writing and ask the Contractor to remedy the violation. If the Contractor is unable or unwilling to remedy the violation, in addition to any other remedy the City may have under the Contract, the Contract may be terminated by the City immediately, and without liability to the City.

GC.8. LABOUR

The Contractor agrees to employ appropriate tradesmen on the Work. Where the tradesmen are covered by collective agreements, the Contractor must abide by the wages and conditions of such collective agreements covering such tradesmen. Notwithstanding the foregoing, the Contractor must pay or cause to be paid to every person employed on the Work not less than the wages or remuneration generally accepted as current at the time.

The Contractor must endeavour to avoid labour problems and minimize work stoppages, jurisdictional or other labour disputes on the Site.

GC.9. COMMENCEMENT AND COMPLETION OF THE WORK

The Contractor must not commence the Work or procure any material therefor until it has received the Notice to Proceed from the City. Forthwith after the receipt of the Notice to Proceed, the Contractor must at once begin and continuously carry on to completion (subject as herein provided) and must complete and give full possession thereof on or before the date specified by the Contractor in its tender, unless a longer period is allowed in writing by the Engineer in which case it must be carried on to completion and possession given to the City within the additional time so allowed. No progress or interim estimate or certificate will release the Contractor or its surety from any responsibility or may be taken as evidence of any such release, or as an acceptance of any Work or material, or as a waiver of any condition herein. The whole Work and every portion and detail thereof must, at the time of completion, be put and left by the Contractor in good and satisfactory condition, finished in all respects and at the time must be fully up to the requirements of the Drawings and Specifications in every particular aspect; all surplus and refuse material and rubbish removed from the vicinity of the Work; the premises left in a neat and tidy condition; all damages to adjacent property, including pavements, foot walks, boulevards, sodding, trees,

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shrubs and plants, or other things injured or interfered with by the Contractor, or in any way due to its work, made good; all wages paid, and every other requirement of the Contract complied with. In case of the Contractor's failure to finish the Work properly and fully, and as required, or in case of the Work or any part thereof being taken out of its hands, as provided in these General Conditions, the City may proceed to finish the Work for the Contractor as its agent in this respect and at the Contractor's expense or proceed as provided in GC.62.

Before the completed Work is accepted and paid for, the Contractor must notify the Engineer in writing that it is ready for final inspection. Upon receipt of such notification, the Engineer will arrange to give the entire Work a minute and thorough inspection, either in person or through a competent representative.

Any defects or omissions noted during this inspection must be made good by the Contractor without extra charge before the Work will be accepted.

When the defects or omissions, if any, have been made good to the satisfaction of the Engineer, the Engineer will communicate the Engineer's acceptance of the Work to the City, subject always to Article VI of the Form of Agreement or Agreement and to the Contractor's warranty obligations.

GC.10. DELAY IN PROGRESS OF THE WORK

a) Delays

- i) If the Contractor is delayed in the performance of the Work by an act, omission or wilful default of the City, the Engineer or anyone employed or engaged by them, contrary to the provisions of the Contract Documents, (other than as a result of lockouts, strikes or other labour disputes involving the City or its employees, which circumstances are covered by paragraph (a)(iii) below), then the time fixed herein for

completion will be extended for such reasonable time as the Engineer may decide.

- ii) If the Contractor is delayed in the performance of the Work by a Stop Work Order issued by a court or other public authority and provided that such Stop Work Order was not issued as the result of an act or fault of the Contractor or anyone employed or engaged by him directly or indirectly, then the time fixed for completion herein will be extended for such reasonable time as the Engineer may decide.
- iii) If the Contractor is delayed in the performance of the Work by unforeseeable causes beyond the Contractor's control (which causes, for the purposes of this paragraph do include lockouts, strikes or other labour disputes involving the City or its employees, but do not include

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(A) lockouts, strikes or other labour disputes involving the Contractor, its subcontractors, suppliers or their respective employees, (B) delays by common carriers supplying goods or services necessary for the Work, where other carriers are available, and (C) unfavourable weather conditions of any kind, given that the Contractor is familiar with the weather conditions applicable to the Site and should have allowed for the same in its tender), then the time fixed for completion herein will be extended for such reasonable time as the Engineer may decide, but in no case will the extension of time be less than the time lost as the result of the event causing the delay, unless such shorter extension be agreed to by the Contractor. The Contractor will not be entitled to payment for any costs, loss, or damages incurred as the result of such delay.

- iv) The Engineer may, from time to time and for such period as the Engineer may deem expedient, suspend in whole or in part, the performance of the Work under the Contract, and the Engineer will order the time herein fixed for the completion of the Work to be extended for a period which is deemed by the Engineer equivalent to the time lost by reason of such suspension.
- v) No extension will be made for delay unless written notice of claim is given to the Engineer not later than seven (7) calendar days after the commencement of delay, providing however, that in the case of a continuing cause of delay only one notice of claim will be necessary.
- vi) In the event that the Work is delayed or suspended in accordance with:

paragraphs (a)(i) or (iv) of this GC.10, the Contractor will not be entitled to make any claim by reason of such delay or suspension for any losses, costs or damages except and unless, within seven (7) calendar days of the occurrence of such delay or suspension, the Contractor must give notice in writing to the Engineer of the basis of its claim. Such claim will be limited to such unavoidable direct costs (excluding all charges for storage of Products, Plant, tools and equipment and indirect, overhead or other like costs) incurred as a result of such delay or suspension, and approved by the Engineer. In the case of a delay as described in paragraph (a)(i) or a suspension pursuant to paragraph (a)(iv), a sum equal to five percent (5%) of such approved, unavoidable direct costs (in lieu of all profit) will also be allowed. Despite any other term of the Contract, in no event will the City's liability for any delay claim (whether under this GC.10 or otherwise, at law or in equity, in contract or in tort) exceed the lesser of \$500.00 for each Working Day of delay or 2% of the Contract Amount. All unavoidable direct costs claimed by the Contractor must be submitted and substantiated to the Engineer for verification on a weekly basis as incurred, failing which,

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they will not be considered nor payable by the City. Authorization for any payment of the claim will only be given by written Work Order, duly signed and issued by the Engineer; and

paragraphs (a)(ii) or (a)(iii), the Contractor will not be entitled to payment for any costs, loss or damages incurred as the result of such delay and despite any other term of the Contract, the City will incur no liability for any such delay claim whether or not such claim is brought at law or in equity, contract or tort, or any other basis.

b) Non-Avoidance

No delay or suspension described in this GC.10 will vitiate or avoid the obligations or the Contractor under the Contract, or any part thereof, or any security or obligation for the performance thereof, unless the City elects to the contrary.

c) Resumption of Work

At the end of such delay or suspension, or upon the removal of the cause thereof, or upon the Contractor receiving notice from the Engineer requiring the resumption of work, the Contractor must at once resume the performance of the Work and diligently carry on the same under the direction of the Engineer.

d) Continuance of Work After Time Fixed for Completion

The Contractor must not construe any direct or inferred permission to continue work after expiry of time for completion of the Work, as stipulated in the Contract or as amended by the order of the Engineer, as a waiver of damages for non-compliance with the requirement for the completion of the Work by or within such time. The Engineer may withhold such amounts from amounts otherwise due to the Contractor as the Engineer deems necessary to satisfy claims by the Engineer, the City or by Other Contractors caused by such non-compliance with the requirement for the completion of the Work by or within such time.

e) Restriction of Delay Claims

Despite any other term of the Contract Documents, including without limitation this GC.10 and GC. 47 - *Alterations, Extras, Deductions and Claims*, in no event will the Contractor be entitled to make any extra or delay claim or seek any other form of compensation either in contract or in tort, at law or in equity, on account of any delay or work stoppage ordered by the Engineer

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- (i) on account of any emergency pursuant to GC.24 - *Emergencies*, or
- (ii) in order to investigate, mitigate or otherwise supervise or administer any potential discovery of heritage artifacts, environmental contamination, or other matter requiring a stoppage or suspension of the Work in order to comply with environmental, aboriginal, heritage, burial or other similar regulatory requirements.

GC.11. SPECIFICATIONS AND DRAWINGS

The Contractor must keep in its field office and available to the Engineer a complete set of the Specifications and Drawings, and of any further drawings which may from time to time be supplied or approved by the Engineer. The Contractor will be supplied with five (5) sets of Specifications.

Wherever standard Specifications are referred to, it will be a reference to the latest edition of those Specifications, and they will be considered to be a part of the Contract Documents.

The Contractor will be supplied with five (5) prints of each of the Drawings and the Contractor must satisfy itself as to the accuracy of the said copies in every detail. Any additional copies desired will be furnished by the Engineer at cost to the Contractor.

The Drawings forming part of the Contract Documents are intended to show the position and extent of the works, the general features of the design and construction, and the dimensions and proportions of all principal parts, but neither they nor the Specifications are guaranteed to show or describe every part or detail of the Work; anything omitted from the Drawings and Specifications, which may fairly be considered to be necessary for the proper execution and completion of the Work, will be deemed to be included in the Contract Documents.

Anything whatever which may be imperfectly specified or imperfectly shown on the Drawings, must be taken, considered and done as if it were perfectly shown and perfectly specified.

All dimensions on the Drawings, except as noted thereon, are shown in metric units.

The Engineer may from time to time issue further drawings or revised drawings as the Engineer deems necessary and such drawings will be deemed to form part of the Contract Documents. All sets of Drawings and Specifications must be kept up to date by the Contractor at all times utilizing the Engineer's revised drawings and other documents issued to the Contractor.

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All Drawings, Specifications, models and copies thereof furnished by the Engineer are and will remain the Engineer's property. Such documents and models are to be used only with respect to the Work, are not to be copied or revised in any manner without the written authorization of the Engineer and are to be returned to the Engineer on request at the completion of the Work.

GC.12. SHOP DRAWINGS

- a) The Contractor must submit, with such promptness so as to cause no delay in its work, or that of any Other Contractor, one (1) sepia and one (1) copy of all shop or setting drawings and schedules required for the Work of the Contractor, and the Engineer will pass upon them with reasonable promptness. The Contractor must make any corrections required by the Engineer, and file with the Engineer one (1) sepia and one (1) copy.
- b) The Engineer's review of shop drawings or schedules will not relieve the Contractor from responsibility for deviations from Drawings and Specifications unless the Contractor has in writing called the Engineer's attention to such deviation at the time of submission, nor will it relieve the Contractor from the responsibility for errors of any sort in shop drawings or schedules.

GC.13. RECORD PLANS

The Contractor must supply the Engineer with three (3) complete sets of "as constructed record plans" of the Work, on or before the date the Contractor makes application to the Engineer for a Certificate of Substantial Performance.

GC.14. ENGINEER SOLE JUDGE (intentionally omitted)

GC.15. ENGINEER'S ABSENCE

In the absence of the Engineer, any of the Engineer's assistants whom the Engineer may designate to supervise the Work, will have (subject to the instructions of the Engineer) full power to decide as to the manner of conducting and executing the Work in every particular aspect, and the Contractor must follow the instructions or orders of the person so designated.

GC.16. ACCESS AND ASSISTANCE

The Contractor must furnish the Engineer and any of the Engineer's assistants at all times with convenient means of access to all parts of the Work, and also with all required assistance, to facilitate thorough examination of the same, and inspection, culling or removal of doubtful or defective material or Products and for any other purpose required in connection with the Work, or in the discharge of their respective duties, for which service no additional allowance will be made.

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GC.17. NOTICES TO CONTRACTOR

During the continuance of the Work, the Contractor must maintain an office within the Greater Vancouver area equipped with a telephone and must have in this office on all Working Days between 8:30 a.m. and 4:30 p.m., an official of the Contractor.

Before commencement of construction, the Contractor must provide the Engineer with a list of at least three (3) persons who have authority to act on behalf of the Contractor in times of emergency. At least one on the list must be available at all times beyond the normal working hours of the City (9:00 a.m. to 5:00 p.m., on all Working Days).

Any written notice, instruction, order or other communication to the Contractor will be conclusively deemed to have been well and sufficiently given and served if delivered to the Contractor personally (or in the case of a company, to any of its officers or directors personally), or to the Contractor's superintendent, foreman or any of the three (3) authorized representatives referred to above in this GC.17.

Any such communication given by mail or fax addressed to the Contractor at the address or fax number of the Contractor set forth in Article VII of the Form of Agreement or Agreement or in the tender for the Work will be conclusively deemed to have been well and sufficiently given and served, in the case of fax, when confirmation of dispatch is received by the sender, and in the case of mail, on the second Working Day following the mailing thereof; provided, however, that should there be between the time of the mailing and the actual receipt of the notice, a mail strike, slowdown or other labour dispute which might affect delivery of such notice, then such notice will only be effective if and when actually delivered.

In any written notice to the Contractor in respect of general, special or other repairs, or of any Work of any nature required to be done under any of the provisions of the Contract Documents, or of any other matter, it will not be obligatory upon the Engineer to specify minutely or in detail everything required, or to specify by measurement the exact extent thereof, or the precise spot or spots where the Work, material or products may be defective or faulty, or where any of the requirements of the Specifications have not been observed; but a reference in such notice to the clause or clauses bearing upon the matter, and a description of the locality in general terms and sufficiently clear, in the Engineer's opinion, to indicate where the defects or trouble exists, will be deemed to be and will be ample notice.

GC.18. CONTRACTOR'S SUPERINTENDENT AND EMPLOYEES

The Contractor must keep on the Work Site, during the progress of the Work, a competent superintendent and any necessary assistants, all satisfactory to the Engineer. The superintendent must not be changed except with the consent of the

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Engineer, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in its employ. The superintendent must represent the Contractor in the Contractor's absence and directions on minor matters given to the superintendent will be held to be given to the Contractor. Important decisions will be given in writing to the Contractor. The Contractor must give efficient supervision to the Work, using its best skill and attention.

Should any person employed on the Site, or in connection therewith, give any just cause for complaint, the Engineer may require that such person be replaced forthwith, and such person must not be again employed by the Contractor on the Site without the consent, in writing, of the Engineer.

GC.19. INSPECTION OF WORK

The Engineer may appoint inspectors or surveyors to inspect all materials used, Products made and all work done. Such inspections may extend to any or all parts of the Work and to the preparation or manufacture of the Products to be used whether on Site or elsewhere. Inspectors and surveyors are not authorized to revoke, alter, enlarge or accept any portion of the Work or to issue instructions contrary to the Drawings and Specifications.

GC.20. DAILY REPORT

The Engineer will maintain, in detail, a daily report to record progress of the Work, the number of personnel at the Site, the materials delivered to the Site, and all such other items which the Engineer deems necessary to record. The daily reports will be kept in the Engineer's Site Office and the Contractor or the Contractor's representative will be required to read and sign each report. In case of differences of opinion between the Engineer and the Contractor regarding the particulars stated in the daily report, the Contractor must, within seven (7) days, give notice in writing to the Engineer expounding such difference.

GC.21. WEEKLY MEETINGS

The Contractor must meet weekly with the Engineer on the Site to discuss work done in the previous week, and work proposed to be done in the week just starting, and as requested by the Engineer during the course of the Work.

GC.22. CONSTRUCTION SCHEDULE

Before beginning work, the Contractor must furnish the Engineer with a complete construction schedule showing the Contractor's proposed program of operations. This schedule must indicate the various subdivisions of the Work and the dates of commencing and finishing of each. The construction schedule must be completed using Microsoft Project or other scheduling software as approved by the Engineer.

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The form of the schedule must be approved by the Engineer. On the last day of each calendar month, a copy of the schedule must be submitted to the Engineer with particulars indicating the percentage completed of each division of the Work to that date.

The Contractor must immediately advise the Engineer of any proposed changes in the submitted construction program. If, in the opinion of the Engineer, the construction program as submitted is inadequate to ensure the completion of the Work within the time limited therefor, or is otherwise not in accordance with the Tender, or if the Work is not being adequately or properly prosecuted in any respect, the Engineer, without derogating from the City's rights under the Contract, will have the right to require the Contractor to submit a new construction schedule providing for proper and timely completion of the Work, and the Contractor will be entitled to no claim for extension of time on account of such requirement.

GC.23. MAINTENANCE OF SCHEDULE

a) Work Delayed by the Contractor

The Contractor must at all times provide a sufficient number of skilled personnel to maintain the progress of the Work and compliance with the master schedule, and if in the opinion of the Engineer the Contractor delays the progress of the works of Other Contractors then the Contractor will be responsible for all loss and damage, including, without limitation, that of Other Contractors for stand-by and/or delay occasioned thereby.

If, in the opinion of the Engineer, the Contractor delays or is about to delay the Work or the progress of any portion of the Work as shown by the master schedule, then upon the written notification by the Engineer, the Contractor must use such additional overtime work or shifts as may be necessary to catch up and/or maintain the general progress of the master schedule and the cost and expenses incurred by use of said overtime work or shift will be borne entirely by the Contractor.

b) Work Accelerated by the Engineer

Should the Engineer be required to expedite the final completion of the Work or the works of Other Contractors, then, provided the Contractor is not in default in any of the provisions of the Contract affecting the master schedule, the Engineer may order the Contractor to work additional shifts for which the City will pay:

- i. the substantiated extra premium wage incurred by such shift work;
- ii. the approved additional wages of supervision; and

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- iii. an agreed percentage addition for profit for accelerated work.

Such instructions to the Contractor will only be valid when given in writing by the Engineer. The Contractor will be responsible for having time sheets covering all such shift work checked and approved daily by the Engineer and claims for reimbursement of the extra wages will only be accepted when properly supported by such signed time sheets.

c) Work Out-of-Sequence

The Contractor must at no additional cost perform its Work as to operation or location out-of-sequence as and when directed by the Engineer.

d) Execution of Other Works or Contracts

The Contractor must afford all facilities for the execution of any other works which may be undertaken by the City or by such parties as may be employed by the City, so that such works may be properly and conveniently completed, and the Engineer will have full authority to make and enforce such regulations as the Engineer may deem necessary for the conduct of such other works; and the Contractor must proceed in such manner and with and complete in such order such portions of the Work as the Engineer may require, and the Engineer will be the sole judge as to what facilities are due and proper, and can be afforded without any undue interference with performance of the Contractor's obligations under the Contract.

The Contractor must at all times give free access and every reasonable facility to the employees of the City and to Other Contractors, to such portion of the Works and adjoining land as may be necessary to enable them to execute and maintain works of any description; such accommodation and access being regulated and directed by the Engineer and no inconvenience or alleged inconvenience arising therefrom will form any ground for claims, losses or damages, compensation or otherwise, by the Contractor against the City.

GC.24. EMERGENCIES

The Engineer has the authority in an emergency to stop the progress of the Work whenever in his/her opinion such stoppage may be necessary to ensure the safety of life, or the Work or neighbouring property. This includes authority to make changes in the Work, and to order, assess and award the cost of work extra to the Agreement or otherwise, as may in his/her opinion be necessary. The Engineer will within two (2) Working Days confirm in writing any such instructions.

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GC.25. SUBCONTRACTORS AND SUPPLIERS

The Contractor must supply complete information to Subcontractors and equipment and material suppliers. The Contractor agrees to bind every Subcontractor by the terms of the General Conditions, Drawings, Specifications, and other Contract Documents as far as applicable to their component of the Work. Where both Specifications and Drawings are required to provide complete information on any aspect of the Work, the Contractor must supply both to the Subcontractor or supplier concerned.

In every subcontract the Contractor must specify that the Contractor or agent of the Contractor will be the person responsible for payment certification under that subcontract for the purposes of the *Builders Lien Act* (and not the City or Engineer).

GC.26. CONTRACTOR'S PLANT AND UTILITIES

The Contractor must at its own expense supply, maintain and remove its field office and whatever electric or telephone facilities the Contractor requires for its Plant for either domestic or construction purposes.

The Contractor must provide and properly maintain, in clean and sanitary condition, suitable and convenient privy or toilet accommodation for the Contractor's employees so that they will not be a source of inconvenience, complaint or nuisance to the public or to others in the vicinity of the Site.

Contractors must make all necessary arrangements with the Engineering Department of the City for obtaining water from the City.

GC.27. PLANT, LABOUR AND MATERIALS

The Contractor at its own expense must provide all necessary temporary buildings and storage grounds and must furnish all necessary labour, materials and Plant together with all proper and required facilities for moving and transporting the same, so that the Contract and all Work required to be done under it can and will be carried on in a workmanlike manner, properly, satisfactorily, continuously and expeditiously, to completion, to the Engineer's satisfaction in all respects. Unless otherwise specified, all materials must be new and both workmanship and materials must be of good quality.

Should any Plant, equipment, appliance, materials or workmanship which the Engineer may deem to be inferior or unfit for use in the Works or on the Site be brought on the ground or used, the same must be wholly removed there from within twenty-four (24) hours after notification to that effect from the Engineer, and in the case of failure or neglect on the part of the Contractor to remove the same the Engineer may cause the same to be taken away at the Contractor's

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expense, and deposited, wasted or otherwise disposed of in any locality, place or way the Engineer considers convenient or proper, and the Contractor must forthwith pay to the City on demand, all expenses incurred including storage, if any, or the same may be deducted or collected by the City as provided in GC.58.

GC.28. MATERIAL AND EQUIPMENT SUPPLIED BY THE CONTRACTOR

Material and equipment supplied by the Contractor must be as specified. If the Contractor wishes to supply and install items other than specified, the Contractor must apply for and must receive written permission from the Engineer before incorporating such items into the Work. Descriptive literature and price schedules covering such alternative items must be supplied to the Engineer if requested.

The Contractor must furnish for the approval of the Engineer as the Engineer may reasonably require samples of any material of any kind to be used in the Work and no material may be used which is in any way inferior to the approved samples; but it is understood that the approval of any material will not subject the City or the Engineer to pay for the same nor prevent the rejection afterwards of any portion thereof which is found in the Engineer's judgement to be unsound or unfit to be used, nor will such approval be considered as any waiver of objection to the Work at any subsequent period on account of the unsoundness or imperfection of the materials used.

GC.29. MATERIAL IN IMPERIAL UNITS

Where manufactured materials that are specified in metric units are not available, materials manufactured to Imperial units may be substituted, provided the Contractor can satisfy the Engineer that the substitute materials are at least equivalent to those specified.

GC.30. SUPPLY OF MATERIALS BY THE CITY

The Contractor's responsibility for materials supplied by the City will begin upon the Contractor's acceptance at the points of supply to the Site. All such materials must be examined by the Contractor and the Contractor must advise the Engineer in writing of any defective or damaged material. Any material supplied by the City which is damaged after acceptance by the Contractor must be replaced by the Contractor at its own expense.

Any material supplied by the City that is not required for the Work will remain the property of the City. Such material must be neatly stored by the Contractor at the point of original supply.

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GC.31. TEMPORARY STRUCTURES

Temporary structures erected by the Contractor will remain the Contractor's property and be removed from the site on completion of the Work.

The Contractor will be responsible for the design, adequacy, safety and efficiency of all falsework, temporary structures and construction processes required in connection with the completion of the Work and performance of the Contractor's obligations contained within the Contract. All such designs and plans must be prepared and sealed by a professional engineer licensed to practice in British Columbia and submitted to the Engineer for review and comment, but such review will not relieve the Contractor of any responsibility.

The Contractor must make good at the Contractor's expense immediately all defects arising from the Contractor's faulty design, equipment or application thereof.

GC.32. WORK AREAS AND CONTRACT LIMITS

The Contractor must lay out the Work and will be responsible for establishing and maintaining all stakes, lines, levels and elevations as may be required to carry out the Work, and to the satisfaction of the Engineer. The Contractor may have to modify the alignment and elevation of the Work to suit the as-built location of existing City watermains to which it will be connecting. Test holes shown on drawings should be dug prior to laying of pipes. The Contractor assumes full responsibility for the alignment, dimensions and elevations of each and every part of the Work and their mutual compatibility.

The Contractor must, as far as is practicable, confine its operations to the Site. Any land or property outside Site boundaries which the Contractor requires during performance of the Work must be acquired by the Contractor at its own expense, and the Contractor must make its own arrangements for the use of such land or property and for the compensation of its owners. Work Site boundaries will be determined by the Engineer.

The City will have attempted to obtain all the permits and easements required for the Work to take place by the time at which the Contractor is scheduled to perform the Work but due to extenuating circumstances may not have actually finalized all the easements and permits. It may be necessary, therefore, for the Contractor to reschedule the Work to refrain, temporarily, from working on certain of the easements or permit areas. Extra compensation will not be allowed for costs incurred by the Contractor as a result of the failure of the City to secure permits or easements on properties such that the Contractor can proceed on its predetermined schedule of installation.

Work to be performed by the Contractor outside the Contract Work limits includes:

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- a) installation of barricades and barriers and other safety and traffic control measures; and
- b) repairing and making good property and improvements which are damaged or destroyed by the Contractor's operations.

GC.33. OFFICE FACILITIES FOR THE ENGINEER (Intentionally Omitted)

GC.34. STORAGE AREAS

Working and storage areas will be allocated by the Engineer for use by the Contractor. The Contractor will be responsible for the maintenance and clean-up of the allotted areas.

GC.35. HOURS OF WORK

The Contractor must comply at all times with all applicable requirements of the City's Noise By-law, which allows construction between the hours of 7:00 a.m. to 8:00 p.m., Monday to Saturday, and 10:00 a.m. to 8:00 p.m. on Sundays and holidays. No work may be done outside these hours except as approved by the Engineer. A request for a Noise By-Law exemption to work outside the specified hours must be made in writing to the Mayor's Office a minimum of two (2) weeks prior to the work being done.

The Contractor must keep the Engineer advised on the proposed hours of work so that inspection can be co-ordinated. Work without inspection is not permitted.

The City's forces work between the hours of 7:30 a.m. and 3:30 p.m. on all Working Days, except those where City Hall is closed. The Contractor must not expect any work to be performed by the City's crews outside these hours except by special arrangement agreed to by the Engineer or in case of emergency. Work performed in the absence of a required inspection is not permitted.

GC.36. TRAFFIC CONTROL

For all works on City streets, lanes or sidewalks, all traffic control must be provided by the Contractor, at the Contractor's expense, except where otherwise specifically provided for in the Contract Documents. The Contractor must adhere to the standard procedures and practices prescribed in the Ministry of Transportation and Highways "Traffic Control Manual for Work on Roadways" (Second Field Edition).

The Contractor must, at the Contractor's expense, also provide, erect and maintain all requisite barriers, fences or other proper protection and must provide and

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maintain such flagpersons, watchpersons and lights as may be necessary or as may be ordered by the Engineer, in order to ensure safety to the public as well as to those engaged about the premises or Works, and must (where it is practicable in the Engineer's opinion) keep any roadway open for the use of the public, or for some restricted use specified by the Engineer, for such width as the Engineer may direct.

At the request of the Engineer, the Contractor must submit a traffic management plan for the Engineer's approval prior to commencing work or at any other time within two (2) Working Days of such request.

The Contractor must, from the date of commencement to the date of completion of the Work, assume responsibility for the barricading and signing of hazards resulting from such works as utility trenches, out-of-grade utility-access covers, or any other obstruction or impediment to pedestrian or vehicular traffic, be these works in progress prior to or subsequent to the above mentioned date of commencement.

Unless ordered otherwise by the Engineer, the Contractor must inspect the barricades and warning signs of unattended construction sites at least once per day.

When any work is carried out at night, the Contractor must supply, at the Contractor's expense, a sufficient number of electric or other approved lights to enable the work to be done in an efficient and satisfactory manner, and the Engineer will have the right to order additional lights at the Contractor's expense if, in the Engineer's opinion, they are or may be required.

Licence numbers of vehicles legally parked at the time of placement of signs must be recorded by the Contractor and made available for the Engineer. If these vehicles are still parked when work commences, the Engineer must be contacted by the Contractor for further instructions.

For the information of the Contractor, the Parking Enforcement Branch or the Vancouver City Police are the only designated authorities approved to call tow trucks. Providing the signing is adequate and the Contractor has contacted the Engineer, the City of Vancouver will pay the costs of towing. Owners of vehicles unlawfully parked will be charged with costs of towing and other costs.

The Contractor must provide forty-eight (48) hours notice to the Engineer for erection or relocation of temporary no parking or no stopping signs. Parking regulation signage placed by the Contractor is unenforceable.

Truck Safety

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All truck operators must operate the vehicle in a safe and courteous manner and in full compliance with the *Motor Vehicle Act* [RSBC 1996] Chapter 318 and its associated regulations.

All truck operators must comply with the City of Vancouver By-laws including: Motor Vehicle Noise and Emission Abatement By-law (9344) and the Street and

Traffic By-law (2849) regulating truck use, including truck routes, engine brake noise, and weight and load securement provisions.

GC.37. PUBLIC CONVENIENCE

In carrying out the Work, or any portion thereof, the convenience of the public must always be specially considered and provided for by the Contractor, who must not obstruct any street, thoroughfare or sidewalk longer or to any greater extent than is absolutely necessary in the Engineer's opinion. The Contractor must not deposit any material upon any street, sidewalk, boulevard, grass plot or other City or public property, without the Engineer's permission nor may the Contractor allow the same to remain thereon longer than necessary, but must remove all rubbish and other material, clean and thoroughly restore all such places to as good and as tidy a condition as the Contractor found them, as speedily as possible, from time to time as the Work progresses, or as directed. Unless material and rubbish are removed within four (4) days after the completion of the Work and without previous notice to the Contractor the Engineer will proceed to do whatever is necessary to restore such places to as good and as tidy a condition as before the commencement of the Work and charge the cost thereof against the Contractor. Where the Contractor obstructs more of the street, roadway or place than is ordered or sanctioned by the Engineer in writing, then the Engineer may cause such obstructions to be removed at the expense of the Contractor.

GC.38. ACCESS TO EXISTING STRUCTURES

The Contractor must at all times maintain satisfactory pedestrian access to buildings and private property.

The Contractor must provide suitable notice to affected property owners prior to changes in access. Interruption of access to any entrance must be kept to a minimum.

The Contractor must maintain fire exits from existing buildings as required by the Fire Department.

GC.39. PROTECTION OF WORK AND PROPERTY

The Contractor must maintain continuously adequate protection of all the Contractor's Work from damage and must protect the City's property from all

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injury arising in connection with the Contract. The Contractor must make good any such damage or injury. The Contractor must protect adequately adjacent property as required by law and the Contract.

GC.40. FIRE, SECURITY AND SAFETY REGULATIONS

a) Fire and Security

The Contractor must comply and the Contractor must enforce compliance by all its agents, employees, Subcontractors and suppliers with any and all fire regulations which have been or may be established from time to time by the Engineer and anybody having jurisdiction over such matters.

All security regulations which have or may be promulgated by the Engineer or other authorized representatives of the City must be complied with. Watchmen for the buildings and grounds may be provided by the City at the City's discretion. However, neither the City nor the Engineer will be responsible for any loss or damage to the property of the Contractor whether or not watchmen are provided by the Engineer. The Contractor will furnish such security as the Contractor feels necessary for the protection of the Contractor's equipment and Products stored or used on Site.

b) Loss Control

The Contractor will provide a Loss Control Program, satisfactory to the City to meet WorkSafeBC and other requirements.

c) Safety

When required by WorkSafeBC Regulations, first aid facilities, including an attendant, must be provided on the Site at all times during working hours by the Contractor. Such facilities will be completely equipped in accordance with the requirements of the Workers' Compensation Board.

The Contractor will be fully responsible for taking all necessary precautions for the safety of the Contractor's workers on the Site or for complying with all applicable safety laws and regulations, particularly those regulations pursuant to the Workers' Compensation Act to prevent accidents or injury to persons on, about or adjacent to the Site.

The Contractor must provide all safeguards required directly for or as a result of the Work as referred to in GC.39 - *Protection of Work and Property* and in the scope of work described in the Contract Documents.

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GC.41. OVERLOADING

No part of the Site may be loaded with a load greater than it is calculated to bear safely. Should any damage or accident occur through the violation of this requirement, the City will hold the Contractor solely answerable and liable.

GC.42. DRAINAGE

The Contractor must keep all portions of the Work well, properly and efficiently drained until completion, and the Contractor will be held responsible for all damage which may be caused or result from water backing up or flowing over, through, from or along any part of the Work, or which any of the Contractor's operations may cause to flow elsewhere.

GC.43. CLEANING UP

The Contractor must at all times keep the Site free from accumulations of waste material or rubbish caused by its employees or work, and at the completion of the Work, it must remove all its rubbish from and about the Site and all its tools, scaffolding and surplus materials, and must leave the Site "broom clean" or the equivalent, unless more exactly specified. In case of dispute, the Engineer may remove the rubbish and charge the cost to the Contractor as the Engineer determines to be just.

GC.44. SAFEGUARDING EXISTING PROPERTY

Existing property, buildings, fences or other improvements of any kind must be protected by the Contractor during the life of the Contract. The Contractor must make good to the satisfaction of the Engineer any damage done to the existing property, buildings, fences or other improvements. This applies to areas of private property incorporated in the Work area.

Where removal of existing improvements such as pavement, fences, structures, sewers and ducts is necessary during the course of the Work, the same must be re-established by the Contractor to the satisfaction of the Engineer. The cost of protection and rehabilitation will be borne by the Contractor.

GC.45. EXISTING UTILITIES

The Contractor will be responsible for the care of all public utilities and in the event of any of these requiring to be removed, raised or lowered permanently, this will be done either by the City or by the utility company interested and at the expense of the City. If temporary alteration of location is required for purposes of the construction, such work will be done by the City or by the utility company

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interested at the expense of the Contractor. The Contractor, however, will be held responsible for, and will have to bear the cost due to any damage done to utility services through its operations.

Reasonable notice must be given to the Engineer of any change required in utility services.

Existing utilities are shown on the Drawings. These, however, are shown for convenience only and the City assumes no responsibility for improper locations, or failure to show utility locations on the construction plans. The Contractor must establish their locations by obtaining relevant City of Vancouver, BC Hydro, Terasen Gas and other plans and uncovering the utilities on site at no extra cost to the City.

The Contractor must provide adequate barricades and lighting around and adjacent to any open excavation or potentially dangerous location or other locations designated by the Engineer.

The Contractor must at all times ensure that the fire hydrants are not obstructed.

GC.46. DUST CONTROL

The Contractor must at all times control the generation of dust by its operations by water sprinkling or by other methods approved by the Engineer.

GC.47. ALTERATIONS, EXTRAS, DEDUCTIONS & CLAIMS

The City without invalidating the Contract will have the right to make or order any alterations and changes, such as it may deem advisable, at any time before or during the prosecution of the Work, in any line, grade, Drawings, Specifications or detail thereof, or to increase or decrease the dimensions, quantity of material or work, or to alter the situation or level, or to vary the form or dimensions of any part of the Work, or to vary in any other way the Work; or to order any additional or extra work to be done or additional or extra materials to be furnished; and the Contractor must, in pursuance of the Engineer's written orders to that effect, proceed with, carry out and execute the Work as directed, and must supply such additional materials and do such additional or extra work in pursuance of such orders without being entitled to any extension of time for completion, or any additional payment on account thereof, except only as herein provided.

In each and every case where additional or extra work or material of any kind is ordered to be done or supplied, or where the Contractor does or supplies, or contemplates doing or supplying, any work or material, the Contractor must notify the Engineer in writing and must state in its notification clearly and fully what the circumstances are, and the additional sum or compensation it intends to demand therefor, otherwise it will have no claim in respect thereof. All such demands for

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additional payment will be subject to review and approval by the Engineer. If any work, labour or material is not required to be performed or supplied, then the City may deduct from the Contract Amount the value of such work, labour or material not required to be performed or supplied which will be determined by using the unit or lump sum prices contained in the Schedule of Quantities and Prices applicable to such work, labour or material, or if, in the opinion of the Engineer none of the unit or lump sum prices aforesaid apply, then using the hourly rates for work and labour or cost of material set out herein, or such fixed sum as agreed upon between the Contractor and the City.

All claims of every nature which the Contractor may have in respect of the Contract or Work done thereunder, are to be summarized and submitted by it (in duplicate) to the Engineer within one (1) month of the completion of same, and the Contractor may make no claim of any nature afterwards; and no claim not then made or not then allowed by the City will be sustainable, and the City will be in no way disentitled to determine any and all questions concerning said claims, and no action or suit may be commenced by either party to the Contract until after the final Certificate of Total Performance has been signed by the Engineer and then only for the amount appearing thereby to be due to the Contractor.

GC.48. ERRORS BY CONTRACTOR

Changes, errors or mistakes made by the Contractor or the Contractor's Subcontractors, workmen or employees, and all settlements, washouts and defects, must be rectified by the Contractor at its expense.

GC.49. TESTING OF MATERIALS

Except where otherwise specified, testing of materials will be carried out by the Contractor and paid for by the Contractor.

GC.50. DEFECTIVE WORK

All defective work must be forthwith made good by the Contractor at its own expense to the Engineer's or City's satisfaction, as the case may be.

GC.51. WARRANTY

The Contractor must perform the Work in a proper and workmanlike manner and in accordance with the requirements of the Contract Documents and maintain the Work against any defects arising from faulty installation, material or workmanship during the period of twelve (12) months from the date of issuance of the Certificate of Substantial Performance (the "Warranty Period") and make good in a permanent manner satisfactory to the City any defects arising from any of such causes (the "Warranty").

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Whether the Contractor should replace defective Products or Work, or repair the same, will be determined by the Engineer. Should the Contractor fail to make good defects within (3) working days after being notified by the City to do so, the City at its option may do so and all costs, charges and expenses so incurred may be deducted or collected by the City as provided in GC.58 - *Money Due to City*. If the City considers the defects to be dangerous and that an emergency situation exists, the City, at the City's discretion may effect repairs immediately and all costs, charges and expenses incurred as a result may be deducted or collected by the City as provided in GC.58 - *Money Due to City*. The decision of the City will be final as to the necessity of repairs or of any work done or required to be done under the provisions of the Contract and for the amounts expended thereunder. If in the opinion of the Engineer, it is in the City's best interests (taking into account effects on the City's overall schedule, the difference in value between the Work as performed and that called for by the Contract Documents, and other relevant factors) not to correct defective Work or Work not provided in the Contract Documents, the Engineer will assess the amount which should be deducted from the amount otherwise due to the Contractor and will assess the length of time by which the obligations should be extended in order to put the City in as close a position financially and in terms of the useful life of the Work as would have been the case had the Contractor performed the Work as called for by the Contract Documents. For further certainty, the Engineer may extend the Warranty Period in appropriate circumstances to a minimum of twice the Warranty Period originally provided for under the Contract Documents, subject always to the above parameters.

GC.52. CONTRACTOR'S LIABILITY

The Contractor will be liable for any and all damages, losses, costs, actions, causes of action, suits, claims, demands, orders, judgements, builders' liens, liabilities, obligations, expenses (including legal expenses), indirect or consequential damages (including loss of profits and loss of use and damages arising out of delays) (collectively, "Losses"), as applicable, for injuries or accident to person or property done or caused by the Contractor, the Contractor's Subcontractors or employees, or resulting from the prosecution of the Work or any of its operations,

or caused by reason of the existence or location or condition of the Work, or of any materials, Products or Plant used therein or thereon, or which may happen by reason thereof, or arising from any failure, neglect or omission on the Contractor's part, or on the part of the Contractor's Subcontractors or employees, to do or perform any or all of the several acts or things required to be done by the Contractor or them under and by the Contract, and the Contractor hereby releases and agrees to hold harmless the City from, and covenants and agrees to indemnify and save harmless at all times the City against, all such Losses whatsoever arising out of or in connection therewith, and in the event of any action being brought by any person against the City, either directly or indirectly, or by reason of the execution of the Contract, the City may enforce payment by the Contractor of all

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such loss, costs, damages and expenses as a debt due to the City. The release and indemnity of the City set forth above will survive the expiry or sooner termination of the Contract, and expressly includes and extends to the Engineer, and to all elected officials, officers and other employees and agents of the City. This indemnity will not affect or prejudice the City from exercising any other rights that may be available to it at law or in equity.

In the case of the Contractor's failure, neglect or omission to observe and perform faithfully and strictly all the provisions of the Contract, the City may either with or without notice (except where in the Contract notice is specially provided for, and then upon giving the notice therein provided for), take such steps, procure such material, equipment, trucks and men, and do such work or things as it may deem advisable towards carrying out and enforcing the same, and any and all expenses so incurred may be deducted or collected by the City under the provisions of GC.58.

Any such action taken by the City under this General Condition as it is herein empowered to take will not in any way relieve the Contractor or its sureties from any liability under the Contract.

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GC.53. CONTRACTOR/SUBCONTRACTOR INSURANCE REQUIREMENTS

53.1 GENERAL INSURANCE REQUIREMENTS

- 53.1.1** The Contractor and Subcontractors shall deliver to with the City within five (5) Working Days of issuance of the Notice of Award, a certificate of insurance in the form of Appendix B to Part D of the Invitation to Tender (the "Certificate of Insurance"), and where required by the City, certified copies of all insurance policies and endorsements evidencing the placement and endorsement of insurance in accordance with this GC.53.
- 53.1.2** The Contractor and Subcontractor shall file with the City evidence of renewal of the insurance policies required under this GC.53 at least fifteen (15) calendar days prior to their respective expiry.
- 53.1.3** In addition to the specific requirements below, all policies of insurance shall:
- a) be endorsed so as to provide for thirty (30) calendar days' prior notice to the City of cancellation, lapse or material change;
 - b) if property insurance (as opposed to liability) insurance, contain a waiver of subrogation in favour of the City and its mayor and council members, officers, directors, employees, volunteers and agents (collectively, "City Personnel");
 - c) specifically name (i) the City and (ii) all City Personnel as additional insureds;
 - d) be issued by a company or companies authorized to issue insurance policies in British Columbia and acceptable to the City;
 - e) be endorsed to provide the following Notice for Policy Changes and Cancellations to the City: "It is understood and agreed that this policy will not be cancelled nor will coverage be reduced either in whole or in part, without the insurer giving at least thirty (30) days prior written notice by registered mail to the City of Vancouver (except for cancellation for non-payment of premiums, in which case applicable statutory provisions apply"); and
 - f) be issued on a policy form acceptable to the City.
- 53.1.4** Unless otherwise specified, insurance shall be continuously maintained from no later than the five (5) Working Days after issuance of the Notice of Award through to the date of Total Performance of the Work.
- 53.1.5** The Contractor and each of its Subcontractors, as applicable, shall be responsible for payment of all deductible amounts.

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53.1.6 The Contractor and each of its Subcontractors, as applicable, must provide at its own cost any additional insurance which it is required by law to provide or which it considers necessary to appropriate.

53.1.7 The City will have the right to deduct amounts for which the Contractor is responsible under this General Condition from any monies which are due or may become due to the Contractor.

53.2 **SPECIFIC INSURANCE COVERAGE**

53.2.1 Without restricting the generality of the Contractor's release and indemnification obligations set forth elsewhere in the Contract Documents, the Contractor shall provide at the Contractor's expense the following types of insurance:

- a) **Wrap Up Liability Insurance** protecting the City, City Personnel, the Contractor, its Subcontractors and their respective agents and employees against damage arising from personal injury (including death) and claims for property damage which may arise out of the operations of the Contractor, its Subcontractors, or their respective agents or employees in connection with the Work.

The policy shall be placed prior to commencement of the Work and shall specifically cover liability arising out of the performance of the Contract and shall cover all liability assumed by the Contractor under any contract or agreement, including the indemnity provisions of the Contract. The policy shall be maintained continuously throughout the entire term of the Contract until Total Performance of the Work, and thereafter, in the case of completed operations coverage for a further period of twenty-four (24) months and shall contain the following extensions of coverage:

- i) Broadform Property Damage and Completed Operations;
- ii) Personal Injury;
- iii) Blanket Contractual Liability;
- iv) Cross Liability and Severability of Interests Clause;
- v) Contingent Employer's Liability; and
- vi) Non-owned Automobile Liability.

And where such further risk exists, following extensions of coverage shall be included:

- i) Shoring, blasting, excavating, underpinning, demolition, removal, pile-

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driving and grading, as applicable;

- ii) Hoist liability;
- iii) Operation of attached machinery;
- iv) Unlicensed and specifically licensed vehicles;
- v) Loading and unloading of vehicles; and
- vi) Contractor's pollution liability including coverage for liability arising out of hostile fire and sudden and accidental release of contaminants.

This insurance shall be for an amount of not less than five million dollars (\$5,000,000) inclusive per occurrence, and shall include a standard form of severability of interests and cross-liability clause. The deductible per occurrence shall not exceed ten thousand dollars (\$10,000) and the Contractor shall be liable for all deductible amounts.

- b) **Automobile Liability Insurance**, to be carried at all times during performance of the Work, on all licensed vehicles owned by or leased to the Contractor, protecting against damages arising from bodily injury (including death), and from claims for property damage arising from the operations of the Contractor, its agents or employees. This insurance shall be for a minimum amount of five million dollars (\$5,000,000) inclusive per accident.
- c) **All-Risks Course of Construction Property Insurance** in the joint names of the Contractor, the City and all City Personnel, covering the Work and all property of every description to be used in the performance of the Work. This insurance shall be primary, and be of an amount of not less than the sum of the Total Contract Amount. The deductible per occurrence shall not exceed ten thousand dollars (\$10,000). This insurance shall remain in full force and effect throughout the period of construction or until Total Performance of the Work, and also during any period in which the property insured is being prepared for use or occupancy and while partially used or occupied; provided all coverage may cease when the Work has been formally accepted as fully and finally complete by the City, whichever occurs first. This property insured shall include the following:
 - i) **At Site:** all materials, equipment and machinery, labour and supplies of any nature whatsoever, work in progress, including property of the insured or of others for which the insured may have assumed responsibility to be used in or incidental to the Site preparations, excavation, demolition or existing structures, erection and/or fabrication and/or reconstruction and/or repair of the project insured (collectively, "Property"), commencing when the Property becomes at

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the insured's risk, at the Site, and while there awaiting, during and subsequent to erection, installation, fabrication, repair and/or testing.

- ii) **In Transit:** Transit coverage for Property that will form a part of the project insured, from the commencement of loading at the original point of shipment anywhere in Canada or the Continental United States of America, but excluding such Property in the course of manufacturing or processing within buildings at the manufacturer's or supplier's site.
- iii) **Off Site:** Off Site coverage for Property that will form a part of the project insured, anywhere in Canada or the Continental United States of America, but excluding such property while in transit or in the course of manufacturing or processing within buildings at the manufacturer's or supplier's site.
- d) **All Risk Contractor's Equipment Insurance:** covering all equipment owned or rented by the Contractor, its Subcontractors and their respective agents or employees against all risks of loss or damage, with coverage sufficient to allow immediate replacement. In the event of loss or damage to the said construction equipment, or any part thereof, the Contractor or the Subcontractor, as the case may be, will, if so requested by the City in writing, forthwith replace such damaged or destroyed construction equipment. In the event of a loss and upon payment of claim under this policy of insurance, the insurer will waive its right of subrogation against the City, the Engineer and all architects, engineers or consultants engaged in or connected with the construction and Site preparation and related operations of the Work and any of their servants, agents, employees, and parent, subsidiary, affiliated or associated firms.

53.3 FAILURE TO INSURE

- 53.3.1** If the Contractor or any Subcontractor fails to obtain and maintain insurance as required hereunder, or if the City does not approve any insurance policy or policies submitted to the City, and the Contractor or Subcontractor, as the case may be, thereafter does not meet the requirements of the City as to terms and conditions of the insurance policy, the City will have the right to place and maintain such insurance in the name of the Contractor or Subcontractor. The cost thereof will be payable by the Contractor to the City on demand, and the City may deduct the cost thereof from any monies which are due or may become due to the Contractor. If coverage should lapse, all work by the Contractor must be stopped until satisfactory evidence of renewal is produced.

GC.54. WorkSafeBC ASSESSMENTS [intentionally omitted - see GC.7]

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GC.55. CLAIMS FOR WAGES

The City may settle any claim for damages, and pay all wages overdue or the price of any materials or the amount due and payable by the Contractor to any Subcontractor, for which payment is in arrears, and the amount thereof will be debt due by the Contractor to the City, as and for money paid by the City for the Contractor and may be deducted or collected by the City as provided in GC.58 - *Money Due to City*, but the City does not assume any liability in this respect; nor will the persons to whom such wages or payments are paid become, by such payments, the employees or servants of the City.

GC.56. LIENS

The Contractor hereby agrees to make payment and take all other steps which may be necessary to insure that all monies payable pursuant to the Contract, and the Work, and every part thereof, will be and remain at all times free from and not liable to any lien or charge at law or in equity, or to any claim of liability under the *Builders Lien Act*, or to any attachment for debt, garnishee process or otherwise, and the Contractor and its sureties, as well as its respective executors, administrators, successors and assigns, will fully indemnify and save harmless the City and all its officers, servants and employees from any and all such liability, and will, on demand, immediately cause any such lien, charge, claim or attachment to be removed or released from the records of any Land Title Office or Court in which the same may appear.

Notwithstanding anything to the contrary contained in the Contract Documents, the City will not be obliged to pay any monies to the Contractor if and for so long as any liens exist against the Works or the Work Site.

GC.57. PATENT INFRINGEMENT

The Contractor will fully indemnify the City against and from all suits or actions arising from the claim of any person or persons who are or claim to be patentees of any process used in connection with the Work or of any material, Products, Plant, machinery, tool or appliance used therein or thereon, or in any way therewith.

GC.58. MONEY DUE TO CITY

All money payable to the City by the Contractor may be retained out of any money then due, or which may become due, from the City to the Contractor under this or any other contract with the City, (including, without limitation, out of any Maintenance Security held pursuant to Article VI(f) of the Agreement, in the case of amounts payable in respect of the Contractor's Warranty), or otherwise howsoever, or may be recovered from the Contractor and its sureties, or any of either of them, in any Court of competent jurisdiction as a debt due the City; and the Engineer will have full power to withhold any estimate or certificate, if

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circumstances arise which may indicate to him the advisability of so doing, until the Engineer is satisfied that the Work and material so far done or furnished are in accordance with the Contract and that the Contractor is otherwise entitled thereto, though the sum to be retained may be unascertained.

GC.59. ASSIGNMENT

The Contractor must not, without the consent in writing of the City first had and obtained, assign or transfer any sum or sums, or any part thereof, due or to become due to the Contractor under the Contract, or assign, transfer or sublet any portion of the Contract or of the Work, but must carry out the Work with its own men or those of a Subcontractor under the Contractor's supervision. This General Condition, however, does not apply to the furnishing of material for the different parts of the Work, for which material, however, the Contractor will be held strictly responsible, and no excuse for the quality of the material or for the non-delivery in good time by any Subcontractor, as affecting the progress of the Work, will be entertained, not will the City's consent to the assigning, transferring or subletting of any portion of the Work relieve the Contractor from any of its obligations or liabilities under the Contract. No assignment, transfer or subletting hereinbefore mentioned, except if the same is made in accordance herewith, will be in any manner valid or binding on the City.

GC.60. CERTIFICATES AND PAYMENTS

Payment Certifier:

The Engineer will be the "payment certifier" and the person responsible for payment certification under the Contract for the purposes of the *Builders Lien Act*. The Engineer will not be the "payment certifier" under any subcontract.

Certificate for Substantial Performance:

- a) The Contractor must give written notice to the Engineer that the Work is substantially performed when applicable, and, upon subsequent inspection by the Engineer, a list of deficient work will be issued to the Contractor by the Engineer. When these deficiencies have been rectified to the satisfaction of the Engineer, the Engineer will recommend that the Work is substantially performed and ready for official inspection.

At the time of the application for a Certificate of Substantial Performance, the Contractor must deliver up to, and to the complete satisfaction of the Engineer:

the "as constructed record plans" of the Work required by GC.13 - *Record Plans*; documentation showing compliance with WCB requirements; and a sworn declaration in a form acceptable to the Engineer that all amounts

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relating to the Work, due and owing to third parties including all Subcontractors and suppliers, have been paid.

- b) The City, the Engineer and the Contractor will inspect the Work and any remaining deficiencies will be detailed and included on the Certificate of Substantial Performance. The date of Substantial Performance will be as stated in this Certificate. Upon issuance of the Certificate of Substantial Performance to the Contractor, the Engineer will set a reasonable date for the Total Performance of the Work.
- c) For the purposes of the *Builders Lien Act*, the Certificate of Substantial Performance as described herein will serve as the Contract's certificate for completion, and the date of Substantial Performance stated in the Certificate will be deemed to be the date of the Certificate's issuance.
- d) Notwithstanding the foregoing, under no circumstances will issuance of the Certificate of Substantial Performance be deemed to mean that the Engineer or the City has accepted the Work as being in compliance with the Contract Documents.

Certificate of Total Performance:

- a) Upon the provision of satisfactory evidence that the deficiencies have been rectified, the City and the Engineer will then be permitted to verify such rectification. Upon rectification of all claims and statutory declarations as specified in GC 60(b) ii and to the reasonable satisfaction of the Engineer, the Engineer will issue the Certificate of Total Performance.

Statutory Declarations:

- a) The Contractor must submit with the Contractor's application for payment such statutory declarations as may be required herein, which must be sworn in duplicate by the Contractor, or by such person on behalf of the Contractor as the Engineer may approve.
 - i. Prior to payment and as condition to any payment, the Engineer may at any time require the Contractor to file with him a statutory declaration showing that all wages for the various classes of labour, the hire of trucks, equipment, etc., employed in or about the Site, all Products or other things supplied for use in or upon the Work and amounts due to Subcontractors and suppliers have been paid and satisfied and that there is no encumbrance, lawful claim or lien accruing for labour or services in connection with the Work.

Should any amounts be due and unpaid for wages, equipment, hire, Products and Subcontractors or suppliers as above listed or any

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encumbrance, lawful claim or lien accrue, the amounts must be listed on a duly attested statement, in duplicate, and attached to the Statutory Declaration referred to above.

The Engineer may at any time, if the Engineer deems it advisable, require from the Contractor a statement showing the rates of wages paid by him for the various classes of labour, the rates of hire of trucks and equipment employed and the prices and quantities of any Products

supplied for use in or upon the Work and may also require the statement to show in detail the names of unpaid employees, the rates of wages and amounts due to each, and the names of creditors, quantities, prices and amounts due to each. Such statement must be duly attested in duplicate as above and be a condition precedent to the right of the Contractor to receive payment.

- ii. Prior to final payment and as a condition to issuance by the Engineer of a Certificate of Total Performance, the Contractor must file with the Engineer a statutory declaration showing that all Work in respect of the Contract has been completed; all accounts, detailed in the first sentence of paragraph (d)(i) of this General Condition have been paid and satisfied and there is no encumbrance, lawful claim or lien accruing for labour, products or services in connection with the Work; and payments already received and now due under the final payment application are accepted by the Contractor as full compensation for everything furnished and done by the Contractor under the Contract.

Other Documentation

- a) The Engineer may as a further condition to any payment, at any time, require the Contractor to furnish such or other detailed information as may be necessary to establish to their satisfaction the compliance by the Contractor with the conditions of the Contract.

Books Open for Inspection

- a) The Contractor's payrolls, time-books, books of account, invoices, receipts and statements relating to its Work under the Contract must be at all times open for inspection and extract by the Engineer and the City and any authorized representative of them.

GC.61. TERMINATION OF CONTRACT WITHOUT DEFAULT OF CONTRACTOR

The Engineer may, as agent for and on behalf of the City, at the Engineer's discretion terminate the Contract at any time upon written notice to the Contractor notwithstanding the fact that the Contractor may not then be in

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default, in which event the City will be liable to the Contractor only for a reasonable amount for Work done and materials delivered at or to the Site up to the date of the termination.

Upon payment of the aggregate of the aforesaid sums, the City, the Engineer and the Contractor will be released from their liabilities or obligations under the Contract save and except that the liabilities and obligations of the Contractor will

continue with respect to deficiencies and warranties in the portion of the Work completed prior to termination.

GC.62. TERMINATION OF CONTRACT FOR CONTRACTOR'S DEFAULT

- a) The Engineer as agent for and on behalf of the City, without prejudice to any other right, may elect to terminate the Contract forthwith upon notice to the Contractor if:
 - i) the Contractor neglects or refuses to sign the Drawings and execute the Contract within seven (7) days after notification from the Engineer so to do;
 - ii) the Contractor neglects or fails to commence work within seven (7) days after the date of execution of the Contract by the Contractor;
 - iii) the Contractor commits an act of bankruptcy or becomes a bankrupt or makes a general assignment for the benefit of the Contractor's creditors;
 - iv) a receiver is appointed for the Contractor's business;
 - v) the Contractor fails, on reasonable notice from the Engineer, to supply enough proper workmen or Products;
 - vi) the Contractor does not pay promptly the Contractor's employees, Subcontractors or suppliers;
 - vii) the Contractor does not comply with the requirements of the WCA, the OH&S Regulation or WorkSafeBC, or otherwise fails to meet the safety requirements of the Contract; or
 - viii) the Contractor breaches any provision of the Contract.
- b) On such termination the Engineer may arrange for the performance of the Work by whatever method the Engineer deems expedient but without undue delay or expense.

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- c) The Engineer may take possession of all Products, equipment, tools, structures and appliances belonging to or provided by the Contractor located on the Site which the Engineer deems necessary to prosecute the Work, which possession the Contractor hereby pledges to the Engineer as agent for and on behalf of the City, as security for the performance of the Contract and the Work, provided that upon completion of the Work the Engineer will

return to the Contractor or its legal representative any such chattels so taken in possession in their original condition (ordinary wear and tear excepted) if not incorporated in the Work, without any compensation for use thereof.

- d) In case the Work or any part thereof is taken out of the hands of the Contractor, as herein provided, it will in no way affect the relative obligations of the City and the Contractor or its sureties in respect of the Contractor's or their obligation, or in respect of the remainder of the Work (if any), as the Engineer may consider reasonable. The Contractor and its sureties in every case will be liable for such damages, expenditures and extra expenditures, and for all additional cost of the Work which may be incurred by reason of termination of the Contract pursuant to this GC.62, together with the penalties, if any, from the date fixed for the completion of the Work, and the same may be deducted or collected by the City as provided by GC.58.
- e) All the powers of the Engineer with respect to the determination of any doubts, disputes and differences, and the determination of the sum or sums, or balance of money to be paid to or received from the Contractor, and otherwise in respect of the Contract will nevertheless continue in force.
- f) The fulfilment by the Contractor of any stipulation in the Contract may be enforced by legal proceedings and judgement, or order of Court, without prejudice to any other remedy herein contained. Neither the City nor any of its officers or employees will be liable or accountable to the Contractor in any way for the manner in which, or the price at which the Work, or any portion thereof, may have been or may be done or completed by the City.
- g) No proceeding taken pursuant to this GC.62 or pursuant to any other provision of the Contract, will at any time be deemed to be an assignment of the Contract or of any portion thereof, unless otherwise agreed to in writing.

GC.63. SUBMITTALS

The Contractor must submit product data and samples to the Engineer for review on request. The Contractor's responsibility for deviation in submissions is not relieved by the Engineer's review unless the Engineer gives written acceptance of specific deviations from the requirements of the Contract Documents. The Contractor must make any changes in submissions which the Engineer may request

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PART E - GENERAL CONDITIONS

consistent with the Contract Documents and must resubmit as directed by the Engineer. The Contractor must not proceed with work until relevant submittals have been reviewed by the Engineer. The Contractor must co-ordinate submittals with the requirements of the Contract Documents and must allow fourteen (14) days for the Engineer's review.

GC.64. NON-RESIDENT WITHHOLDING TAX

If the Contractor is, at any time, a non-resident of Canada, within the meaning of the *Income Tax Act* (Canada) as amended, then, and the Contractor hereby so agrees, the City may deduct from all money payable under the Contract and remit to the Receiver-General of Canada, the Government of Canada or Canada Revenue Agency sums not greater than the greater of:

- a) twenty-five percent (25%) of all money payable under the Contract; and
- b) sums required to be withheld and remitted by the *Income Tax Act* (Canada) as amended.

The City will receive a further credit under the Contract for money withheld as of and from the date of the withholding (regardless of when or whether remitted) and no interest will be payable by the City on sums withheld, not remitted as aforesaid and later paid directly to the Contractor.

GC.65. NO PROMOTION OF RELATIONSHIP WITH THE CITY OR THE OLYMPICS

The Contractor must not disclose or promote its relationship with the City or any board, branch, department or other part thereof, including by means of any verbal declarations, announcements, sales, marketing or other literature, letters, client lists, press releases, brochures, internet based information or other written materials (the "Communications") without the express prior written consent of the City (except as may be necessary for the Contractor to perform the Contractor's obligations under the terms of the Agreement or as the City may otherwise expressly agree in writing).

Furthermore, the Contractor undertakes not to disclose or promote its relationship with the City in any Communications in a manner which could suggest or create an association, express or implied, between the Contractor and the International Olympic Committee, the 2010 Olympic and/or Paralympic Winter Games, the Olympic Movement or the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (also known as "VANOC"). Without limiting the generality of the foregoing, the Contractor must not refer to "VANOC", "Vancouver 2010", the "2010 Games", the "Games", "Host City", "Olympic Village", "Athletes' Village" or "Olympics", and must not use any official emblem, logo, website, domain name, or mascot of the 2010 Games, in any Communications, without the express prior written consent of the City.

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GC.66 TOXIC AND HAZARDOUS SUBSTANCES AND MATERIALS

The City has made no independent inquiries to ascertain the existence or nature, of any toxic or hazardous material, substance or condition at the Site (which expressly includes the subsurface as well as the surface at the Site), and accordingly makes no representations regarding the same. Prior to the Contractor commencing the Work, and thereafter through the term of performance of the Work, the Contractor must take all reasonable steps to determine whether any toxic or hazardous material, substance or condition is present at the Site.

If the Contractor encounters any toxic or hazardous material, substance or condition at the Site or has reasonable grounds to believe that any of the same are present at the Site, then the Contractor must promptly take all reasonable steps to ensure that no person suffers any injury, sickness or death and that no property is injured or destroyed as a result of exposure to or the presence of such material, substance or condition, and must immediately report the situation and circumstances to the City in writing.

The Contractor must in all instances comply fully with all requirements of applicable environmental legislation, the City, the WCA and WorkSafeBC, whether specifically outlined above in this GC.66 or not, applicable to toxic and hazardous materials, substances and work/work site conditions.

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**SECTION 01310
CONSTRUCTION SCHEDULE**

**PAGE 1
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1.0 GENERAL

- 1.0.1 Section 01310 describes the Contractor's responsibilities in the preparation and submission of construction schedules. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Section Includes

- 1.1.1 Schedule, form, content.
1.1.2 Staged construction.
1.1.3 Scheduled revisions.

1.2 Schedules Required

- 1.2.1 Submit following schedules as required by the Engineer:
1.2.1.1 Construction Progress Schedule
1.2.1.2 Submittal Schedule for Shop Drawings and Product Data
1.2.1.3 Submittal Schedule for Samples
1.2.1.4 Submittal Schedule for Owner supplied Products
1.2.1.5 Product Delivery Schedule

1.3 Format

- 1.3.1 Prepare schedules in form of horizontal bar chart.
1.3.2 Provide separate bar for each activity.
1.3.3 Provide horizontal time scale identifying first work day of each week.
1.3.4 List activities in chronological order based on start of each item of work.

1.4 Submissions With Tender

- 1.4.1 Refer to Tender Documents for details regarding schedules to be submitted with tender.

1.5 Submissions Following Award of Contract

- 1.5.1 Submit required schedules within 15 days after Award of Contract.
1.5.2 Engineer will review schedules and return reviewed copy within 10 days after receipt.
1.5.3 Resubmit finalized schedules within 7 days after return of reviewed copy.
1.5.4 Submit revised progress schedule with each application for payment or as directed otherwise by Engineer.

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CONSTRUCTION SCHEDULE

**SECTION 01310
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- 1.5.5 Distribute copies of revised progress schedule to:
 - 1.5.5.1 Job site office.
 - 1.5.5.2 Subcontractors.
 - 1.5.5.3 Other concerned parties as directed by Engineer.

- 1.5.6 Instruct recipients to report any problems anticipated with the schedule to Contractor within 10 days.

1.6 Construction Progress Schedule

- 1.6.1 Include complete sequence of construction activities.
- 1.6.2 Include dates for commencement and completion of each major element of construction including the following:
 - 1.6.2.1 Clearing.
 - 1.6.2.2 Utilities.
 - 1.6.2.3 Roadworks.
 - 1.6.2.4 Testing.
 - 1.6.2.5 Deficiencies.
 - 1.6.2.6 Completion.
- 1.6.3 Show projected percentage of completion of each item as of first day of month.
- 1.6.4 Indicate progress of each activity to date of submission schedule.
- 1.6.5 Show changes occurring since previous submission of schedule:
 - 1.6.5.1 Major changes in scope.
 - 1.6.5.2 Activities modified since previous submission.
 - 1.6.5.3 Revised projections of progress and completion.
 - 1.6.5.4 Other identifiable changes.
- 1.6.6 Provide a narrative report to define:
 - 1.6.6.1 Problem areas, anticipated delays, and impact on schedule.
 - 1.6.6.2 Corrective action recommended and its effect.

1.7 Submittals Schedule

- 1.7.1 Include schedule for submitting shop drawings, product data and samples if required.
- 1.7.2 Indicate dates for submitting, review time, resubmission time, float time, and last date for meeting fabrication schedule.
- 1.7.3 Include dates when Owner supplied products will be required.
- 1.7.4 Include dates when reviewed submittals will be required from Engineer.

END OF SECTION

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1.0 GENERAL

1.0.1 Submit to Engineer, for review, shop drawings, product data and samples specified.

1.0.2 Until submission is reviewed, work involving relevant product may not proceed.

1.1 Shop Drawings

1.1.1 Drawings to be originals prepared by Contractor, Sub-Contractor, Supplier or Distributor, which illustrate appropriate portion of work. Drawings to show fabrication, layout, setting or erection details, as specified in appropriate Sections.

1.1.2 Identify details by reference to sheet and detail numbers shown on Contract Drawings.

1.1.3 Maximum sheet size 1,000 X 707 mm.

1.2 Product Data

1.2.1 Manufacturer's standard schematic drawings, catalogue sheets, diagrams schedules, performance charts, illustrations and other standard descriptive data may be accepted in lieu of shop drawings, as determined by Engineer.

1.2.2 The above must conform to the following:

1.2.2.1 Delete information which is not applicable to the project.

1.2.2.2 Supplement the standard information to provide additional information applicable to the project.

1.3 Coordination of Submissions

1.3.1 Review shop drawings, product data and samples prior to submission.

1.3.2 Verify:

1.3.2.1 Field measurements;

1.3.2.2 Field construction criteria; and

1.3.2.3 Catalogue numbers and similar data.

1.3.3 Coordinate each submission with requirements of work and Contract documents. Individual shop drawing will not be reviewed until all related drawings are available.

1.3.4 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submittals. Refer to GC.12.

1.3.5 Contractor's responsibility for deviations in submission from requirements of Contract documents is not relieved by Engineer's review of submission, unless Engineer gives written acceptance of specified deviations. Refer to GC.12.

1.3.6 Notify Engineer in writing at time of submission, of deviations from requirements of Contract documents.

1.3.7 After Engineer's review, distribute copies.

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1.4 Submission Requirements

- 1.4.1 Schedule submissions at least 10 days before date that reviewed submission will be needed.
- 1.4.2 Submit number of copies of shop drawings and product data which Contractor requires for distribution plus two (2) copies which will be retained by Engineer.
- 1.4.3 Accompany submissions with transmittal letter, in duplicate, containing:
 - 1.4.3.1 Data;
 - 1.4.3.2 Project title and number;
 - 1.4.3.3 Contractor's name and address;
 - 1.4.3.4 Number of each shop drawing, product data and sample submitted; and
 - 1.4.3.5 Other pertinent data.
- 1.4.4 Submission shall include:
 - 1.4.4.1 Data and revision dates;
 - 1.4.4.2 Project title and number;
 - 1.4.4.3 Name of:
 - 1.4.4.3.1 Contractor;
 - 1.4.4.3.2 Sub-Contractor;
 - 1.4.4.3.3 Supplier;
 - 1.4.4.3.4 Manufacturer; and
 - 1.4.4.3.5 Separate detailer, when pertinent.
 - 1.4.4.4 Identification of product or material;
 - 1.4.4.5 Relation to adjacent structure or material;
 - 1.4.4.6 Field dimensions, clearly identified as such;
 - 1.4.4.7 Specification Section number;
 - 1.4.4.8 Applicable standards, such as CSA or CGSB numbers; and
 - 1.4.4.9 Contractor's stamp, initialled or signed, certifying review of submission, verification of field measurements and compliance with contract documents.

END OF SECTION

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TEMPORARY FACILITIES

**SECTION 01535
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2009**

1.0 GENERAL

- 1.0.1 Section 01535 addresses general requirements for temporary utilities and construction facilities not incorporated into the final or permanent work. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Section Includes

- 1.1.1 Temporary utilities.
- 1.1.2 Construction facilities.
- 1.1.3 Office and sheds.
- 1.1.4 Project identification.

1.2 Installation and Removal

- 1.2.1 Provide temporary utilities and construction facilities in order to execute work expeditiously.
- 1.2.2 Remove from site all such work after use.

1.3 Dewatering

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

1.4 Sanitary Facilities

- 1.4.1 Provide sufficient sanitary facilities for workers in accordance with local health authorities.

1.5 Water Supply

- 1.5.1 Arrange for connection to municipal water system and pay all costs for installation, maintenance and removal.
- 1.5.2 Provide adequate supply of potable water.
- 1.5.3 A hydrant use permit is required if any hydrant is to be used for the supply of water. Fees (including applicable deposits) for permits are the responsibility of the Contractor.

1.6 Site Storage/Loading

- 1.6.1 Confine work and operations of employees in accordance with Contract Documents. Do not unreasonably encumber premises with products.
- 1.6.2 Do not load or permit to load any part of work with a weight or force that will endanger the work.

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TEMPORARY FACILITIES

**SECTION 01535
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1.7 Construction Parking

- 1.7.1 Parking will be permitted on or near the site provided it does not disrupt the performance of work and does not contravene any Traffic By-laws.

1.8 Hoarding and Barricades

- 1.8.1 Provide hoarding and/or barricades and flashers as required and as requested by the Engineer to protect the public from injury and private and City property from damage.

1.9 Site Offices

- 1.9.2 Provide adequate first aid facilities in accordance with Workers' Compensation Board requirements.
- 1.9.3 Contractors may provide their own offices as necessary. Location of these offices must be approved by the Engineer prior to construction.
- 1.9.4 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- 1.9.5 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with the public or work activities.

1.10 Public Notice Prior to Construction

- 1.10.1 Prior to construction, advise residents and/or other parties within the affected area of planned construction activities and schedule.

Coordinate with and obtain Engineer's approval before delivery or mailing of public notices.

1.11 Measurement for Payment

- 1.11.1 Payment for all work performed under this section will be incidental to payment for work described in other sections unless shown otherwise on the Form of Tender.

END OF SECTION

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ENVIRONMENTAL PROTECTION

**SECTION 01561
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1.0 GENERAL

- 1.0.1 Section 01561 addresses general requirements for environmental protection. This section is not intended to identify all and/or specific requirements. This section must be referenced to and interpreted simultaneously with all other section pertinent to the works described herein.
- 1.0.2 The Contractor shall have due regard for the protection of the environment in the performance of the Work and shall not place any materials, or dispose of any materials, or perform any Work in a manner contrary to applicable Federal or Provincial or municipal environmental laws and regulations, either at the place of the Work, or at any other place or property.
- 1.0.3 Cleanup shall progress as rapidly as the work itself and upon completion of the job, the Contractor shall remove all debris and waste material caused by construction operations and leave the job site in a clean and neat condition. Where vehicular, bicycle, or pedestrian conditions are heavy and where weather conditions result in unsightliness, discomfort, or hazards, the Contractor shall always take special precautions, to ensure that the site is kept both clean and safe. Fire hydrants shall be left clear for hose connections at all times.

1.1 Fires

- 1.1.1 Fires and burning of rubbish on site is not permitted.

1.2 Disposal of Wastes

- 1.2.1 Do not bury rubbish and waste materials on site unless approved by Engineer.
- 1.2.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 Drainage

- 1.3.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- 1.3.2 Do not discharge water containing suspended materials into waterways, sewer or drainage systems, unless approved by Engineer. Place filter cloth in catch basins to prevent suspended materials entering into drainage systems.
- 1.3.3 Control disposal of runoff of water containing suspended materials or other harmful substances in accordance with Municipal, Provincial and Federal requirements.

1.4 Site Clearing and Plant Protection

- 1.4.1 Protect trees and plants on site and adjacent properties.
- 1.4.2 Protect roots of trees to drip line during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- 1.4.3 Minimize stripping of topsoil and vegetation.
- 1.4.4 Restrict tree removal to areas approved by Engineer.

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ENVIRONMENTAL PROTECTION

SECTION 01561
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1.5 Pollution Control

- 1.5.1 Maintain temporary erosion and pollution control features as required by this contract.
- 1.5.2 Control emissions from equipment and plant to local authorities emission requirements.
- 1.5.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.
- 1.5.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for roads.

1.6 Payment

- 1.6.1 Payment for all work performed under this Section will be incidental to payment for work described in other Sections unless shown otherwise in the Form of Tender.

END OF SECTION

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TRAFFIC REGULATION

**SECTION 01570
PAGE 1
2009**

1.0 GENERAL

- 1.0.1 Section 01570 addresses the general requirements for accommodation of roadway traffic during construction. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.
- 1.0.2 Comply with GC.36, Traffic Control.
- 1.0.3 During progress of the Works, make adequate provisions to accommodate normal pedestrian and vehicle traffic along streets and lanes immediately adjacent to or crossing the Works so as to cause minimum inconvenience to the general public.
- 1.0.4 Give minimum 48 hours notice to local police, fire departments and emergency services prior to beginning construction and comply in all respects with their requirements.
- 1.0.5 Inform all owners or occupants of properties where access is affected in advance of proposed road and/or sidewalk closures.
- 1.0.6 The Contractor shall, at his own expense and without further or other order, provide, erect and maintain all requisite barriers, fences, or other proper protection in accordance with the "B.C. M. O. T. Traffic and Control Manual for Work on Roadways".

The Contractor shall also abide by any instructions issued by the City Engineer regarding traffic control.

1.1 Protection of Public Traffic

- 1.1.1 Comply with requirements of the "Traffic Control Manual for Work on Roadways, published by the Ministry of Transportation and Highways, for regulation of vehicle and pedestrian traffic or use of roadways upon or over which it is necessary to carry out work or haul materials or equipment.
- 1.1.2 Observe all traffic regulations in accordance with the City of Vancouver Traffic By-law.
- 1.1.3 When working on traveled way:
- 1.1.3.1 Place equipment in position to present minimum of interference and hazard to traveling public.
 - 1.1.3.2 Keep equipment units as close together as working conditions will permit and preferably on same side of traveled way.
 - 1.1.3.3 Do not leave equipment on traveled way overnight.
 - 1.1.3.4 Photograph traffic control setup at the end of each day.
- 1.1.4 Do not close any portions of road or lane without approval of the Engineer. Notify all contacts on the Emergency Notification Checklist of any closed roads. Before rerouting traffic, erect suitable signs and devices as approved by the Engineer. Provide sufficient crushed gravel to ensure a smooth riding surface during work.

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Emergency Notification Checklist

Company or Entity	Fax Number
Ambulance (911) Radio Room	(604) 872-6742
Vancouver Police Department	(604) 665-5078
Vancouver Fire Department	(604) 665-6016
Coast Mountain Bus Company	(604) 953-3509
Coast Mountain Bus Company	(604) 953-3315
Translink	(604) 453-4628
City of Vancouver Engineering Operations	(604) 873-7212
BC Trucking	(604) 888-2941
ICBC Compliance	(604) 592-6440
BC Ambulance Charge Dispatcher	(604) 872-6742

- 1.1.5 Keep traveled way well grade, free of pot holes and of sufficient width that required number of lanes of traffic may pass.
- 1.1.6 When directed by the Engineer, provide well graded, graveled detours or temporary roads to facilitate passage of traffic around restricted construction area. Provide and maintain signs and lights and maintain roadway.
- 1.1.7 Provide and maintain road access and egress to property fronting along or in vicinity of Work unless approved otherwise by the Engineer.

1.2 Informational and Warning Devices

- 1.2.1 Provide a traffic management plan to the Engineer prior to commencement of construction for approval. Include locations and duration of road and sidewalk closures and signage required for closures.
- 1.2.2 Provide 48 hours notice to the Engineer for erection or relocation of temporary no parking or no stopping signs. Parking regulation signage placed by the contractor is unenforceable.
- 1.2.3 Supply and erect signs, delineators, barricades and miscellaneous warning devices in accordance with the traffic management plan.
- 1.2.4 Place signs and other devices in additional locations as appropriate or as directed by the Engineer.
- 1.2.5 Continually maintain traffic control devices in use by:
 - 1.2.5.1 Checking signs daily for legibility, damage, suitability and location. Clean, repair, or replace to ensure clarity and reflectance.
 - 1.2.5.2 Removing or covering signs which do not apply to conditions existing from day to day.

1.3 Control of Public Traffic

- 1.3.1 Provide flag persons, trained and properly equipped in following situations:
 - 1.3.1.1 When public traffic is required to pass working vehicles or equipment which may block all or part of traveled roadway.
 - 1.3.1.2 When it is necessary to institute one way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.

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TRAFFIC REGULATION

**SECTION 01570
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- 1.3.1.3 When workmen or equipment are employed on traveled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - 1.3.1.4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - 1.3.1.5 For emergency protection when other traffic control devices are not readily available.
 - 1.3.1.6 In situations where complete protection for workmen, working equipment and public traffic is not provided by other traffic control devices,
- 1.3.2 Provide and maintain suitable detours or temporary access routes for pedestrian traffic, complete with suitable warning and advisory signs.
- 1.3.3 Maintain existing conditions for traffic throughout period of Contract except that, when required for construction under Contract and when adequate measures have been taken as specified herein and approved by the Engineer to protect and control public traffic, existing conditions for traffic may be restricted.
- 1.4 Payment**
- 1.4.1 Payment for all work performed by the Contractor under this Section will be incidental to payment for work described in other Sections unless shown otherwise in the Form of Tender.
- 1.4.2 Temporary parking signs will be supplied and installed at the City's cost.

END OF SECTION

INVITATION TO TENDER NO. PS10180
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PROJECT RECORD DOCUMENTS

**SECTION 01721
PAGE 1
2009**

1.0 GENERAL

- 1.0.1 Section 01721 addresses general requirements for submittal of record documents. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Section Includes

- 1.1.1 Record documents, samples, specifications.

1.2 Submission

- 1.2.1 Submit one (1) complete set of drawings of the Work, as constructed, on or before the date of application to the Engineer for a Certificate of Substantial Completion.
- 1.2.2 Submit record documents in accordance with GC.13, Record Document.
- 1.3.3 Revise content of drawings as required by Engineer prior to issuance of Final Certificate of Acceptance.

1.3 Record Documents and Samples

- 1.3.1 Maintain at site for Engineer one record copy of all Contract Documents including:
- 1.3.1.1 Contract Drawings.
 - 1.3.1.2 Specifications.
 - 1.3.1.3 Addenda.
 - 1.3.1.4 Change Orders and other modifications to the Contract.
 - 1.3.1.5 Reviewed shop drawings, product data, and samples.
 - 1.3.1.6 Field test records.
 - 1.3.1.7 Inspection certificates.
 - 1.3.1.8 Manufacturer's certificates.
- 1.3.2 Store record documents and samples in site office apart from documents used for construction. Provide files, racks, and secure storage.
- 1.3.3 Label and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- 1.3.4 Maintain record documents in a clean, dry and legible condition. Do not use record documents for construction purposes.
- 1.3.5 Keep record documents and samples available for inspection by Engineer.
- 1.4 Recording Actual Site Conditions**
- 1.4.1 Record information concurrently with construction progress. Do not conceal work until required information is recorded.

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PROJECT RECORD DOCUMENTS

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- 1.4.2 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
- 1.4.2.1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced from property lines and finished surface improvements.
 - 1.4.2.2 Field changes of dimension and detail.
 - 1.4.2.3 Changes made by addenda and change orders.
 - 1.4.2.4 Details not on original Contract Drawings.
 - 1.4.2.5 References to related shop drawings and modifications.
 - 1.4.2.6 The type of soil conditions encountered during trench excavation and the location of any changes in soil conditions.
- 1.4.3 Other Documents: maintain manufacturer's certifications, inspection certifications and field test records required by individual specifications sections.

1.5 Payment

- 1.5.1 Payment for all work under this Section will be incidental to payment for work described in other Sections.

END OF SECTION

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SHRUB AND TREE PRESERVATION

SECTION 02104
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1.0 GENERAL

- 1.0.1 Section 02104 refers to those portions of the Work that are unique to the preservation of existing shrubs and trees. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Related Work

- | | | |
|-------|--|---------------|
| 1.1.1 | Site Grading | Section 02210 |
| 1.1.2 | Excavation, Trenching, and Backfilling | Section 02223 |
| 1.1.3 | Topsoil and Finish Grading | Section 02921 |

1.2 Payment

- 1.2.1 Payment for all work under this Section will be incidental to payment for work described in other Sections.

3.0 EXECUTION

3.1 Existing Trees

- 3.1.1 Protect all trees, shrubs, and planting from damage. Any damage to trees, shrubs, and or planting must be remedied as directed by the Engineer. Do not carry out any construction activity whatsoever on private property,
- 3.1.2 Ensure construction procedures, stockpiling of materials or disposal are not undertaken adjacent to trees, shrubs, planting or areas to be preserved.
- 3.1.3 Ensure construction procedures do not substantially alter natural drainage patterns. Provide interim drainage or irrigation as necessary to compensate for construction interference.
- 3.1.4 Do not prune any tree branches or roots without prior approval of the Engineer. Branches or roots must be cut with a sharp axe or saw, not with a backhoe or excavator bucket. When required by the Engineer, excavation adjacent to trees will be hand dug.
- 3.1.5 Do not excavate closer than 3 times the trunk diameter or 0.5m, whichever is the greatest, from the base of the tree without prior approval of the Engineer.

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SITE GRADING

**SECTION 02210
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1.0 GENERAL

- 1.0.1 Section 02210 is a "LANDSCAPING" Section and refers to those portions of the work that are unique to preparation of subgrade, by rough grading and filling, to provide a base that will allow placing of growing medium (topsoil) to specified depths. THIS SECTION DOES NOT APPLY TO GRADING PRIOR TO PLACEMENT OF PAVED OR CONCRETED SURFACES. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Related Work

- | | | |
|-------|----------------------------|---------------|
| 1.1.1 | Topsoil and Finish Grading | Section 02921 |
| 1.1.2 | Sodding | Section 02938 |

1.2 Site Conditions

- 1.2.1 Size, depth and location of existing utilities and structures shown on Detailed Design Drawings are for guidance only. Completeness and accuracy are not guaranteed.
- 1.2.2 Examine site with Engineer and obtain approval of previous work prior to commencing site grading.
- 1.2.3 Prevent damage to all adjacent natural growth, landscaping, buildings, structures and underground and overhead utilities. Make good all damage to satisfaction of Engineer.

1.3 Measurement for Payment

- 1.3.1 Payment for all work under this Section will be incidental to payment for work described in other Sections.

2.0 PRODUCTS

2.1 Materials

- 2.1.1 Obtain approval from Engineer for excavated or graded material to be used as fill for grading work. Protect approved material from contamination.
- 2.1.2 Fill material to be placed under areas to be landscaped, i.e., with grass, sod, groundcover, shrubs and trees, to be non-toxic to plant and animal life in part or in concentration (leachate).

3.0 EXECUTION

3.1 Grading

- 3.1.1 Rough grade to levels, profiles, and contours that existed prior to construction and allow for surface treatment.
- 3.1.2 Compact subgrade to a consistent 90% Modified Proctor Density in compliance with ASTM D1557.

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- 3.1.3 Excavate soft and unstable areas below subgrade that cannot be compacted to this standard and fill with approved fill material, except in locations where special environmental conditions have been identified. In such cases, appropriate alternative solutions to be approved by Engineer and carried out.
- 3.1.4 Remove and dispose to approved off-site disposal area, all debris, roots, branches, stones, building material, contaminated subsoil, visible weeds and anything else that may interfere with proper growth and development of planned finished landscaping.
- 3.1.5 Place fill materials to elevations that existed prior to construction. Place in maximum 200 mm lifts and compact each lift to 90% Modified Proctor Density.
- 3.1.6 Scarify areas showing excessive compaction to minimum depth of 100 mm and compact as directed by Engineer immediately before placing topsoil.
- 3.1.7 Grade transitions of subgrade smooth and even, such that ponding cannot occur on subgrade surface.
- 3.2 Surplus Material**
- 3.2.1 Remove surplus material unsuitable for fill, grading or landscaping from site and dispose at approved disposal area.
- 3.3 Topsoil and Finish Grading**
- 3.3.1 See Section 02921 - Topsoil and Finish Grading for placement and finish grading of topsoil.

END OF SECTION

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ROCK REMOVAL

**SECTION 02221
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1.0 GENERAL

- 1.0.1 Section 02221 refers to those portions of the work that require rock removal. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Related Work

- 1.1.1 Excavating, Trenching and Backfilling Section 02223

1.2 Definitions

- 1.2.1 Rock is defined as all solid rock in the form of bedrock, consolidated glacial till and hardpan that requires breaking by continuous drilling and blasting before excavation. Rock also includes rocks, boulders, buried concrete and foundations having individual volumes in excess of 1.0 m³, removed by blasting.
- 1.2.2 Dense tills, hardpan, partially cemented materials, clay or frozen materials which do not require breaking by continuous drilling and blasting before excavation and removal are not classified as rock.
- 1.2.3 Concrete forming part of the road pavement structure is not classified as rock.

1.3 Qualifications

- 1.3.1 Retain licensed explosives expert to supervise and program blasting work, and to determine precautions, preparation and operations techniques.

1.4 Blasting Operation Proposal

- 1.4.1 Submit to Engineer for approval, written proposal of operations for removal of rock by blasting.
- 1.4.2 Indicate proposed method of carrying out work. Include details on protective measures, time of blasting and other pertinent details.

1.5 Method of Measurement Rock Excavation

- 1.5.1 All units of measurement for payment will be as specified herein unless shown otherwise in Form of Tender.
- 1.5.2 Rock removed prior to the examination and measurement by the Engineer will not be classified as rock excavation and no payment will be made for rock removal, backfilling and surface restoration.
- 1.5.3 Rock will be measured in cubic meters.

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- 1.5.4 Payment for rock removal by blasting, including any additional material required to backfill the excavated rock, and restore damaged surfaces will be made at the unit prices bid.
- 1.5.5 Payment for rock removal where blasting is specifically prohibited will be measured in cubic meters.
- 1.5.6 No payment will be made for bedrock or consolidated glacial till or hardpan excavated beyond the limits of the maximum trench width and depth specified.
- 1.5.7 No payment will be made for repairing damage to existing pipelines or utilities caused by rock removal.
- 1.6 Seismic Survey and Monitoring**
- 1.6.1 The Contractor and the Engineer will visit owners of buildings and structures to determine existing conditions and describe blasting and seismic recording operations.
- 1.7 Blasting and Vibration Control**
- 1.7.1 Complete all blasting before any structural elements are installed within 15m from blast holes.
- 1.7.2 Minimize ground vibrations which may damage structures or shatter or damage rock mass to remain.
- 1.7.3 Exercise care and limit use of explosives to such charges that do not cause damage to existing pipelines and other utilities.
- 1.7.4 Blasting is not permitted within a distance of 30m of concrete or grout less than 24 h after pouring.
- 1.7.5 Maintain complete and accurate record of all drilling and blasting operations. Submit records to Engineer at end of each shift.
- 1.8 Protection**
- 1.8.1 Prevent damage to surroundings and injury to persons. Post guards, sound warnings and display signs when blasting is to take place.
- 2.0 EXECUTION**
- 2.1 Rock Removal**
- 2.1.1 Do blasting operations in accordance with City of Vancouver By-laws.

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- 2.1.2 Remove rock to alignments, profiles, and cross sections as shown on Contract Drawings.
- 2.1.3 Locations where explosive blasting is not permitted will be determined by Engineer.
- 2.1.4 Use methods, techniques and procedures for control of all factors affecting operations in order to produce smooth and sound peripheral surfaces of all completed excavations, to minimize overbreak, and to avoid damage to adjacent structures.
- 2.1.5 Except as specified otherwise or as directed by Engineer, employ pre-shearing, cushion blasting or other smooth wall drilling and blasting techniques to achieve final excavation surfaces.
- 2.1.6 Remove boulders and fragments which may slide or roll into excavated areas.

2.2 Rock Disposal

- 2.2.1 As directed by the Engineer, dispose of surplus removed rock.

END OF SECTION

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1.0 GENERAL

- 1.0.1 Section 02223 refers to those portions of the work that are unique to excavating, trenching, backfilling and surface restoration for underground utility installations and related structures. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Related Work

- | | | |
|-------|---|---------------|
| 1.1.1 | Environmental Protection | Section 01561 |
| 1.1.2 | Rock Removal | Section 02221 |
| 1.1.3 | Waterworks | Section 02742 |
| 1.1.4 | Hot-Mix-Asphalt for Surface Restoration | Section 02230 |
| 1.1.5 | Concrete Walks, Curb and Gutter | Section 02523 |

1.2 Definitions

- 1.2.1 Rock Excavation: As defined in Section 02221 - Rock Removal.
- 1.2.2 Common Excavation: Excavation of materials of whatever nature, which are not included under definitions of rock excavation including dense tills, hardpan, partially cemented materials, clay or frozen materials which can be ripped and excavated with heavy construction equipment.
- 1.2.3 Overexcavation: Excavation below design elevation of bottom of specified bedding, and including backfilling of resultant excavation with specified material, as authorized by the Engineer.
- 1.2.4 Removals: Removal and disposal off-site of surface concrete structures and walks, curbs, gutters, manholes, catchbasins, pipes, culverts, endwalls, and any other structures on surface or underground specifically designated on Contract Drawings for removal. Removals to include backfilling of resultant excavation with specified material.

1.3 Safety Requirements

- 1.3.1 Comply with applicable Municipal regulations to protect existing features.
- 1.3.2 Trench shoring to be designed and installed in accordance with the regulations of WorkSafeBC.
- 1.3.3 Sides of trenches or other excavations to be adequately supported. Trench stability and safety procedures to meet or exceed minimum requirements of "Accident Prevention Regulations" current issue of WorkSafeBC.

1.4 Blasting

- 1.4.1 Ensure all blasting operations comply with Section 02221 - Rock Removal.

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1.5 Disposal

- 1.5.1 Contractor to be responsible for off-site disposal of all surplus spoil from excavations. Dumping of spoil on private property will be permitted only upon written request from property owner and provided all necessary permits and approvals have been obtained.

1.6 Limitations of Open Trench

- 1.6.1 Excavate trenches only as far in advance of pipe laying operation as safety, traffic, and weather conditions permit and, in no case, to exceed 30 m. Before stopping work on last day of work before each weekend or holiday, completely backfill every trench. If circumstances do not permit complete backfilling of all trenches, all open trenches or excavations to be adequately protected by approved fencing or barricades and, where required, with flashing lights. Under no circumstances shall an inactive open trench be open for more than five working days.
- 1.6.2 No more than 1 block of construction can remain unbackfilled at one time.
- 1.6.3 Maintain access to local residents by plating excavations in intersections, private driveways, and any other area where vehicular traffic could be expected.

1.7 Permits and Approvals

- 1.7.1 Obtain all required permits and approvals from regulatory authorities before commencing any excavation.
- 1.7.2 Conduct with Engineer, a condition survey prior to commencing any excavation.

1.8 Measurement for Payment

- 1.8.1 All units of measurement for payment will be as specified herein unless shown otherwise in Form of Tender.
- 1.8.2 With the exception of payment for rock excavation, overexcavation, and surface restoration, payment for all work performed under this section will be incidental to payment for work described in other sections.
- 1.8.3 Measurement for payment for surface restoration will be made in a lump sum for each payment item described in the Form of Tender.
- 1.8.4 Payment for rock excavation will be made in accordance with Section 02221 - Rock Removal.
- 1.8.5 Payment for overexcavation /additional excavation, including any additional material to backfill the overexcavated area will be made at the unit prices bid.
- 1.8.6 All costs incurred as a result of unnecessary excavation beyond neat lines or limits of excavation shown on the Detailed Design Drawings or Standard Waterworks Drawings will be at Contractor's cost.

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1.9 Inspection and Testing

- 1.9.1 Testing of materials and compaction to be carried out at Contractor's cost by testing laboratory approved by Engineer. Tests will be performed every 20 meters at top of trench fill, 0.45m of cover or other depths if required by the Engineer.
- 1.9.2 Additional testing may be required by the Engineer. If the test shows adequate compaction, the Owner shall pay for the testing. Otherwise, the cost of testing and retesting is the Contractor's responsibility.
- 1.9.3 Sources and gradation curves for backfill materials must be submitted to the Engineer prior to construction. Material samples are required if requested by the Engineer.

2.0 PRODUCTS

2.1 General

- 2.1.1 Unless shown otherwise on Contract Drawings, the materials specified in 2.2 following are approved for their respective uses.

2.2 Use of Specified Materials

- 2.2.1 Backfill for overexcavated trench:
 - 2.2.1.1 20mm minus combined crushed aggregate (CoV #9).
 - 2.2.1.2 80mm crushed tailings (CoV #13).
 - 2.2.1.3 Drain rock (only where approved by the Engineer).
- 2.2.2 Pipe bedding and surround:
 - 2.2.2.1 20mm minus combined crushed aggregate (CoV #9) for pipes without polyethylene encasement.
 - 2.2.2.2 Sand Fill (CoV #17) for pipes with polyethylene encasement.
- 2.2.3 Trench backfill:
 - 2.2.3.1 20mm minus combined crushed aggregate (CoV #9).
 - 2.2.3.2 Sand fill (CoV #17) (only where approved by the Engineer).
- 2.2.4 Surface treatment to be:
 - 2.2.4.1 Restoration to match existing conditions.
 - 2.2.4.2 Subgrade, subbase and base for works described in other Sections.
 - 2.2.4.3 Topsoil, grass, sod or requirements for other landscaping works described in other Sections.

2.3 Materials

- 2.3.1 Refer to Section 02226 - Aggregates and Granular Materials for specifications for approved granular materials.
- 2.3.2 Concrete (except pavement base): to Section 03300, to be minimum 20MPa.

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- 2.3.3 Portland Cement Concrete for pavement base - refer to Standard Detailed Drawing DWG. P2.
- 2.3.3.1 Sufficient water for proper hydration must be used. Extremely dry concrete known as double zero slump concrete shall not be used.
- 2.3.3.2 Under no circumstances shall the calcium chloride content exceed 3% by weight.
- 2.3.3.3 Mechanical vibration and compaction are required under all conditions.

3.0 EXECUTION

3.1 Site Preparation

- 3.1.1 Sawcut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly. Milling is not allowed. Vacuum slurries from saw cutting and place filter cloth at catch basins to prevent suspended material entering drainage systems. Filter cloth to remain in catch basins until end of construction.
- 3.1.2 In grass areas, strip topsoil after area has been cleared and stockpile, if approved by Engineer, in locations as directed. Stockpile height not to exceed 2 m. Avoid mixing topsoil with subsoil. Dispose of unused topsoil as directed by Engineer. Do not handle topsoil in wet or frozen condition or in any manner in which soil structure is adversely affected.

3.2 Stockpiling

- 3.2.1 Stockpile fill materials in areas designated by Engineer. Stockpile granular materials in manner to prevent segregation. Do not block curb and gutter drainage with granular materials.

3.3 Excavation

- 3.3.1 Existing utilities:
- 3.3.1.1 Utilities shown on Contract Drawings are based on available information and are not necessarily accurate. Contractor to take extreme care when working near or around existing utilities or services. Any utility or service disturbed during construction to be rectified to the satisfaction of the Engineer at the Contractor's cost.
- 3.3.1.2 To prevent damage to existing utilities, excavate last 300mm over utility by hand.
- 3.3.1.3 Provide uninterrupted flow of all watercourses, sewers and drains encountered during the work.
- 3.3.2 Connection to existing mains: Prior to or at commencement of construction, check existing mains for line and elevation at points of connection. If found to be different from Contract Drawings, report such difference to Engineer immediately.
- 3.3.3 Surface Drainage:
- 3.3.3.1 Provide suitable temporary ditches or other approved means of handling drainage prior to excavation and during construction to protect construction area and adjacent and other affected properties. Provide siltation controls to protect natural watercourses or existing municipal drainage facilities.
- 3.3.3.2 Comply with Section 01561 - Environmental Protection.
- 3.3.4 Excavation to grade: excavate trenches to allow pipe to be laid to alignment and grades required with allowance for specified pipe bedding.

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- 3.3.5 Excavation below grade: when bottom of excavated trench at subgrade is unstable and, in opinion of Engineer, cannot adequately support pipe, overexcavate trench to suitable subgrade as directed by Engineer. Backfill overexcavation with specified materials and compact to minimum 95% Modified Proctor density in compliance with ASTM D1557. Use drain rock backfill only if authorized by Engineer.
- 3.3.6 Trench width: excavate trench to dimensions shown on Waterworks Standard 305/1/4a. All additional requirements as a result of excessive trench width to be Contractor's cost.
- 3.3.7 Hand and Hydro Vacuum excavation: excavate by hand if necessary to preserve or minimize damage to existing trees, shrubs, buildings and all similar existing features or facilities. Where, in the opinion of the Engineer, mechanical excavation presents a high risk of damage to existing underground utilities, the Engineer can require either hand or Hydro Vacuum excavation to be done in order to expose those underground utilities.
- 3.3.8 Trench bottom conditions: remove disturbed or softened material from trench bottom before placing bedding material. Maintain trench free from water and soft materials during placement of pipe bedding, pipe installation and trench backfill to ensure proper compaction of granular materials.
- 3.3.9 Trench drainage:
- 3.3.9.1 During pipe laying, jointing, bedding and backfilling, keep trench free of water by pumping or other appropriate means. Provide pumps and dewatering equipment and take precautions to prevent any damage to adjoining buildings, structures, roads or land from prolonged or excessive pumping by installing shoring, sheeting or other supportive measures. Discharge water from excavations in such a manner as not to cause nuisance, injury, loss or damage. Contractor to be responsible for any claims or actions arising from such discharge of water.
- 3.3.9.2 Do not discharge silt or sand laden water into storm sewers. Water discharged into storm sewers must meet the requirements of the City of Vancouver Sewer Use Regulation By-law (No. 5320).
- 3.3.9.3 Material that becomes unsuitable, in the opinion of the Engineer, through the Contractor's failure to divert surface water or control water in the trench must be excavated and disposed of.
- 3.3.9.4 Keep bell holes free from water during jointing.
- 3.3.10 Disposal of surplus material: dispose of surplus excavated soil, concrete, and asphalt off-site. Side-casting not allowed.
- 3.3.11 Rock Excavation: As indicated in Section 02221 - Rock Excavation.
- 3.3.12 Dust Control: haul routes and across any public traveled way shall be kept free of all rubbish and debris including spillage, resulting from construction operations. Water or dust palliative, or both, shall be supplied as necessary to prevent dust nuisance, to the satisfaction of the Engineer.

If sites are not adequately controlled for dust, or kept clean to the satisfaction of the Engineer, the City will do the work at the Contractor's expense. Flushing of debris into City catchbasins is not permitted without the express written consent of the Engineer.

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3.4 Pipe Installation

- 3.4.1 Related Work: Pipe installation, including bedding, pipe laying, and granular surround to be in accordance with following sections:
- 3.4.1.1 Waterworks 02742
- 3.4.2 Concrete encasement or protection: where specified or required by Engineer provide concrete encasement of pipe or slab protection. Do not place backfill material until concrete has taken its initial set and in no case less than 1 hour.

3.5 Backfill and Compaction

- 3.5.1 General: Place backfill carefully in trench to prevent damage to installed pipe.
- 3.5.2 Shoring: During backfill and compaction of trench, remove shoring in such a manner as to allow proper compaction and to prevent trench walls from collapsing. Remove all bracing and/or shoring from trench.
- 3.5.3 Backfill Materials:
- 3.5.3.1 Boulevards and easements: for trenches in boulevards, easements or other areas not subjected to vehicle loading, backfill with approved granular materials for watermain trenches and approved native materials for service connection trenches.
- 3.5.3.2 Roads, driveways, shoulders and sidewalks: for trenches in paved or gravelled roads, driveways, shoulders, sidewalks and other areas subjected to vehicle loading, backfill with imported granular material as specified on Contract Drawings.
- 3.5.4 Compaction: place granular backfill and compact to following Modified Proctor densities in compliance with ASTM D1557. (All following references to density imply compliance with ASTM D1557).
- 3.5.4.1 Boulevards and easements with no utilities and at least 1.5m from roads, driveways, shoulders, and sidewalks to minimum 90%.
- 3.5.4.2 All other boulevards and easements to minimum 95%.
- 3.5.4.3 Roads, driveways, shoulders, and sidewalks to minimum 95%.
- 3.5.4.4 Use caution in pipe zone to ensure no damage to pipe.
- 3.5.4.5 Compact bedding with mechanical plate tamper to min. 95%. Compacting by hand is not permitted.

3.6 Surface Restoration

- 3.6.1 General:
- 3.6.1.1 Restore all disturbed surfaces to condition at least equal to that which existed prior to construction.
- 3.6.1.2 Make good any damage to adjacent lands or improvements.
- 3.6.1.3 Resolve all reasonable claims arising from Contractor's actions and obtain written releases from land owners following final restoration.
- 3.6.2 Boulevards and easements:
- 3.6.2.1 Restore surface to minimum 100 mm depth.
- 3.6.2.2 Restore unimproved surfaces with material equal to that removed at surface.
- 3.6.2.3 Restore gardens with approved topsoil or bark mulch to match existing conditions.

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- 3.6.2.4 Restore lawns with approved topsoil and sod to match existing lawn.
- 3.6.2.5 Restore gravel surfaces with matching granular materials.
- 3.6.2.6 Complete final restoration within 2 weeks of trench backfilling.
- 3.6.3 Gravelled driveways:
 - 3.6.3.1 Restore surface with minimum 75 mm granular road base material.
 - 3.6.3.2 Compact to minimum 95% Modified Proctor density.
 - 3.6.3.3 Complete final restoration immediately upon completion of trench backfilling.
- 3.6.4 Base preparation for paved surfaces:
 - 3.6.4.1 Paved surfaces to include all paved roads, driveways, sidewalks and parking areas.
 - 3.6.4.2 Provide specified depth of sub-base as shown on Standard Detail Drawings. Provide 100mm of sub-base for concrete sidewalks.
- 3.6.5 Temporary pavement patching:
 - 3.6.5.1 Patch arterial and collector roads, and all residential road and lane intersections, same day backfilling done.
 - 3.6.5.2 Patch all other roads within 2 weeks of closing trench. Compact trench adequately to support vehicular load prior to temporary patching and maintain trench in safe condition.
 - 3.6.5.3 Patching material to be hot-mix asphalt on all roads.
 - 3.6.5.4 Place temporary pavement to 50mm minimum thickness.
 - 3.6.5.5 The practice of mounding up a repair in order to rely on passing traffic to complete consolidation and compaction will cause of immediate rejection by the Engineer.
 - 3.6.5.6 Maintain temporary patch to ensure safe and smooth conditions.
- 3.6.6 Permanent pavement restoration:
 - 3.6.6.1 Pavement restoration to be completed by City of Vancouver approved Paving Contractors only. Contractor to submit asphalt mix design to Engineer for approval 7 days prior to paving.
 - 3.6.6.2 Install permanent pavement within 30 days of placement of temporary patch or sooner where directed by Engineer.
 - 3.6.6.3 Remove broken or cracked pavement as well as any paved areas showing settlement by sawcutting in neat straight lines and dispose off-site. Milling is not allowed.
 - 3.6.6.4 Sawcut 200mm minimum on both sides of trench as indicated on Standard Detail Drawings P1 through P5, with the exception of P6. If the existing cut is 500mm or less from a pavement edge, joint or crack, remove the portion of pavement between the trench and the edge, joint or crack and dispose of off-site. Milling is not allowed.
 - 3.6.6.5 Remove underlying granular road base material as required to permit placement of specified thickness of permanent pavement. Ensure remaining base meets specified thickness in Standard Detail Drawings.
 - 3.6.6.6 Compact base to minimum 95% Modified Proctor density.
 - 3.6.6.7 Restore pavement as shown on standard Detail Drawings. Dry edge of pavement if necessary and paint clean, dry edge with asphalt emulsion (tack coat).
 - 3.6.6.8 Place and compact hot-mix pavement material to minimum thickness as shown on Standard Detail Drawings.
 - 3.6.6.9 Material and placement of hot-mix pavement to Section 02230 - Hot-Mix-Asphalt for Surface Restoration.
 - 3.6.6.10 Restore surface to smooth condition and match with grade of adjacent pavement.

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- 3.6.6.11 Maintain restored pavements in complete repair during the Contract Maintenance Period. Effect repairs within 3 days from receipt of written notice from Owner or immediately if so directed by Engineer if dangerous situation exists. If the situation is deemed as dangerous by the Engineer and the Contractor is unable or unwilling to effect repair immediately, the Owner will effect the repair at the Contractor's expense.
- 3.6.7 Concrete Sidewalk Restoration: Whenever a part of a panel, square or section of sidewalk is broken, damaged or undermined, the entire panel, square or section shall be removed neatly to the nearest score, groove or joint.
- 3.6.8 Concrete Driveway Restoration: Refer to Standard Detail Drawing DWG P5. The outline of the final repair shall be rectangular in shape and shall provide for a minimum shoulder of 0.2m in each direction from the excavation. Thus, the width and length of the final repair shall be at least 0.4m oversize from that of the original cut dimension. If a side of the cut is 0.5m or less from the concrete edge, joint or crack after providing a 0.2m shoulder, the portion of the concrete between the cut and the edge, joint or crack shall be replaced.
- 3.6.9 Concrete curb and gutter: Restore damaged curb and gutter to the satisfaction of the Engineer.
- 3.6.10 Landscape Restoration:
- 3.6.10.1 Landscape restoration to following sections:
- 3.6.10.1.1 Topsoil and Finish Grading Section 02921
- 3.6.10.1.2 Sodding Section 02938
- 3.6.10.2 Restoration of planted areas, either in private or public places, to consist of restoration to original condition by replacement to original depth of approved topsoil (minimum of 100 mm), sodding of grassed areas and replacement of any killed or removed plants or shrubs by ones of equal quality, type and maturity to originals. Should restored item fail to grow successfully either throughout work area, or in patches, restore so that a successful regrowth is established over entire area.
- 3.6.10.3 Replacement trees and shrubs to be planted at a suitable time of year in accordance with good horticultural practice, to provide maximum assurance of plant survival. Trees or shrubs close to, but not actually within excavated area, which show signs of dying during maintenance period to be replaced by new trees of a similar variety, age and size, up to limits of maximum available size, if tree has died as a result of environmental disturbance, cutting of roots, or other cause directly attributable to Contractor's work.
- 3.6.11 Restoration acceptance: no restoration work to be considered satisfactory until acceptance by Engineer and in case of properties not owned by the City, until a written and signed statement of release from property owner has been obtained by Contractor and provided to Engineer.

END OF SECTION

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1.0 GENERAL

- 1.0.1 Section 02226 refers to those portions of the work that are unique to the supply and processing of aggregates. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Related Work

- 1.1.1 Section 02226 includes specifications for aggregates and granular materials referred to in the following sections:

1.1.1.1	Shrub and Tree Preservation	Section 02104
1.1.1.2	Excavation, Trenching and Backfilling	Section 02223
1.1.1.3	Portland Cement Concrete Pavement	Section 02521
1.1.1.4	Waterworks	Section 02742

- 1.1.2 Section 02226 does not include specifications for aggregates to be incorporated into controlled density fill, hot-mix asphalt concrete paving, pavement crack filling, ready-mixed concrete or granular materials for landscaping purposes.

1.2 Approvals

- 1.2.1 Inform Engineer of proposed source and provide samples or access for sampling at least 2 weeks prior to commencing production.
- 1.2.2 If materials from proposed source do not meet specified requirements, locate alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- 1.2.3 Should a change of material source be proposed during work, advise Engineer 2 weeks in advance of proposed change to allow sampling and testing.
- 1.2.4 Acceptance of material does not preclude future rejection if it is subsequently found to lack uniformity, or if it fails to conform to requirements specified.

1.3 Measurement for Payment

- 1.3.1 Payment for all work performed under this Section will be incidental to payment for work described in other Sections unless shown otherwise in Schedule of Quantities and Prices.

1.4 Inspection and Testing

- 1.4.1 Engineer to arrange for all testing for work described in this Section.

2.0 PRODUCTS

2.1 Materials - General

- 2.1.1 Gravel to be composed of inert, durable material, reasonably uniform in quality and free from soft or disintegrated particles.

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2.1.2 All crushed gravel when tested according to ASTM C-136 and ASTM C-117, or latest revised issue, to have a generally uniform gradation and conform to following gradation limits and 60% of the material passing each sieve must have one or more fractured faces. Determination of the amount of fractured material shall be in accordance with the Ministry of Transportation and Highways' Specification I-11, Fracture Count for Coarse Aggregate, Method "A", which determines fractured faces by count. The plasticity Index for crushed gravel not to exceed 6.0.

2.1.3 All details of material not covered in this section shall comply with the latest edition of the City of Vancouver street Restoration Manual.

2.2 Sand (CoV #17)

2.2.1 To be of uniform quality and unwashed river sand or any clean sand containing less than 5% organic materials, clay or silt (passing 80 micro metre sieve) is acceptable. It can contain a limited amount of small stones or rocks as it comes from the pit. Material to compact to specified density and conform to following gradations:

Total Passing	12.5 mm	100 %
Total Passing	9.5 mm	91 to 100 %
Total Passing	4.75 mm	83 to 100 %
Total Passing	2.36 mm	73 to 94 %
Total Passing	1.18 mm	57 to 80 %
Total Passing	600 um	33 to 60 %
Total Passing	300 um	10 to 37 %
Total Passing	150 um	4 to 17 %
Total Passing	75 um	0 to 5 %

2.3 20mm Minus, Combined Crushed Aggregate (CoV #9)

2.3.1 To be of uniform quality, crushed to size as necessary and consisting of sound, tough, durable, mechanically crushed fragments with the portion retained on a 9.5 mm sieve not being less than 60% crushed. Material to compact to specified density and conform to following gradations:

Total Passing	19 mm	100 %
Total Passing	12.5 mm	61 to 95 %
Total Passing	9.5 mm	45 to 85 %
Total Passing	4.75 mm	35 to 60 %
Total Passing	2.36 mm	26 to 47 %
Total Passing	1.18 mm	20 to 39 %
Total Passing	600 um	13 to 29 %
Total Passing	300 um	8 to 21 %
Total Passing	150 um	5 to 15 %
Total Passing	75 um	2 to 8 %

2.4 80mm Crushed Tailings (CoV #13)

2.4.1 To be well-graded 80mm minus 100% crushed quarried material of uniform quality suitable for use in fills and road subgrade. It shall consist of durable particles capable of withstanding the effects of handling, spreading and compacting without degradation productive of deleterious fines. Material to compact to specified density and conform to following gradations:

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Total Passing	75 mm	100 %
Total Passing	19 mm	40 to 50 %
Total Passing	4.75 mm	20 to 35 %
Total Passing	0.075 mm	2 to 8 %

2.5 Drain Rock

2.5.1 To consist of clean crushed rock conforming to following gradations:

Total Passing	25 mm	100 %
Total Passing	19 mm	0 to 100 %
Total Passing	9.5 mm	0 to 5 %

3.0 EXECUTION

3.1 Handling

3.1.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

3.1.2 Do not use intermixed or contaminated materials. Remove and dispose rejected materials within 48 hours of rejection.

END OF SECTION

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1.0 GENERAL

- 1.0.1 The work of this section includes the supply and placement of all hot mix asphaltic concrete required for surface restoration of roads or other travelled or non-travelled areas disturbed during excavation, trenching or other construction activities.
- 1.0.2 Hot mix asphalt concrete materials and procedures shall meet the requirements of these specifications and the requirements of the City of Vancouver in all respects unless otherwise approved by the Engineer.
- 1.0.3 Additional surface restoration requirements are provided in other specification sections and on the Contract drawings.

1.1 Related Work

- 1.1.1 Construction Schedule Section 01310
- 1.1.2 Excavating, Trenching, Backfill and Surface Restoration Section 02223

1.2 Material Certification

- 1.2.1 At least 4 weeks prior to commencing work submit viscosity-temperature chart for asphalt cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175⁰ C.
- 1.2.2 Upon request submit manufacturer's test data and certification that asphalt cement meets requirements of this section.

1.3 Submission

- 1.3.1 Submit asphalt concrete mix design and trial mix test results to Engineer for review at least 4 weeks prior to commencing work.

1.4 Repair of Asphalt Surfaces

- 1.4.1 Where asphalt surfaces existed prior to construction, restoration of surfaces shall be provided using hot-mix-asphaltic concrete as soon as possible following final backfilling and other related work.
- 1.4.2 The Contractor may place a temporary patch using hot or cold mix asphalt patch but must remove temporary patch prior to installing final hot mix materials.
- 1.4.3 Should the Engineer determine that the Contractor is not restoring asphalt surfaces in a prompt manner, the City of Vancouver shall require the Contractor to accelerate pavement activities or to install temporary cold mix asphalt patches, all at no additional cost to the City.

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2.0 PRODUCTS AND SPECIFICATIONS FOR SUPERPAVE ASPHALT MIX DESIGN

2.1 Materials

2.1.1 Asphalt cement:

Asphalt cement shall meet Performance Grade PG 64-22 for industrial/arterial pavements and PG 58-22 for higher zoned residential pavements and light duty residential pavements and shall conform with PG specifications according to Superpave Level 1 Mix, Superpave Series No.2 (SP-2). Test results and Temperature-Viscosity Relationships for the Project Binder shall be provided to the City Engineer.

2.1.2 Mineral Aggregates :

Aggregates shall meet the Superpave established standards for aggregate characteristics. The requirement for each of these properties is based on traffic level and position within the pavement structure. Specifications shall be based on the traffic level of 3 to 10 million ESALs and mat thickness of less than or equal to 100 mm.

2.1.3 Consensus Aggregate Requirements :

2.1.3.1 Coarse Aggregate Angularity:

ASTM D5821, "Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate." The required minimum value shall be 95/90 that is 95% of the coarse aggregate shall have one or more freshly fractured face and at least 90% shall have two or more freshly fractured faces.

2.1.3.2 Fine Aggregate Angularity;

AASHTO TP33, "Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate." The required minimum value shall be 45% for <100mm and 40% for >100mm.

2.1.3.3 Flat and Elongated Particles:

ASTM D4791, "Flat or Elongated Particles in Coarse Aggregate." Test is performed on coarse aggregate larger than 4.75 mm. The required maximum value shall be 10%.

2.1.3.4 Clay Content:

ASTM D2419, "Sand Equivalent Value of Soils and Fine Aggregate." The allowable clay content value for fine aggregate shall be sand equivalent of minimum 45%.

2.1.4 Source Aggregate Requirements

2.1.4.1 Toughness:

ASTM C131, "Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine." The required maximum loss shall be 35%.

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- 2.1.4.2 Soundness:
ASTM C88, "Soundness of Aggregates by use of Sodium Sulfate or Magnesium Sulfate." The required maximum loss shall be 18% for Coarse aggregate and 20% for Fine aggregate.
- 2.1.4.3 Deleterious materials:
ASTM C142, "Clay Lumps and Friable Particles in Aggregates."
- 2.4.1.4 Asphalt Mixture Gradation Requirements
The design aggregate structure shall meet the Superpave gradation requirements. A design structure must pass between gradation control points while avoiding gradation restricted zones.
- 2.1.4.5 9.5 mm Nominal Maximum Size
City of Vancouver, Slot-Mix (also referred to as #32 1/2" Surface Mix). The design aggregate gradation for the above shall pass below the restricted zone.

Sieve (mm)	Control Points		Restricted Zone Boundary	
			Minimum	Maximum
19				
12.5	100.0			
9.5	90	100.0		
4.75		90		
2.36	32.0	67	47.2	47.2
1.18			31.6	37.6
0.600			23.5	27.5
0.300			18.7	18.7
0.150				
0.075	2.0	10.0		

- 2.1.4.6 12.5 mm Nominal Maximum Size
City of Vancouver, Heavy Duty Surface Mix (also referred to as 3/4" Surface Mix).
The design aggregate gradation for the above shall pass below the restricted zone.

Sieve (mm)	Control Points		Restricted Zone Boundary	
			Minimum	Maximum
19		100.0		
12.5	90.0	100.0		
9.5				
4.75				
2.36	28.0	58.0	39.1	39.1
1.18			25.6	31.6
0.600			19.1	23.1
0.300			15.5	15.5
0.150				
0.075	2.0	10.0		

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- 2.1.4.7 25 mm Nominal Maximum Size
City of Vancouver, Base Mix (also referred to as 1 ½" Base Mix)
It is recommended that the design gradation pass below the restricted zone.

Sieve (mm)	Control Points		Restricted Zone Boundary	
			Minimum	Maximum
37.5		100.0		
25	90	100.0		
19				
12.5				
9.5				
4.75			39.5	39.5
2.36	19.0	45.0	26.8	30.8
1.18			18.1	24.1
0.600			13.6	17.6
0.300			11.4	11.4
1.150				
0.075	1.0	7.0		

- 2.1.4.8 Mixing tolerances:
Permissible variation in an aggregate gradation from the job mix (percent of total mass) shall be as follows:

<u>Gradation</u>	<u>Tolerance</u>
Passing 4.75 mm and larger sieves	+/- 5%
Passing 2.36 mm to 0.6 mm	+/- 4%
Passing 0.6 mm to 0.3 mm	+/- 3%
Passing 0.3 mm to 0.15 mm	+/- 2%
Passing 0.15 mm to 0.075 mm	+/- 1.5%

*Note: Superpave uses these aggregate size definitions:

Maximum Size: One sieve size larger than the nominal maximum size.

Nominal Maximum Size: One sieve size larger than the first sieve to retain more than 10 percent.

Control Points: Function as master range between which gradation must pass.

Restricted Zone: Resides along the maximum density gradation. It forms a band through which the gradation cannot pass.

2.2 Asphalt Mix Design

- 2.2.1 Submit job mix formula to the Engineer for review and approval.
- 2.2.2 Mix Designs should be based on the improvements and updates (May 1999) made to the following AASHTO Standards:

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- MP2: Specifications for SuperPave Volumetric Mix Design
- PP2: Practice for Mixture Conditioning of Hot-Mix Asphalt (HMA)
- PP28: Practice for Designing Superpave Volumetric Design for HMA
- TP4: Method for Preparing And Determining the Density of Hot-Mix (HMA) Specifications by means of the SHRP Gyratory Compactor
- "Superpave 2000 - Improved Standards For A New Millennium" issued by Canadian Strategic Highways Research Program (C-SHRP): C-SHRP Technical Brief #17.

- 2.2.3 Laboratory compaction shall be by means of a Superpave Gyratory Compactor (SGC) and the asphalt content selected based on volumetric design requirements according to Asphalt Institute Manual Series No.2 (SP-2), Superpave Level 1 Mix Design.

Mixture Properties	Criteria
Air Voids, %	4.0
VMA, % for 25 mm Nominal Max. Size	12.0 min
VMA, % for 12.5 mm Nominal Max Size	14.0 min
VFA, %	65 - 70
Dust Proportion	0.6 - 1.2
% Gmm @ N - ini	less than 89
% Gmm @ N - max	less than 98
Gmm - maximum theoretical specific gravity	

- 2.2.4 The Superpave level 1 specimen preparation procedures shall be according to AASHTO Designation TP4, and for the volumetric design, AASHTO Designation MP2 as referred above.

2.3 Compactive Effort

Asphalt mix shall be designed at the following specified design number of gyrations:

N-initial	8
N-design	100
N-maximum	160

2.4 Mixture Properties

The design asphalt content is established at 4.0 % air voids.

2.5 Reclaimed Asphalt Pavement (RAP)

Superpave may contain up to a maximum 15% RAP by weight of total mix without a special mix design. The Engineer may approve a higher proportion of RAP if the Contractor demonstrates the ability to produce a mix meeting the requirements of the specification.

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TIER	% RAP by wt of Total Mix	Determine RAP AC Content	Measure RAP Graduation	Measure RAP AC Stiffness	Measure Agg Blend Properties	PG Grade Change
1	< 15%	(a)	yes	no	yes	none
2	16% to 25%	yes	yes	no (b)	yes	one grade lower (c)
3	> 25%	yes	yes	yes	yes	use blending chart
(a) At the discretion of the agency (b) Unless blending chart is used (c) Or use blending chart						

3.0 EXECUTION

3.1 Equipment

- 3.1.1 Pavers: mechanical self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- 3.1.2 Spreader boxes shall not be used for the placement of asphalt under this contract unless approved by the City of Vancouver.
- 3.1.3 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- 3.1.4 Vibratory Rollers:
- 3.1.4.1 Vibratory Rollers may be used only if it can be operated safely, without vibratory damage to nearby structures and utilities, or caused unreasonable discomfort to nearby citizens.
 - 3.1.4.2 Minimum drum diameter: 1200 mm.
 - 3.1.4.3 Maximum amplitude of vibration: 0.5 mm for lifts less than 40 mm thick.
- 3.1.5 Haul trucks: of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
- 3.1.5.1 Boxes with tight metal bottoms.
 - 3.1.5.2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - 3.1.5.3 In cool weather or for long hauls, insulate entire contact area of each truck box.
 - 3.1.5.4 Trucks which cannot be weighed in a single operation on scales supplied will not be accepted.
- 3.1.6 Hand tools:
- 3.1.6.1 Lutes or rakes with covered teeth for spreading and finishing operations.
 - 3.1.6.2 Tamping irons having mass not less than 12 kg and a bearing area not exceeding 310cm² for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Engineer, may be used instead of tamping irons.
 - 3.1.6.3 Straight edges, 4.5 m in length, to test finished surface.

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3.2 Preparation

- 3.2.1 The Contractor shall examine all base course or other materials to be paved prior to commencing asphaltic concrete work and satisfy himself that it is properly prepared to receive pavement in all respects including compaction and grading.
- 3.2.2 The Contractor's responsibility for pavement failures shall include those caused by base, sub-base deficiencies or subgrade compaction failures.
- 3.2.3 When paving over existing asphalt surface, clean existing pavement surface. When levelling course is not required, patch and correct depressions and other irregularities to approval of the Engineer before beginning paving operations.
- 3.2.4 Apply prime coat and tack coat in accordance with City of Vancouver standards prior to paving.
- 3.2.5 Prior to laying mix, clean surfaces of loose and foreign material.

3.3 Transportation of Mix

- 3.3.1 Transport mix to job site in vehicles cleaned of foreign material.
- 3.3.2 Paint or spray truck beds with light oil, limewater, soap or detergent solution, at least once a day or as required. Elevate truck bed and thoroughly drain. No excess solution will be permitted.
- 3.3.3 Schedule delivery of material for placing in daylight, unless Engineer approves artificial light.
- 3.3.4 Deliver material to paver at a uniform rate and in an amount within capacity of paving and compacting equipment.
- 3.3.5 Deliver loads continuously in covered vehicles and immediately spread and compact. Deliver and place mixes at a temperature within range directed, but not less than 135 °C.

3.4 Placing

- 3.4.1 Ensure base course materials and existing surfaces are satisfactory prior to placing asphalt.
- 3.4.2 Place asphalt concrete to thickness, grades and lines indicated on Contract Drawings or as directed by Engineer.
- 3.4.3 Placing conditions:
 - 3.4.3.1 Place asphalt mixtures only when air temperature is above 4 °C.
 - 3.4.3.2 When temperature of surface on which material is to be placed falls below 10 °C, provide extra rollers as necessary to obtain required compaction before cooling.
 - 3.4.3.3 Do not place hot-mix asphalt when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- 3.4.4 Place asphalt concrete in compacted lifts of thickness as follows:
 - 3.4.4.1 To thickness required but not exceeding 75 mm or less than 50mm each lift.
 - 3.4.4.2 Spread and strike off mixture with self propelled mechanical finisher.

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- 3.4.4.3 Place required total thickness in two lifts and confirm thickness of each lift with the Engineer prior to placement.
- 3.5 In addition to the requirements of this specification, the contractor shall adhere to the practices described in the Paving Manual Series No. 8 published by the Asphalt Institute.
- 3.5.1 Roll asphalt continuously to average density not less than 97% of 75 blow Marshall density obtained in accordance with ASTM D1559 with no individual test less than 95% with specimens prepared from samples of mix being used.
- 3.5.2 General:
- 3.5.2.1 Provide at least two rollers and as many additional rollers as necessary to achieve specified pavement density. When more than two rollers are required, one roller must be pneumatic tired type.
- 3.5.2.2 Start rolling operations as soon as placed mix can bear weight of roller without undue displacement of material or cracking of surface.
- 3.5.2.3 Operate roller slowly initially to avoid displacement of material. For subsequent rolling do not exceed 5 km/h for static steel- wheeled rollers and 8 km/h for pneumatic- tired rollers.
- 3.5.2.4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 20 impacts per metre of travel. For lifts less than 50 mm thick, impact spacing should not exceed compacted lift thickness.
- 3.5.2.5 Overlap successive passes of roller by at least one half width of roller and vary pass lengths.
- 3.5.2.6 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.
- 3.5.2.7 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.
- 3.5.2.8 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.
- 3.5.2.9 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side.
- 3.5.2.10 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll when joint between lanes is rolled.
- 3.5.2.11 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.
- 3.5.3 Breakdown rolling:
- 3.5.3.1 Commence breakdown rolling with static steel wheeled roller immediately following rolling of transverse and longitudinal joint and edges.
- 3.5.3.2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.

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3.5.4 Second rolling:

3.5.4.1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.

3.5.4.2 Rolling shall be continuous after initial rolling until mix placed has been thoroughly compacted.

3.5.5 Finish rolling:

3.5.5.1 Accomplish finish rolling with two-axle or three-axle tandem steel wheel rollers while material is still warm enough for removal of roller marks. If necessary to obtain desired surface finish, Engineer may specify use of pneumatic-tired rollers.

3.5.5.2 Conduct rolling operations in close sequence.

3.6 Joints

3.6.1 General

3.6.1.1 Trim to vertical face to provide true surface and cross section against which new pavement may be laid. Remove loose particles.

3.6.1.2 Paint joint face with thin coat of hot asphalt cement or preheat joint face with approved heater, prior to placing of fresh mix.

3.6.1.3 Overlap previously laid strip with spreader by 100 mm.

3.6.1.4 Remove surplus material from surface of previously laid strip. Do not dispose on surface of freshly laid strip.

3.6.1.5 Construct joints between asphalt concrete pavement and portland cement concrete pavement as indicated.

3.6.1.6 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

3.7 Finish Tolerances

3.7.1 Finished asphalt surface to be within 5 mm of design elevation but not uniformly high or low.

3.7.2 Finished asphalt surface not to have irregularities exceeding 5 mm when checked with a 4.5 m straight edge placed in any direction.

3.7.3 Water ponding is not permitted.

3.8 Defective Work

3.8.1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required. If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form a true and even surface and compact immediately to specified density.

3.8.2 Repair areas showing checking or rippling.

3.8.3 Repair areas showing improper surface drainage.

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3.8.4 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

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1.0 GENERAL

- 1.0.1 Section 02523 refers to those portions of the work that are unique to the construction of Portland cement concrete walks, curbs and gutters. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.

1.1 Related Work

- 1.1.1 Cast-in-Place Concrete Section 03300
- 1.1.2 Excavation, Trenching, Backfilling and Surface Restoration Section 02223

1.2 Test Panels

- 1.2.1 If specified in Contract Documents construct test panels to set standard for acceptance of finished surfaces.

1.3 Measurement for Payment

- 1.3.1 Payment for work performed under this section will be incidental to work described in other Sections.

1.4 Inspection and Testing

- 1.4.1 Engineer will arrange for all testing for work described in this Section.

2.0 PRODUCTS

2.1 Materials

- 2.1.1 Granular subbase: to Section 02226 - Aggregates and Granular Materials.
- 2.1.2 Granular base: to Section 02226 - Aggregates and Granular Materials.
- 2.1.3 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.
- 2.1.4 Concrete mixes and materials: to Section 03300 - Cast-in-Place Concrete with the following criteria specific to this section:
- 2.1.4.1 Hand-formed and hand-placed concrete:
Slump: 80mm.
Air entrainment: 6 to 9%.
Maximum aggregate size: 19 mm.
Minimum cement content: 335 kg/m³.
Minimum 28 day compressive strength 32 MPa.
- 2.1.4.2 Extruded concrete:
Slump: 0 - 25 mm.
Air entrainment: 7 to 10 %.
Maximum aggregate size: 9.5 mm.

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Fineness modulus: 2.1 to 2.4.
Minimum cement content: 335 kg/m³.
Minimum 28 day compressive strength 32 MPa.

2.1.5 Joint filler and Curing Compound: to Section 03300 - Cast-in-Place Concrete.

3.0 EXECUTION

3.1 Granular Subbase and Base

3.1.1 Place subbase and minimum of 100 mm granular base material to design grade as shown on Contract Drawings, including Standard Detail Drawings.

3.1.2 Compact subbase and base to minimum 95% Modified Proctor density.

3.1.3 Obtain Engineer's approval of compacted base prior to placing forms or control devices for extruding equipment.

3.2 Formwork

3.2.1 Ensure steel forms of approved design and free from twists and warp.

3.2.2 Ensure wood forms of select dressed lumber, straight and free from defects and thoroughly cleaned.

3.2.3 Use flexible forms for all curves less than 60 m radius.

3.2.4 After obtaining Engineer's approval of compacted base, set forms to line and grade as shown on Contract Drawings, free from waves or irregularities in line or grade.

3.2.5 Set special isolation forms as required around catchbasins, manholes, poles or other objects as shown on Contract Drawings or as directed by Engineer.

3.2.6 Forms to be to shape, lines and full dimensions of work being formed.

3.2.7 Adequately brace forms to maintain specified tolerances after concrete is placed.

3.2.8 Treat forms lightly with approved form release agent and remove surplus agent.

3.2.9 At lanes, crossings, etc., formwork shall be left in place until the concrete has attained sufficient strength to bear traffic loads without edge damage.

3.3 Inspection

3.3.1 Immediately prior to placement of concrete, carefully inspect all formwork to ensure forms are properly set at required horizontal and vertical alignment, sufficiently rigid, clean, surface treated and ready for placement of concrete. Obtain Engineer's approval of formwork and compacted base.

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3.4 Concrete Placement

- 3.4.1 Place concrete to Section 03300 - Cast-in-Place Concrete and the following criteria specific to this section.
- 3.4.2 Do not place concrete during rain or on ponded water or frozen base.
- 3.4.3 Do not place concrete when air temperature appears likely to fall below 4°C within 24 h, unless specified precautions are taken and approved by Engineer.
- 3.4.4 Schedule concrete placement to ensure sufficient daylight hours available to permit edging and finishing or provide adequate illumination.
- 3.4.5 Moisten granular base immediately prior to placing concrete.
- 3.4.6 Place concrete within 1.5 h of batching time.
- 3.4.7 Place concrete in forms, ensuring no segregation of aggregate and consolidate with approved mechanical vibrator or power screed.
- 3.4.8 Place concrete in continuous operation until entire panel or section completed. Do not place fresh concrete on concrete which has achieved partial set.
- 3.4.9 Incorporate all castings into concrete at time of placement.
- 3.4.10 Discontinue placement at expansion, construction or isolation joints only.
- 3.4.11 Remove face forms as soon as practical to permit face finishing. Do not leave face forms in place overnight.

3.5 Extruded Sections

- 3.5.1 Extruding machine to be fitted with approved template consistent with sections shown on Standard Detail Drawings.
- 3.5.2 Extruded sections to be true to line, grade and cross-section.
- 3.5.3 Finished appearance, quality and workmanship to comply with Contract Drawings, this Specification and Standard Detail Drawings.
- 3.5.4 Where finished product does not conform to specifications, remove defective product and replace.
- 3.5.5 Defective extruded work replaced with hand placed concrete to be paid at tendered price for extruded product.

3.6 Driveway Crossings and Wheel Chair Ramps

- 3.6.1 Construct driveway crossings and wheel chair ramps where shown on Contract Drawings or to Standard Detail Drawings.

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3.7 Tolerances

- 3.7.1 Maximum horizontal deviation = 6 mm.
Maximum vertical deviation = 6 mm.
Maximum deflection from horizontal or vertical alignment to be 6 mm in 3 m.

3.8 Control Joints

- 3.8.1 In sidewalks, construct control joints at maximum 3 m intervals.
- 3.8.2 In curb or curb and gutter construct control joints at maximum 3 m intervals and match with control joints in abutting sidewalk.
- 3.8.3 Cut to minimum depth of concrete section as directed by Engineer.
- 3.8.4 Use proper tool to make cut while concrete is still green or sawcut after concrete has hardened.

3.9 Isolation Joints

- 3.9.1 Form isolation joints around all poles, hydrants, manholes and all structures or fixed objects located within the concrete section by using specified joint filling material.
- 3.9.2 Form longitudinal isolation joints between sidewalk and abutting curb and gutter, abutting utility strips, abutting structures using 13 mm approved joint filling material.
- 3.9.3 Use 13 mm premoulded hardboard joint material to form isolation joints between sidewalks and abutting walls and structures.

3.10 Finishing

- 3.10.1 Finish surface of concrete sidewalks and utility strips to smooth surface with magnesium or wood float trowel and brush or broom to provide uniform non-skid surface.
- 3.10.2 Broom or brush crossways or as otherwise required to match adjacent finish or as directed by Engineer.
- 3.10.3 Grooves or scoring (dummy joints) used for aesthetic purposes as shown on the Contract Drawings or as directed by Engineer, to be marked with proper tools and set 15 mm deep.
- 3.10.4 Finish driveway crossings and wheel chair ramps as shown on Standard Detail Drawings.
- 3.10.5 Round edges with steel edging tool to a width of 50 mm around perimeter of each panel or as shown on Standard Detail Drawings.
- 3.10.6 Ensure surface of handformed curb and gutter is smooth trowelled finish. Ensure extruded curb and gutter is smooth finished and hand trowelled as required to correct irregularities.
- 3.10.7 Under no circumstances is concrete to be overworked by trowelling, dusted with dry cement or finished with a mortar coat.

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3.10.8 Ensure finished surface as specified.

3.10.9 Finished curb and gutter shall have a smooth and uniform surface, true to line, grade and section, and be free from air pockets, sags, bumps, or other irregularities and shall be satisfactory to the Engineer.

3.10.10 Divisions and Markings

3.10.10.1 Walks 1.5 m in width shall be marked off in panels 1.5 m long. Walks 1.8 m in width shall be marked off in panels 1.5 m long.

3.10.10.2 Cutting and marking tool shall have a cutting edge not less than 25 mm in depth and the edge of the panel shall be rounded to a 6 mm radius.

3.10.11 Carefully fit, cut and mark the sidewalk around all waterworks boxes, lamp standards, poles, and hydrants to the satisfaction of the Engineer.

3.11 Special Effects

3.11.1 Exposed aggregate and coloured or stamped concrete as specified on Contract Drawings.

3.11.2 At Street intersections, the year shall be stamped in the surface of the sidewalk as directed by the Engineer. The necessary figures will be available from the Engineer.

3.12 Protection

3.12.1 Protect freshly finished concrete from dust, rain or frost by using tarpaulins or other suitable protective coverings for 24 hours after final set. Keep clear of finished surface.

3.13 Curing

3.13.1 Apply approved curing compound to all exposed concrete surfaces at rate recommended by manufacturer or alternatively, use moist curing procedures for a minimum of 7 calendar days.

3.13.2 When temperature is below 5°C, maintain all concrete at temperature not less than 10°C for at least 72 h and protect from freezing for at least another 72 h or such time as required to ensure proper curing of concrete. Admixtures are not to be used for prevention of freezing.

3.14 Perforated Drain Pipe

3.14.1 Where shown on Contract Drawings or where directed by Engineer install perforated drain pipe adjacent to sidewalk or curb and gutter.

3.14.2 Drain pipe or fittings to be continuously extruded polyvinyl chloride (PVC) or acrylonitrile butadienestyrene (ABS) plastics, meeting the requirements of the latest revision of CSA Standard B182.1-87. It shall be available in 3 metre lengths with nominal diameter of 100 mm and perforations as detailed in Section 4.1.4 of CSA Standard B182.1-87 for leach field pipe. The pipe will include bell and spigot design suitable for solvent welding.

3.14.3 Connect to catch basins and stamp letter "D" in walk where drain crosses under.

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- 3.14.4 Perforated corrugated metal pipe (PCMP) shall conform to the latest revision of the requirements for Corrugated Metal Culvert Pipe AASHTO Designation M36. PCMP shall consist of 18 gauge (minimum 1.214 mm) metal with 6.35 mm minimum diameter rivets or the seam may be formed by welding. Helical corrugated pipe will be acceptable if it has corrugation 6.35 mm deep by 38 mm wide. Perforations shall consist of two groups of two lines each. The holes shall be not less than 6.35 mm nor more than 11.1 mm in diameter and shall be located in the inside ridges of all corrugations. The lines of holes shall be approximately 25 mm apart and the outer rows of holes shall be not more than 67.5 degrees from the centre line of the unperforated segment.
- 3.14.5 Drain pipe placed across lane entrances shall be either corrugated metal pipe or non-perforated PVC pipe conforming to the latest CSA standard and having a S.D.R. of 28 or lower, 700 KPa at 5% deflection, and a minimum of 400 mm of cover.
- 3.14.6 Filter fabric shall be non-woven, needle punched or spun bonded with a minimum Grab Tensile strength of 330 N (75 lbs) ASTM D-1682; a minimum Ball Bursting strength of 550 N (125 lbs) ASTM D-3787 or Mullen Bursting strength of 0.86 MPa (125 psi) ASTM D751 and water permeability of 0.2 to 0.3 cm per second.

3.15 Acceptance

- 3.15.1 Before acceptance of finished concrete remove all irregular, cracked, vandalized or otherwise defective sections and replace in accordance with specifications.
- 3.15.2 Any portion marked or damaged by vandalism, rain, frost, equipment, traffic, or other, is to be replaced.

3.16 Adjustment of Existing Catchbasins

- 3.16.1 Adjust existing catchbasins to specified alignment and elevation using concrete bricks and mortar or concrete adjusting rings.
- 3.16.2 Remove all debris from inside catchbasin.

END OF SECTION

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**SECTION 02742
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1.0 GENERAL

- 1.0.1 Section 02742 refers to those portions of the Work that are unique to the supply and installation of watermain up to 450mm diameter, hydrants, valves and valve boxes, service connections and related appurtenances. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.
- 1.0.2 All details of waterworks facilities not specifically covered in this section to comply with the latest edition of the appropriate American Water Works Association (AWWA) standards, unless otherwise directed by the Engineer.

1.1 Related Work

- 1.1.1 Excavating, Trenching, Backfilling and Surface Restoration Section 02223
1.1.2 Cast-in-Place Concrete Section 03300

1.2 Material Certification

- 1.2.1 All materials to conform to this specification, to the latest edition of the appropriate specifications of the AWWA and of the American Society for Testing and Materials (ASTM) or to other standards expressly specified. All provisions in the AWWA, ASTM or other specified standards pertaining to materials, workmanship, finish, inspection and rejection form part of these specifications as far as they are applicable and not inconsistent. This specification takes precedence over the AWWA or ASTM specifications in the case of a discrepancy or conflict. Materials incorporated into the Work but not specifically covered in the specifications to be of good quality. Permission for use of these materials to be obtained from the Engineer prior to installation.
- 1.2.2 If requested by the Engineer and at least 2 weeks prior to commencing work, submit manufacturer's recent test data and certification that materials to be incorporated into the Works are representative and meet the requirements of this section. Include manufacturer's drawings where pertinent.
- 1.2.3 Material delivery and storage to meet the requirements of the manufacturer. Materials damaged during transportation or through rough handling to be repaired to the satisfaction of the Engineer prior to installation. If, in the opinion of the Engineer, the damaged material cannot be satisfactorily repaired, then the damaged material will be removed from the job site and replaced with new material.

1.3 Shop Drawings and Technical Data

- 1.3.1 Submit shop drawings and technical data, as requested by the Engineer, in accordance with General Condition 12.

1.4 Record Drawings

- 1.4.1 Provide record drawings, including locations of pipes, valves, hydrants, bends, cathodic protection test points and all other appurtenances and inverts of pipes, fittings, valves and valve chambers.
- 1.4.2 Provide connection change-over sheets for each block as shown in the example included in the standard drawings. Blank copies of this form are available from the Engineer.

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- 1.4.3 Provide a completed work order slip for any work done on an individual service other than a change-over. Blank forms are available from the Engineer.

1.5 Scheduling

- 1.5.1 Notify affected residents and businesses at least 2 weeks prior to construction of the scope and timing of work. Submit notification to Engineer for approval prior to distribution.
- 1.5.2 Schedule work to minimize interruptions to existing services. Service interruptions limited to customers served off of the main being replaced, unless otherwise approved by Engineer.
- 1.5.3 Submit schedule and details of expected service interruptions to the Engineer for approval and adhere to approved schedule. Schedule and details to include:
- 1.5.3.1 Methods for temporary servicing.
 - 1.5.3.2 Timing and duration of any temporary servicing.
 - 1.5.3.3 Tie-in sequence, method and timing.
- 1.5.4 Notify any affected residences and businesses, in writing, a minimum of 48 hours in advance of any interruption in service. Notices and corresponding distribution area to be approved by the Engineer prior to distribution.
- 1.5.5 Do not interrupt water service for more than 3 hours and confine this period between 0900 and 1600 hours unless otherwise approved by the Engineer. Provide temporary servicing to those customers who cannot accommodate a service interruption during this period, in the opinion of the Engineer, such as restaurants, hair salons, hospitals, educational institutions, daycares, process industries, and photo labs, or schedule work so as to minimize disruption. Payment for temporary servicing will be incidental to payment for watermain installation.
- 1.5.6 Notify Fire Department at 604-665-6031 and the City Waterworks Dept. at 604-323-4800 of any planned or accidental interruption of water supply to hydrants and label these hydrants "Out of Service" or "Not in Use".

1.6 Measurement For Payment

- 1.6.1 All units of measurement for payment will be as specified herein unless shown otherwise in the Form of Tender.
- 1.6.2 Form of Tender describes separate payment items for various sections of watermain consistent with pipe diameters and location of mains shown on the Contract Drawings.
- 1.6.3 Measurement for payment for watermain will be made in a lump sum for each payment item described in the Form of Tender.
- 1.6.4 Payment for watermain will include saw cutting, excavation, disposal of surplus excavated material, bedding, supply and installation of all pipe, valves, hydrants and fittings, all thrust blocking, polyethylene encasement and support concrete, bolts, gaskets and tie-rods, imported fill, cleaning, pressure and leakage testing, flushing, disinfection, removal and disposal of abandoned main as shown on drawing, service connection change over (transfer to new main), service replacements as shown on contract drawing, temporary servicing and all other work and materials necessary to complete the installation as shown on the Contract Drawings and specified herein

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- 1.6.5 Payment for hydrants, including lateral connections from watermain to hydrants, valve and adjustable valve box, will be incidental to payment for watermain installation.
- 1.6.6 Payment for service connections, including the scope defined in 1.6.4, surface restoration and mainline saddles where specified, corporation stops, curb stops, and all related fittings and appurtenances specified or shown on Standard 301 Section 3, will be incidental to payment for watermain installation. The waterworks connection database service lists are provided for reference only. Contractor must verify locations and material in the field. All services from the old main must be changed over to the new main. The database may not have listed all the addresses or services. Payment for all services changed over from the existing main to the new main, whether listed in the database or not, will be incidental to payment for watermain installation.
- 1.6.7 Payment for mainline valves, including valves, valve boxes and support or anchor blocks will be incidental to payment for watermain installation.
- 1.6.8 Payment for air-release / air-vacuum and combination air valves, chambers and apparatus will be incidental to payment for watermain installation.
- 1.6.9 Payment for polyethylene bagging shown on drawings will be incidental to payment for watermain installation. Payment for polyethylene bagging not shown on drawings will be measured in lineal metres at the unit price bid.
- 1.6.10 Miscellaneous fittings and appurtenances not specifically identified on the Contract Drawings, and not included in the described separate payment items in the Form of Tender, are deemed to be included in described payment items.
- 1.6.11 Payment for abandoning old watermain, removal of old valves and hydrants, including scope defined in item 3.6 will be incidental to payment for watermain installation.
- 1.6.12 Payment for removing old curb stop riser pipe that contains asbestos will be in units removed.
- 1.6.13 Payment for sawcutting of asphalt and concrete pavement up to 150 mm depth will be incidental to payment for watermain installation.
- 1.6.14 Payment for sawcutting of asphalt and concrete pavement deeper than 150mm up to 300 mm depth, including removal of cut material will be measured in lineal metres at the unit price bid.
- 1.6.15 Payment for removal of existing watermain as shown on the Contract Drawings, including sawcutting, excavation, backfilling, disposal, surface restoration and temporary servicing will be incidental to payment for watermain installation.
- 1.7 Inspection and Testing**
- 1.7.1 Engineer will arrange for testing other than that specified in Part 3.0, Execution, to be performed by Contractor.
- 1.7.2 Contractor to accommodate soil resistivity testing by City crew during excavation of trench and prior to laying pipe at least once per block, or as directed by the Engineer. Engineer will arrange for testing.

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2.0 PRODUCTS

2.1 Mainline Pipe, Joints and Fittings

2.1.1 Ductile Iron Pipe:

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- 2.1.1.1 Ductile iron pipe to conform to current AWWA Standards 151/A12-51-86, thickness Class 52, double cement mortar lined to AWWA C104/A21.4-90 with the added requirement that the lining not exceed a maximum thickness of 1/4" (6.4 mm) for 100-300 mm pipe, and 3/8" (9.5 mm) for 450 mm pipe.
- 2.1.1.2 Unless otherwise specified, the exterior surface of all pipes shall be coated in accordance with AWWA Standard C151/A21.51-86. The material shall be smooth, durable and water resistant. It shall be tough and well bonded to the pipe surface.
- 2.1.1.3 The nominal laying length of the pipe, as defined in AWWA C151/A21.51-86, Section 51-4 shall be 18 or 20 feet (5.5 or 6.0 m).
- 2.1.2 Joints:
- 2.1.2.1 Pipe shall be "Tyton" push-on bell and spigot type joints or mechanical bell and spigot joints in accordance with AWWA C111/A21.11-85. Restrained joint pipe shall conform to the design of "MJ-TJ" pipe as manufactured by "Pacific States Cast Iron Pipe", or City of Vancouver approved equal.
- 2.1.2.2 Gaskets shall be manufactured from Nitrile type (Acrylonitrile Butadiene, NBR) materials, in conformance with AWWA Standard C111/A21.11-85, excluding Section 11-7.4.1 and 11-8.3.1.
- 2.1.2.3 All gasket lubricant shall meet the specifications set out in AWWA C111/A21-11-85 Section 11-8-4.
- 2.1.3 Fittings:
- 2.1.3.1 All fittings shall be ductile iron and shall conform to AWWA C110/A21.10-87 suitable for pressure rating of 350 psi (2410 kPa), double cement mortar lined to AWWA C104/A21.4-90. The maximum cement lining thickness shall not exceed the specified minimum "double thickness" by more than 150 percent.
- 2.1.3.2 Flanged ends shall conform to American Standard Association (ASA) B16.1, Class 125 with drilling and dimension to ANSI B16.1, for cast iron flanges Class 125, unless otherwise specified by the Engineer.
- 2.1.3.3 "Tyton" push-on bell and spigot ends or mechanical bell and spigot ends shall conform to AWWA Standard C111/A21.11-85.
- 2.1.3.4 Bolts and nuts used with mechanical joints shall be made of high tensile strength (60,000 psi, 400 MPa) low alloy steel (Corten) conforming to Section 11-7.5, AWWA C111-85 composition specification.
- 2.1.3.5 Gaskets and lubricant shall be in accordance with Sections 2.1.2.2 and 2.1.2.3 respectively.
- 2.1.3.6 Couplings shall be mechanical type and shall be Dresser Style 38 or 162 Robar or approved equal, suitable for 150 psi (1034 kPa) pressure class and 50% surge, with ends suitable for the piping materials used. Flanged adapters shall be Dresser Style 128 Robar or approved equal, with flanges conforming in drilling and dimension to ANSI B16.1 for cast iron flange Class 125, unless otherwise specified by the Engineer.

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| 2.1.3.7 | Tie rods shall be in accordance with Section 2.1.3.4 and shall be sized in accordance with Waterworks Standard 415-5-1. No tie rods are permitted on installations requiring cathodic protection. |
| 2.1.3.8 | Wedge Action Restraints shall be Uni-Flange Series 1400 for ductile iron pipe, as manufactured by Ford Meter Box Co., or Engineer approved equal. Wedge Action Harness shall be Uni-Flange Series 1450 for ductile iron pipe, as manufactured by Ford Meter Co., or Engineer approved equal. |

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2.2 Valves and Valve Boxes

- 2.2.1 Isolating valves and accessories shall conform to the latest edition of AWWA Standard C509-94, "Resilient Seated Gate Valves for Water Supply Service" and C111 A21.11-85 "Rubber Gasket Joints for Ductile Iron and Grey Iron Pressure Pipe and Fittings" or as otherwise expressly indicated in this specification. Isolating valves shall be located on all sides of each intersection, in line with adjacent property lines, or where otherwise required by the Engineer.
- 2.2.2 The body and bonnet of valves shall be made of ductile iron. AWWA C509 shall determine wall thickness of the valves. Valves shall be of the resilient wedge, non-rising stem and with "Tyton" push-on, mechanical or flanged ends as specified in the Contract Drawings.
- 2.2.3 Valves shall be designed for a working pressure of 200 psi (1380 kPa)
- 2.2.4 Bolts, studs and nuts shall be cadmium plated ASTM A307 Grade B.
- 2.2.5 The stem nuts, glands and bushings for NRS valves and the followers or glands on OS&Y valves shall be made of grade 1 bronze as specified in AWWA C509 and ASTM B62. The tensile strength must not be less than 30,000 psi (207 MPa) and yield strength of not less than 14,000 psi (96 MPa).
- 2.2.6 The stem shall be of the non-rising type and made of manganese bronze to ASTM B132 Grade B or ASTM B147-8A. The tensile strength must not be less than 65,000 psi (448 MPa) and yield strength of not less than 25,000 psi (172 MPa).
- 2.2.7 Where flanged end valves are used, unless otherwise specified, flanges shall conform in dimensions and drilling to ANSI B16.1 Class 125 and shall conform to the latest edition of ASTM A105 Grade 2.
- 2.2.8 All joint accessories (M.J. Glands, bolts and nuts, O-ring, gaskets, gasket lubricant etc.) shall be in accordance with appropriate Sections in this specification. Gaskets shall be nitrile.
- 2.2.9 Air release valves shall be Apco Combination Air Valve model 143C, 1-inch diameter(25 mm), or approved equal.
- 2.2.10 Valve boxes and lids shall be Telescopic, grey iron castings and conform to City of Vancouver, Waterworks Standards 407/1/1-4 and 407/4/1-2. Valve boxes and lids may be picked-up by the Contractor from the City of Vancouver Central Stores. The City will furnish the valve boxes and lids at no charge to the Contractor. Co-ordinate pick-up of materials with Engineer.

2.3 Service Connection and Appurtenances

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- 2.3.1 No water services shall be installed or transferred to the watermain without approval of the Engineer. Pre-servicing in anticipation of future development will not be permitted. All services must be designed and located in accordance with "City of Vancouver Building Trades: City Water Information", available from Waterworks Design Office, City Hall.
- 2.3.2 Service pipe shall be certified 'K' type copper tube and shall conform to the latest edition of the ASTM Standard Specifications for Seamless Copper Tube, designation B88.

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- 2.3.3 Service line valves (corporation stops and curb stops) and fittings shall conform to AWWA Standard C800-89 for underground service line valves and fittings. All valves and fittings shall withstand static pressure of 300 psi.
- 2.3.4 Saddles for service connections (where required , see section 3.12.4) shall conform to City of Vancouver, Waterworks Standard 415-4-1.
- 2.3.5 If cathodic protection of watermain is required, insulating main stop shall be used for each service connection, in accordance with Waterworks Standard 413-4-3.
- 2.3.6 The depth of the installed water service must be 2.5' (.75m) minimum.

2.4 Fire Hydrants

- 2.4.1 Fire hydrants shall be low head loss, dry, short barrel and compression type with two 2-1/2-inch (62.5 mm) ports and one 4-inch (100 mm) (I.D.) pump port conforming to AWWA Standard C502-85 for Dry-barrel Fire Hydrants and City of Vancouver, Waterworks Standard 409/1/1-4. The threads of the ports shall meet the specifications shown in City of Vancouver Waterworks Standard 409/2/2. Fire hydrants shall be Terminal City model C71PLT, Mueller model A442 or AVK dry barrel hydrant series 2780.
- 2.4.2 Fire hydrants shall be equipped with a (6-inch 150 mm) nominal diameter mechanical joint inlet connection, conforming to AWWA Standard C110/A21.10-87. The mechanical joint shall be wedge action restraint in accordance to City of Vancouver Standard 301/2/2. The gasket material shall be "Nitrile".
- 2.4.3 Fire hydrants shall be painted in the following manner:
- 2.4.3.1 The exterior of the hydrant shall be painted red. The paint shall be oil or acrylic enamel.
 - 2.4.3.2 The exterior of the hydrant barrel below ground line shall be painted with one coat of coal tar enamel.
 - 2.4.3.3 Fire hydrants shall be designed for a 1.0 m depth of bury, in accordance with City of Vancouver, Waterworks Standard 301-2-2, and shall be capable of extension with flanged barrel sections in 150 mm multiples (150, 300, 450 mm, etc.).
 - 2.4.3.4 Hydrants shall be subjected to hydrostatic pressure test of 300 psi. The pressure test shall be certified by the manufacturer.

3.0 EXECUTION

3.1 General

- 3.1.1 Pipe bedding details, including granular surround (pipe cushion) and material specifications, to be as shown on Contract Drawings.

3.2 Pipe Storage and Preparation

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- 3.2.1 Pipe must be stacked using timbers to keep bottom tiers off the ground. Pipe must be stored to prevent dirt and debris from entering the pipe.
- 3.2.2 Thoroughly clean pipes, fittings, valves, hydrants, and appurtenances of debris and water before installation. Carefully inspect materials for defects before installing. Remove defective materials from site.

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3.3 Utility Clearance

- 3.3.1 Install watermain with 300mm minimum clearance from all utilities and service connections, with the exception of gas services having a diameter of 20mm or less where the minimum clearance will be 100mm. Gas services larger than 20mm will require 300mm minimum of clearance.

3.4 Trenching

- 3.4.1 Do trenching in accordance with Section 02223 - Excavating, Trenching, Backfilling and Surface Restoration.
- 3.4.2 Trench alignment and depth as shown on Contract Drawings.
- 3.4.3 Trench depth to provide cover over pipe of not less than 0.9m from finished grade unless shown otherwise on Contract Drawings.

3.5 Granular Bedding

- 3.5.1 Fill over-excavation below design elevation of bottom of specified bedding with approved granular bedding placed and compacted in accordance with Section 02223 - Excavating, Trenching, Backfilling and Surface Restoration and Contract Drawings.
- 3.5.2 Place granular bedding material across full width of trench bottom in uniform layers to depth shown on Contract Drawings.
- 3.5.3 Shape bed true to grade to provide continuous uniform bearing surface for pipe. Do not use blocks when bedding pipe.
- 3.5.4 Shape transverse depressions in bedding as required to suit joints.
- 3.5.5 Compact each layer across full width of bed with mechanical plate tamper to minimum 95% Modified Proctor Density in compliance with ASTM D1557. (All following references to density imply compliance with ASTM D1557).
- 3.5.6 Place ductile iron watermain pipe and copper water services in trench and backfill with approved imported material and compact as specified. Use hand tools to compact material under 'haunch' area of pipe and around fittings and other materials.

3.6 Abandonment of Old Watermains

- 3.6.1 Abandoned watermains are to be plugged with a wooden plug at any point where an open abandoned watermain exists. Wood plugs will be supplied by the City at no charge to the contractor. Co-ordinate pickup of materials with the Engineer.

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- 3.6.2 Once the old main has been taken out of service, each grey iron telescopic valve box, top, bottom and lid (refer Standard Water Drawing 301-1-6), and fire hydrants must be removed. Backfill the barrel extending to the valve nut and restore the surface to match established standards in Section 02223 and 02230.

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3.6.3 Salvaged valve box castings and lids and hydrants may at the discretion of the Engineer be asked to be returned to the City of Vancouver works yard at 70th Avenue and Manitoba Street. Arrange delivery times through the Engineer.

3.6.4 No salvaged fittings or pipe to be used on the work without prior Engineer's approval.

3.6.5 Remove abandoned watermains at locations shown on Construction Drawings and dispose at Engineer approved disposal area.

3.7 Pipe Installation

3.7.1 Handle pipe in accordance with pipe manufacturer's recommendations. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.

3.7.2 Install pipe in accordance with the manufacturer's instructions and AWWA C600 except as noted in this specification. In the case of conflicting specifications, the order of precedence, from highest to lowest, is the COV Waterworks Specification, AWWA C600 and then the manufacturer's instructions.

3.7.3 Horizontal tolerance is ± 50 mm from specified alignment. Vertical tolerance is ± 25 mm from specified grade.

3.7.4 Lay pipes on prepared bed, true to line and grade. Ensure barrel of each pipe is in contact with shaped bed throughout its full length.

3.7.5 Face bell ends of pipe in direction of laying.

3.7.6 Do not exceed 3⁰ (three degrees) joint deflection specified in AWWA C600.

3.7.7 Prevent groundwater, dirt and other foreign materials from entering the watermain during construction. Cap the watermains with a watertight plug at open ends as per AWWA C651, except for the addition of other pipes to the system, to prevent the entry of water and foreign materials. If contamination occurs in a watermain that is not connected to the existing system, the Contractor must immediately stop construction and flush the mains with clean water, chlorinate and test as per AWWA C651. If contamination occurs in a watermain that is in service or already connected to the existing system, the Contractor must stop construction, and immediately take the main out of service, flush the main, chlorinate and test as per AWWA C651.

3.7.8 Position and join pipes with equipment and methods specified in 3.7.2.

3.7.9 Cut pipes as required, and as recommended by pipe manufacturer, without damaging pipe or coating and leaving smooth ends at right angles to the axis of the pipe. For tyton joints, bevelling of cut pipe shall be done to resemble manufacturer's bevel.

3.7.10 Joints:

3.7.10.1 Install gaskets as recommended by manufacturer.

3.7.10.2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.

3.7.10.3 Align pipes carefully before joining.

3.7.10.4 Maintain pipe joints free from mud, silt, gravel and other foreign material.

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- 3.7.10.5 Avoid displacing gasket or contaminating with dirt or other foreign material. Remove disturbed or dirty gaskets; clean, lubricate and replace before joining is attempted.
- 3.7.10.6 Complete each joint before laying next length of pipe.
- 3.7.10.7 Minimize joint deflection (no more than 3⁰) after joint has been made to avoid joint damage.
- 3.7.10.8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.
- 3.7.11 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipe or as specified otherwise.
- 3.7.12 When any stoppage of work occurs, restrain pipes in an approved manner to prevent "creep" during down time.
- 3.7.13 Recheck components assembled above ground after placing in trench to ensure that no movement of joints has taken place.
- 3.7.14 Test and/or bleed points consisting of Corporation cocks, sized to achieve minimum flushing velocities of 0.8 m/s in accordance with AWWA C651, to be provided where shown on Contract Drawings or as required by Contractor for pressure testing and flushing.
- 3.8 Valve Installation**
 - 3.8.1 Install valves in accordance with City Standard 301-1-6 and to manufacturer's recommendations at locations shown on Contract Drawings.
 - 3.8.2 Air valves shall be installed in an underground chamber and vented to atmosphere in accordance with Waterworks Standards 301-9-2 and 407-6-1.
- 3.9 Valve Boxes**
 - 3.9.1 Use precast units as shown on Contract Drawings. Precast units to be in accordance with City of Vancouver, Waterworks Standard 407 Section 4 - "Grey Iron Castings - Valve Boxes and lids".
 - 3.9.2 Construct units as shown on Contract Drawings, plumbed and centred over valve nut, true to alignment and matching desired grade level.
 - 3.9.3 Installation of the precast units shall be in accordance with Waterworks Standard 301-1-6. The 10-inch diameter riser pipe shall be SDR 64 PVC with minimum 1/8-inch wall thickness. Valve boxes to line up with the direction of the watermain, or, if on a service, in line with the service main.
 - 3.9.4 The valve box shall be set centrally over the valve nut. The valve box and its appurtenances shall be set and backfilled within 24 hours of setting appurtenance.
- 3.10 Service Connection Installation**
 - 3.10.1 Replace water services as shown on Contract Drawings.

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- 3.10.2 No water services shall be installed or transferred to the watermain without approval of the Engineer. Pre-servicing in anticipation of future development will not be permitted.
- 3.10.3 Install service connections to Section 3.7 and in accordance with "City of Vancouver Building Trades: City Water Information" (Refer Standard Water drawings 301-3-1, 301-3-2.)
- 3.10.4 Construct service connections at right angles to watermain unless otherwise directed by Engineer. Locate curb stops as shown on Contract Drawings or as directed by Engineer.
- 3.10.5 Tappings in ductile iron may be threaded without saddles, subject to the limitations below. Service saddles with galvanised malleable iron bodies and neoprene gaskets cemented in place may be used. Tappings in ductile iron pipe to conform to ANSI/ASME B1.20.1 for 3 to 4 threads shown as Appendix A to AWWA C151.
- 3.10.6 Services that are 100 mm or larger require a tee or tap tee off of the watermain as follows:

Pipe Diameter (mm)	Maximum Tap Without Saddle (mm)	Maximum Tap with saddle (mm)
100	20	50
150	20	50
200	25	50
250	25	50
300	40	75

- 3.10.7 Tap main at 2:00 o'clock or 10:00 o'clock position only; not closer to a joint nor closer to adjacent service connections than recommended by manufacturer, or 1 m whichever is greater.
- 3.10.8 Leave corporation stop valves fully open.
- 3.10.9 In order to relieve strain on connections, install service pipe in "goose neck" form "laid over" into horizontal position. Looping of services is not permitted.
- 3.10.10 Install curb stop, Ford Model BH41-233Q, B41-344Q, B41-666, B41-777 or Engineer approved equivalent, with valve riser and cap on services 50 mm or less in diameter. The City will furnish the riser caps at no charge to the Contractor. Equip larger services with a gate valve and cast iron box. Set box plumb over stop and adjust top flush with final grade elevation. Leave curb stop valves fully closed.
- 3.10.11 During connection installation and/or connection rehook, locate curb stop valve and measure long length from the street or lane and measure a short length from the opposite property line. These measurements will be transferred to the change-over sheet.
- 3.10.12 Place temporary location marker at ends of plugged or capped unconnected water lines. Each marker to consist of 38 x 89 mm (1.5 by 3.5 inch) stake extending from pipe end at pipe level to 600 mm (2 feet) above grade. Using black paint, mark exposed portion of stake with the description "WATER" and depth from top of stake to service in metres.
- 3.10.13 Some old curb stop riser pipes may contain asbestos. Prior to removing any old riser pipes the contractor shall determine if asbestos are present. If asbestos are present the contractor shall comply fully with all WCB requirements in the removal of the riser pipe. Payment for the removal of such pipes will be made at the unit prices bid.

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3.11 Hydrants

- 3.11.1 Install hydrant assemblies at locations shown on Contract Drawings and in accordance with Waterworks Standard 301-2-1.
- 3.11.2 Install hydrant assemblies in accordance with AWWA Manual of Practice and in accordance with Waterworks Standard 301-2-2.
- 3.11.3 Set hydrants plumb, with hose nozzles parallel with edge of pavement or curb line, with pumper nozzle facing roadway at right angles to road centreline and with body flange set at elevation 50 to 150 mm (2-6 inches) above final grade.
- 3.11.4 To provide proper draining for each hydrant, excavate a pit as shown in section 301-2-2 and backfill with coarse gravel or crushed stone to a level 150 mm (6 inch) above drain holes.
- 3.11.5 Place appropriate sign on installed hydrants indicating whether or not they are in service during construction.

3.12 Thrust Blocks

- 3.12.1 Place concrete thrust blocks between valves, tees, plugs, caps, bends, changes in pipe diameter, reducers, hydrants and fittings and undisturbed ground as shown on Contract Drawings or as directed by Engineer. Concrete shall be placed so that pipe and fitting joints are accessible for repair. Bolts on flanged fittings are to remain accessible and extractable.
- 3.12.2 Size of bearing area for thrust blocks as per Standard Water drawings 301-6-1 to 301-6-4.
- 3.12.3 Keep joints and couplings free of concrete.
- 3.12.4 Do not backfill over concrete within 24 hours of placing, unless otherwise approved by the Engineer.
- 3.12.5 Minimum size of thrust blocks to be as shown on Contract Drawings. No thrust blocks shall be permitted in disturbed or unstable soils such as peat or loose fills. Restrained joint designs in accordance with section 2.0.2.1 will be required.

3.13 Pipe Surrounding

- 3.13.1 Upon completion of pipe laying and after the Engineer has inspected work in place, surround and cover pipes as shown on Contract Drawings.
- 3.13.2 End dumping (dumping fill out of a dump truck directly into an excavation) is not acceptable. Native material (such as the material in the excavation wall) must be kept out of the fill material and fill must be placed in a uniform manner that prevents voids.
- 3.13.3 Compaction to be done in 3 lifts, bedding, 600mm below final grade and final grade to minimum 95% Modified Proctor Density. Each lift shall not be more than 600mm.

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3.14 Cleaning and Preliminary Flushing

- 3.14.1 Before flushing and testing, ensure waterworks system is completely finished except tie-ins to existing watermains and make arrangements for scheduling of testing and disinfection of mains.
- 3.14.2 Contractor may obtain water from the City as specified below:
- 3.14.3 Water may be supplied from fire hydrants upon application for a Hydrant Use Permit and presentation of valid test certificate for reduced pressure principle backflow prevention device conforming to AWWA C506. All hydrants to be used must be accompanied by an approved backflow preventive device.
- 3.14.4 Contractor may obtain water from a metered water connection, provided Contractor pays cost of connection fee plus cost of water used.
- 3.14.5 Remove foreign material from pipe and related appurtenances by flushing with water. In case of groundwater penetration refer to item 3.7.7. Main to be flushed at water velocities as high as can be obtained from available water sources. Minimum velocity to be 0.8 m/s, (2.6 fps) and/or in accordance with AWWA C651. Flushing water will not be discarded through storm sewers, water courses or ditches that discharge into natural waterways. Flushing water shall be discarded into storm or combined sewers that have sufficient capacity to carry flow. Use of a combined sewer is subject to approval by the Engineer. If in the event that a combined or storm sewer is not available, the flushing water must be shipped from the site to a suitable dump site. Flushing to continue at least until flow from most distant point has reached discharge point and until water discharged is clean and clear.

3.15 Testing Procedure

- 3.15.1 All testing to be done by a reputable, independent testing firm approved by the Engineer under the direction of the Contractor. Submit schedule and procedures to Engineer for approval before testing. Pressure test against valve is not permitted. Testing costs are to be included in the Contract Price.
- 3.15.2 Contractor to be in attendance during hydrostatic testing.
- 3.15.2.1 Before pipe is filled with water, pipe bedding, concreting of all valves and fittings and backfilling to be completed as required in this specification. Each section of pipe to be filled and allowed to remain full of water for a period of at least 24 h prior to commencement of any pressure tests. All corporation cocks are to be closed during the test.
- 3.15.2.2 Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the Engineer. Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damaged or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure test shall be repaired or replaced with sound material, and the test shall be repeated until it is satisfactory to the Engineer.

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- 3.15.2.3 Leakage shall be defined as the quantity of water that must be supplied into the newly laid pipe or any valved section thereof to maintain pressure within 5 psi (35 MPa or 0.35

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- bar) of the specified test pressure after the pipe has been filled with water and the air has been expelled. Leakage shall not be measured by a drop in pressure in a test section over a period of time.
- 3.15.2.4 No pipe installation will be accepted if the leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{133,200}$$

Where:

- L = allowable leakage, in US gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge)

In metric units,

$$L = \frac{SD\sqrt{P}}{2,816}$$

Where:

- L = allowable leakage, in litres per hour
S = length of pipe tested, in metres
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in bars

- 3.15.3 The pipeline is to be submitted to a test pressure of 1550 kPa (225 psi or 15.5 bars) applied at highest elevation in each section, for a minimum duration of 2.0 hours.
- 3.15.4 No additional leakage allowance will be made when testing against closed metal seated valves.
- 3.15.5 When hydrants are in the test section, they shall be included in the pressure test.
- 3.15.6 Acceptance shall be determined on the basis of allowable leakage. If any test of laid pipe discloses leakage greater than that specified in Item 3.15.2.4, the Contractor shall, at his/her own expense, locate and make approved repairs as necessary until the leakage is within the specified allowance.
- 3.15.7 All visible leaks are to be repaired, regardless of the amount of leakage.
- 3.15.8 Submit a certificate from the testing firm confirming that the pressure and leakage tests have been successfully carried out to the Engineer.

3.16 Disinfection, General

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- 3.16.1 All disinfections and testing to be done by Contractor, using an independent testing firm approved by the Engineer, at the Contractor's cost. Submit schedule and procedures to Engineer for approval before testing.

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- 3.16.2 After Engineer has certified that pipes and appurtenances have passed water pressure test, pipes and appurtenances shall be flushed and disinfected.

- 3.16.3 Disinfection and flushing procedures in accordance with Item 3.17 following.

3.17 Disinfection And Flushing Procedure

- 3.17.1 Disinfection procedure to include retaining water containing not less than 50 mg/L free chlorine in water system for a period of at least 24 h, in accordance with AWWA C651, Continuous Feed Method with liquid chlorine. An outline of proposed disinfection procedure accompanied by marked up schematic drawing to be submitted for approval 48 h in advance of commencement of disinfection.
- 3.17.2 Water from the existing distribution system, isolated by reduced pressure principle backflow prevention device or other approved source of supply shall be made to flow at a constant, measured rate into the newly laid watermain. In the absence of a meter, the rate may be approximated by methods such as placing a Pitot gauge in the discharge, measuring the time to fill a container of known volume, or measuring the trajectory of the discharge and using the formula presented in AWWA C651.
- 3.17.3 At a point not more than 3 m downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 50 mg/L free chlorine. To assure that this concentration is provided, measure the chlorine concentration at regular intervals as specified in AWWA C651.
- 3.17.4 Flow of water containing chlorine not to cease until entire main, all service connections, extremities and hydrants to be treated are filled with 50 mg/L chlorine solution. To ensure that this concentration has been attained throughout, free chlorine residual to be measured at a number of points and extremities along main. Chlorinated water to be retained in main for at least 24 h during which time all valves, curb stops and hydrants in section treated to be operated in order to disinfect them thoroughly.
- 3.17.5 At end of this 24 h period, treated water to contain no less than 25 mg/L free chlorine throughout main. If chlorine content is less than 25 mg/L the chlorination procedure is to be repeated until specifications are met.
- 3.17.6 After completion of chlorination, heavily chlorinated water to be flushed from system, hydrants and services until chlorine concentration in remaining water is less than 0.3 mg/L chlorine residual, or is equal to the source water residual. Chlorinated water flushed from mains shall be discharged into a **sanitary** sewer, or be treated in such a manner that does not pose a threat to aquatic life in receiving water. Obtain approval of Fisheries and Oceans Canada and BC Fish and Wildlife Authority and implement dechlorination procedures as required prior to discharge of chlorinated water anywhere other than into a sanitary sewer.
- 3.17.7 Bacterial samples can be collected one (1) hour after the watermain was flushed if clean dry construction procedure have been followed. However, if contamination of the main (such as groundwater) occurred during construction, the clear water must remain in the main at least sixteen

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(16) hours before sampling. One water sample per City block from the new watermain, and one sample from the source to be collected for bacterial tests (total and fecal coliforms). No sample shall be collected from fire hydrants.

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- 3.17.8 Submit to the Engineer a certificate from the testing firm confirming the chlorination tests have been successfully carried out. Laboratory results for bacterial results must be approved by the Engineer before acceptance and before connections to existing watermain, or transfer of existing water services, will be permitted.
- 3.17.9 Fittings, valves and sleeves required to complete the tie-in from existing to proposed watermain will be swabbed with a 1 percent hypochlorite solution as per AWWA C651. Swabbing only applies for sections less than 3 pipe lengths and for sections that tie a new system to an old system.
- 3.17.10 Upon completion of disinfection and flushing, Contractor to remove and backfill test and bleed point apparatus, and complete any other work required for placing of waterworks system in service.

3.18 Servicing Fire Hydrants

- 3.18.1 Immediately following completion, all hydrants installed as part of the Work will be inspected by City crews. All repair costs (parts and labour) to remedy defective parts or installation will be charged to Contractor.

3.19 Restoration of Service

- 3.19.1 Once all tie-ins, chlorination and pressure testing are complete and the new water piping is ready to be put into service, the contractor will ensure that all valves, including hydrant valves are in good operational order and are in the open position unless otherwise stated in the drawings and specifications. Contractor is required to maintain a log book for the closing and opening of valves. City crews and contractor will conduct joint inspections of the valves prior to substantial completion. Each valve found to be in its incorrect position at the time of this inspection will incur a charge of \$200.00 per valve to the contractor.

3.20 Polyethylene Encasement

- 3.2.1 Encase watermain in polyethylene tubes in areas shown on the Contract Drawings or as directed by the Engineer.
- 3.2.2 Install polyethylene tubes in accordance to ANSI / AWWA C105 / A21.5 Standard – Installation Method A.
- 3.2.3 Payment for polyethylene encasement will be incidental to watermain installation.
- 3.2.4 Addition and deletions to polyethylene encasement will be measured in lineal meters and paid or deducted at the bid price specified in the Tender Form.

END OF SECTION

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TOPSOIL AND FINISH GRADING

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1.0 GENERAL

- 1.0.1 Section 02921 refers to those portions of the Work that are unique to the supply and placement of topsoil and subsequent finishing grade. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.
- 1.0.2 Topsoil to be a sandy loam or loamy sand texture (no less than 50% sand by weight) containing between 5% and 10% organic matter (dry weight basis). To be free from subsoil, roots, noxious grass, weeds, toxic materials, stones over 25mm, foreign objects, and with an acidity range (Ph) of 6.0 to 7.0. To be free from crab grass, equisetum, convolvulus or other noxious weeds or seeds or parts thereof.

1.1 Related Work

- 1.1.1 Excavation, Trenching, Backfill, and Surface Restoration. Section 02223
- 1.1.2 Sodding Section 02938

1.2 Scheduling of Work

- 1.2.1 Schedule placing of topsoil and finish grading to permit sodding operations under optimum conditions.

1.3 Measurement for Payment

- 1.3.1 Payment for all work under this Section will be incidental to payment for work described in other Sections.

2.0 EXECUTION

2.1 Topsoil Grading

- 2.1.1 Grade topsoil, eliminate uneven areas and low spots, ensuring positive drainage. Remove soil contaminated with toxic materials. Dispose of removed materials as directed by Engineer.
- 2.1.2 Cultivate entire area which is to receive topsoil to depth of 100mm. Repeat cultivation in those areas where equipment used for hauling and spreading has compacted soil.
- 2.1.3 Remove surface debris, roots, vegetation branches and stones in excess of 25mm diameter.

2.2 Restoration of Stockpile Sites

- 2.2.1 Restore stockpile windrow sites to match existing surface grades and to be free draining and acceptable to Engineer.

END OF SECTION

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1.0 GENERAL

- 1.0.1 Section 02938 refers to those portions of the work that are unique to the supply and placement of grassed sod. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein. This section is based on the "British Columbia Landscape Standard" published by the B.C. Society of Landscape Architects and the B.C. Nursery Trades Association. This standard is intended to set a level of quality which is to be equaled or bettered in the construction documents for each project.

1.1 Related Work

- | | | |
|-------|----------------------------|---------------|
| 1.1.1 | Site Grading | Section 02210 |
| 1.1.2 | Topsoil and Finish Grading | Section 02921 |

1.2 References

- 1.2.1 British Columbia Landscape Standard.
- 1.2.2 Canadian System of Soil Classification

1.3 Scheduling

- 1.3.1 Schedule all operations to ensure optimum environmental protection, grading, growing medium placement, planting, seeding or sodding operations as outlined in these Specifications. Organize scheduling to ensure a minimum duration of on-site storage of plant material, minimum movement and compaction of growing medium, and prompt mulching and watering operations. Coordinate work schedule with scheduling of other trades on-site.
- 1.3.2 Coordinate and schedule such that no damage occurs to materials before or after placement. In particular, meet requirements of living plant material.
- 1.3.3 Plan, schedule and execute work to ensure a supply of water for landscape purposes in adequate amounts and at adequate pressures for satisfactory irrigation of all plants.

1.4 Handling and Storage

- 1.4.1 Protect sod during transportation to prevent drying out. Sod to arrive at site in fresh and healthy condition.
- 1.4.2 Install sod as soon as possible after delivery. If any delay in installation, keep sod moist and cool at all times until installation.
- 1.4.3 During growing season, install sod within 24 hours of delivery to site.
- 1.4.4 Do not store sod on site more than 3 levels in height.

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1.5 Drainage Control

- 1.5.1 Provide for proper water management and drainage of site during construction. Include silt traps, erosion control measures, temporary water collection ditches, as well as their adequate maintenance during construction period.

1.6 Samples

- 1.6.1 Provide samples of all materials required, handle and ship in such a manner that they are representative of material or product sampled.

1.7 Site Examination

- 1.7.1 Do not carry out landscaping work in areas or other surfaces that are not properly prepared. Examine site before starting work to verify all surfaces are properly prepared.

1.8 Measurement for Payment

- 1.8.1 Payment for work under this Section will be incidental to payment for work described in other Sections.

2.0 PRODUCTS

2.1 Sod

- 2.1.1. Sod to be approved by the Engineer and to be nursery grown, true to type, conforming to standards of Nursery Sod Growers' Association and their Nursery Sod Specifications. Sod to be quality, cultured turfgrass grown from seed approved by Canada Department of Agriculture, free of diseases, clovers, stones, pests and debris. Sod to be relatively free of weeds, containing no more than two broadleaf weeds or ten annual weeds or weedy grasses per 40 m².
- 2.1.2 Grass mixture in sod to be suited to locality, site conditions, and intended maintenance procedures for each projector area. Sod to be cut by machines designed for that purpose, and by accepted methods, and rolled for shipment. Strips to be 1 m² - 457 mm wide and 2.19 m long.
- 2.1.3 When lifted, height of grass in sod to be between 40 mm and 60 mm.
- 2.1.4 Sod to be lifted in such a manner as to prevent tearing or breaking.
- 2.1.5 Moving height limit to be 38 mm to 64 mm and thickness of soil portion of sod to not exceed 25.4 mm or be less than 16 mm.
- 2.1.6 Grasses in sod to be of sufficient density that no surface soil to be visible when mowed to height of 38 mm.
- 2.1.7 Broken, dry, discoloured pieces will be rejected by the Engineer.

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2.2 Water

2.2.1 Free of impurities that would inhibit germination and growth or may be harmful to environment.

2.2.2 Contractor to supply.

2.3 Fertilizer

2.3.1 To Section 02921 - Topsoil and Finish Grading and meeting requirements of Canada Fertilizer Act.

3.0 EXECUTION

3.1 Finish Grade Preparation

3.1.1 Do not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice or standing water.

3.1.2 Verify that grades are correct. If discrepancies occur, notify the Engineer and do not commence work until instructed by the Engineer.

3.1.3 Remove and dispose of weeds; debris; soil contaminated by oil, gasoline and other deleterious materials; to approved off-site disposal area.

3.1.4 Loosen surfaces of areas that are excessively compacted by means of thorough scarification, discing or harrowing, to minimum 150 mm depth.

3.1.5 Finish grade smooth to extent required for class of sodding to be carried out, firm against footprints, loose textured, and free of all stones, roots, branches, etc. larger than diameter required for removal for class of sodding to be carried out.

3.2 Sodding

3.2.1 Spread growing medium under all sodded areas evenly over approved subgrade to specified depth. See Section 02921- Topsoil and Finish Grading.

3.2.2 Apply required fertilizer to and work well into growing medium by discing, raking or harrowing, at rates specified. Do within 48 hours before laying sod.

3.2.3 Lay sod as soon as possible after delivery to prevent deterioration and lay within 24 hours of delivery.

3.2.4 Lay sod staggered, closely knit together such that no open joints are visible, and no pieces overlap.

3.2.5 Lay sod smooth and flush with adjoining grass areas and paving and top surface of curbs unless shown otherwise on Contract Drawings.

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- 3.2.6 On slopes of approximately 2:1 and steeper, lay sod lengthwise up slope, and peg every row with wooden pegs at intervals of not more than 0.5 metres. Drive pegs flush with sod.
- 3.2.7 Wooden pegs, for pegging sod on steep slopes, to be lath pegs. Pegs to be sufficient length to ensure satisfactory anchorage of sod.
- 3.2.8 Where required, place erosion control mesh or netting and secure with stakes or staples sunk firmly into ground to minimum depth of 150 mm at maximum intervals of 4.5 m along pitch of slope. Place stakes or staples horizontally across slope at intervals equal to width of mesh or netting minus 150 mm to drive flush with top of sod.
- 3.2.9 Protect new sod from heavy foot traffic during laying. Place planks if necessary to prevent damage.
- 3.2.10 Cut sod where necessary only with sharp tools.
- 3.2.11 Roll, tamp, or plank sodded area providing sufficient pressure to ensure good bond between sod and growing medium.
- 3.2.12 Water sod area immediately with sufficient amounts to saturate sod and upper 100 mm of growing medium.
- 3.3 Clean-up**
- 3.3.1 Remove all materials and other debris resulting from sodding operations from job site.
- 3.4 Grass Maintenance**
- 3.4.1 Begin maintenance for sodded areas immediately after sod has been installed, and continue until issuance of Certificate of Total Performance.
- 3.4.2 Include all measures necessary to establish and maintain grass in a vigorous growing condition, including, but not limited to, the following:
- 3.4.2.1 Mow at regular intervals as required, to maintain grass at maximum height of 60 mm. Do not cut more than 1/3 of blade at any one mowing. Neatly trim edges of sodded areas. Remove heavy clippings immediately after mowing and trimming.
- 3.4.2.2 Water when required and with sufficient quantities to prevent sod and underlying soil from drying out.
- 3.4.2.3 Roll when required to remove any minor depressions or irregularities.
- 3.4.2.4 Undertake weed control when density of weeds reaches 10 broadleaf weeds or 50 annual weeds or weedy grasses per 40 m² and reduce density of weeds to zero.

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3.4.2.5 Immediately repair sodded areas that show deterioration or bare spots. Top-dress all areas showing shrinkage due to lack of watering and seed with seed mix that matches original seed mix.

3.4.2.6 Protect all sodded areas with warning signs, temporary wire or twine fences, or other necessary means.

3.5 Conditions for Performance

3.5.1 The Engineer will issue Certificate of Total Performance only when the following conditions exist:

3.5.1.1 Growing medium quality, fertility levels, depths and surface conditions are as specified in Contract Documents.

3.5.1.2 Grasses are required varieties, free of varieties other than those specified.

3.5.1.3 Grass areas are relatively free of weeds, containing no more than two broadleaf weeds or ten annual weeds or weedy grasses per m².

3.5.1.4 Sod is sufficiently established that its roots are growing into underlying growing medium.

3.5.1.5 Sodded areas have been mown at least twice to a height of 38 mm, last mowing being within 48 hours of inspection for acceptance.

3.5.1.6 Grasses established in sufficient density that no surface soil visible when mown to height of 38 mm.

3.5.1.7 Specified maintenance procedures have been carried out.

3.6 Guarantee/Maintenance

3.6.1 Customary one year guarantee period for construction industry will apply as standard for landscape work. Contractor to guarantee all materials and workmanship for a period of one full year from date of Total Performance, unless specified otherwise in Contract Documents.

3.6.2 Guarantee includes replacing all sodded areas determined by the Engineer to be dead or failing at end of guarantee period. Replacements to be made at next appropriate season, and conditions of guarantee will apply to all replacement seeding for one full growing season.

3.6.3 Guarantee will not apply to sodded areas damaged after date of Total Performance by causes beyond Contractor's control, such as vandalism, "acts of God", "excessive wear and tear", or abuse. Contractor is responsible for work until Total Performance. After Total Performance, Owner is responsible for work and proper maintenance.

END OF SECTION

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CAST-IN-PLACE CONCRETE

SECTION 03300
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1.0 GENERAL

- 1.0.1 Section 03300 refers to those portions of the work that are unique to the installation of manholes and catch basins, concrete works associated with the installation of sewers, and similar works incidental to municipal services type construction. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the works described herein.
- 1.0.2 This Specification is **NOT** to be used for any structural facilities such as buildings, bridges, retaining walls, or any similar structure requiring site specific structural engineering design or for the construction of pavements, sidewalks or curbs and gutters.
- 1.0.3 Except where specifically stated otherwise, all materials and methods in this Section to conform to requirements of the latest version of CAN/CSA-A23.1.

1.1 Related Work

- 1.1.1 Waterworks Section 02742

1.2 References

- 1.2.1 The abbreviated standard specifications for testing, materials, fabrication and supply, referred to herein, are fully described in References - Section 02000.

1.3 Certification

- 1.3.1 Minimum 2 weeks prior to starting concrete work, submit to Engineer manufacturer's test data and certification by qualified independent inspection and testing laboratory that following materials will meet specified requirements:
- 1.3.1.1 Portland cement.
 - 1.3.1.2 Blended hydraulic cement.
 - 1.3.1.3 Supplementary cementing materials.
 - 1.3.1.4 Grout.
 - 1.3.1.5 Admixtures.
 - 1.3.1.6 Aggregates.
 - 1.3.1.7 Water.
 - 1.3.1.8 Waterstops.
 - 1.3.1.9 Waterstop joints.
 - 1.3.1.10 Joint filler.
- 1.3.2 Provide certification from Materials Engineer that plant, equipment, and materials to be used in concrete comply with requirements of CAN/CSA-A23.1.
- 1.3.3 Provide certification from Materials Engineer that mix proportions selected will produce concrete of specified quality, durability and yield, and that strength will comply with CAN/CSA-A23.1.

1.4 Construction Quality Control

- 1.4.1 Submit proposed quality control procedures for Engineer's approval.

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WATERMAIN SUPPLY AND INSTALLATION (2B)
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**SECTION 03300
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1.5 Measurement for Payment

- 1.5.1 Payment for all work performed under this Section will be incidental to payment for work described in other sections

2.0 PRODUCTS

2.1 Materials

- 2.1.1 Portland cement: to Type 10 CAN/CSA-A5.
- 2.1.2 Supplementary cementing materials: to CAN/CSA-A23.5.
- 2.1.3 Water: to CAN/CSA-A23.1.
- 2.1.4 Aggregates: to CAN/CSA-A23.1.
- 2.1.5 Air entraining admixture: to CAN/CSA-A266.1.
- 2.1.6 Chemical admixtures: to CAN/CSA-A266.2. Engineer to approve accelerating or set retarding admixtures during cold and hot weather placing.
- 2.1.7 Grouts:
- 2.1.7.1 Provide grout certification prior to use.
 - 2.1.7.2 To be approved by Engineer prior to use.
 - 2.1.7.3 Use in accordance with manufacturer's recommendations.
- 2.1.8 Curing compound:
- 2.1.8.1 To be spray applied, liquid type conforming to ASTM C309 containing a fugitive dye.
 - 2.1.8.2 To be applied in accordance with manufacturer's recommendations.
 - 2.1.8.3 Other curing methods such as sheet material and burlap mats, subject to Engineer's approval.
- 2.1.9 Pre-moulded joint fillers: Bituminous impregnated fibre board: to ASTM D1751.
- 2.2 Concrete Mixes**
- 2.2.1 The City of Vancouver uses four different types of concrete mixtures for sewer applications as follows:
- 2.2.1.1 2828C - Structural concrete used for manholes, catch basins, or other underground chambers;
 - 2.2.1.2 1528A - Protective concrete used over pipes, around manholes, as pipe cradling, and bedding for vertical separation;
 - 2.2.1.3 1528B - Thrust blocks and other non-structural mass concrete needs; and,
 - 2.2.1.4 0128 - Lean concrete for trench backfill and utility cuts (FillCrete).

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**SECTION 03300
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2.2.2 Standard specifications for ready-mix concrete are as follows:

PROPERTIES	MIX NUMBER			
	2828C	1528A	1528B	0128
Cement Type	CAN/CSA 10	CAN/CSA 10	CAN/CSA 10	-
Maximum Aggregate Size	20 mm	28 mm	20 mm	10 mm
Slump	75 - 100 mm	0 - 20 mm	75 - 100 mm	150 - 200 mm
Total Air Content	5% - 8%	4% - 7%	4% - 7%	4% - 6%
Calcium Chloride (% by Wt. of Concrete)	Maximum 1% (from Nov. 1 to March 31)	Nil	Nil	0% - 3%
Hot Water	When Required	-	-	-
Exposure Class (CSA Table 7)	B	D	C	C
Compressive Strength (CAN/CSA-A23.1 M90, Clause 17.5) @ 28 Days Other	28 MPa 15 MPa @ 7 days	15 MPa -	15 MPa -	Max. 0.4 MPa 100 kPa @ 3 days

2.3 Forms

2.3.1 Forms to CAN/CSA-A23.1.11.

2.3.2 Free from surface defects for all concrete faces exposed to view.

2.3.3 Form ties to be metal and of type such that no metal left within 25 mm of concrete surface when forms removed.

2.4 Form Release Agent

2.4.1 Non-staining material type form release agent: chemically active release agents containing compounds that react with free lime to provide water soluble soap.

3.0 EXECUTION

3.1 General

3.1.1 Do cast-in-place concrete work, including surface tolerances, finishing and field quality control, in accordance with CAN/CSA-A23.1 except where specifically stated otherwise.

3.2 Formwork

3.2.1 Formwork to conform to shape, lines and dimensions shown on Contract Drawings.

3.2.2 Formwork to be substantial, sufficiently tight to prevent leakage of mortar and braced and tied to maintain position and shape.

3.2.3 Formwork to be unlined unless specified otherwise.

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3.3 Workmanship

- 3.3.1 Obtain Engineer's approval before placing concrete. Provide minimum 24 h notice prior to placing of concrete.
- 3.3.2 Pumping of concrete is permitted only after approval of equipment and mix.
- 3.3.3 Ensure reinforcement and inserts are not disturbed during concrete placement.
- 3.3.4 Prior to placing of concrete obtain Engineer's approval of proposed method for protection of concrete during placing and curing.
- 3.3.5 Ensure placement and compaction procedures to CAN/CSA-A23.1 and to approval of Engineer.
- 3.3.6 Protect exposed surfaces from weather and vandalism during initial set period.
- 3.3.7 Strip forms ensuring no damage to concrete.
- 3.3.8 Ensure curing procedures consistent with weather and temperature conditions.
- 3.3.9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- 3.3.10 Do not place load upon new concrete until authorized by Engineer.

3.4 Joint Fillers

- 3.4.1 Furnish filler for each joint in single piece for depth and width required for joint, unless authorized otherwise by Engineer. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
- 3.4.2 Locate and form all joints as specified or as directed by Engineer. Install joint filler where applicable.
- 3.4.3 Use 13 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to finished slab surface unless indicated otherwise.

3.5 Field Quality Control

- 3.5.1 Inspection and testing of concrete and concrete materials will be carried out by a CSA certified laboratory designated by Engineer.
 - 3.5.1.1 Owner will pay costs for inspection and initial testing.
 - 3.5.1.2 If initial tests determine materials or construction not as specified, Contractor to take all steps necessary to correct deficiencies. Subsequent testing will be at Contractor's cost.
 - 3.5.1.3 Engineer will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

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- 3.5.1.4 Non-destructive Methods for Testing Concrete to be in accordance with CAN/CSA-A23.2.
- 3.5.1.5 Inspection or testing by Engineer will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

END OF SECTION

PS10180

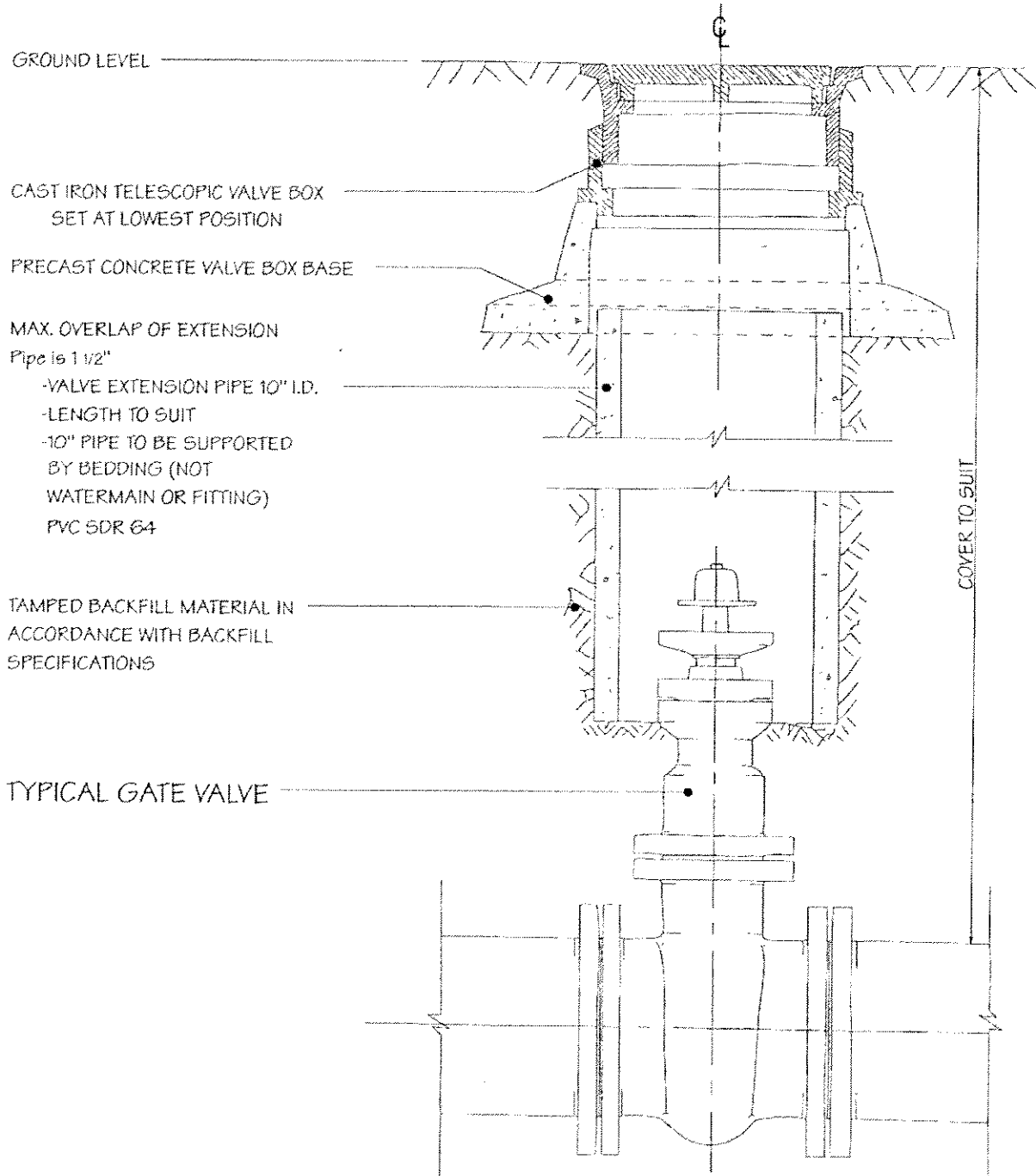
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APPROVED *B. Lowe*

PIPE LAYOUT

Mains & Valves

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PAGE 6

TYPICAL VALVE INSTALLATION



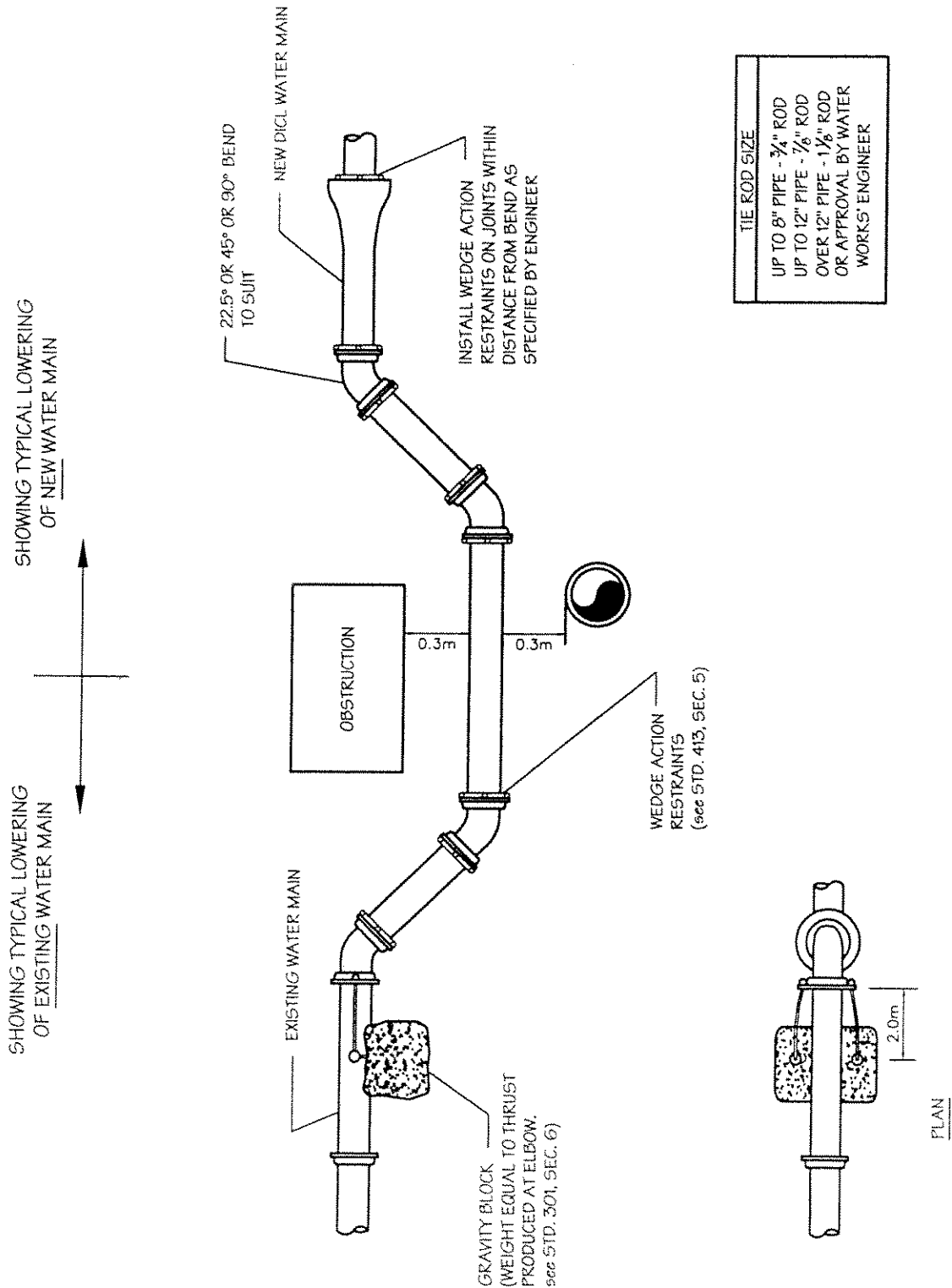
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ISSUE: (DATE) April 19/02
APPROVED: *[Signature]*

PIPE LAYOUT

Mains & Valves

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MAIN LOWERING DETAILS

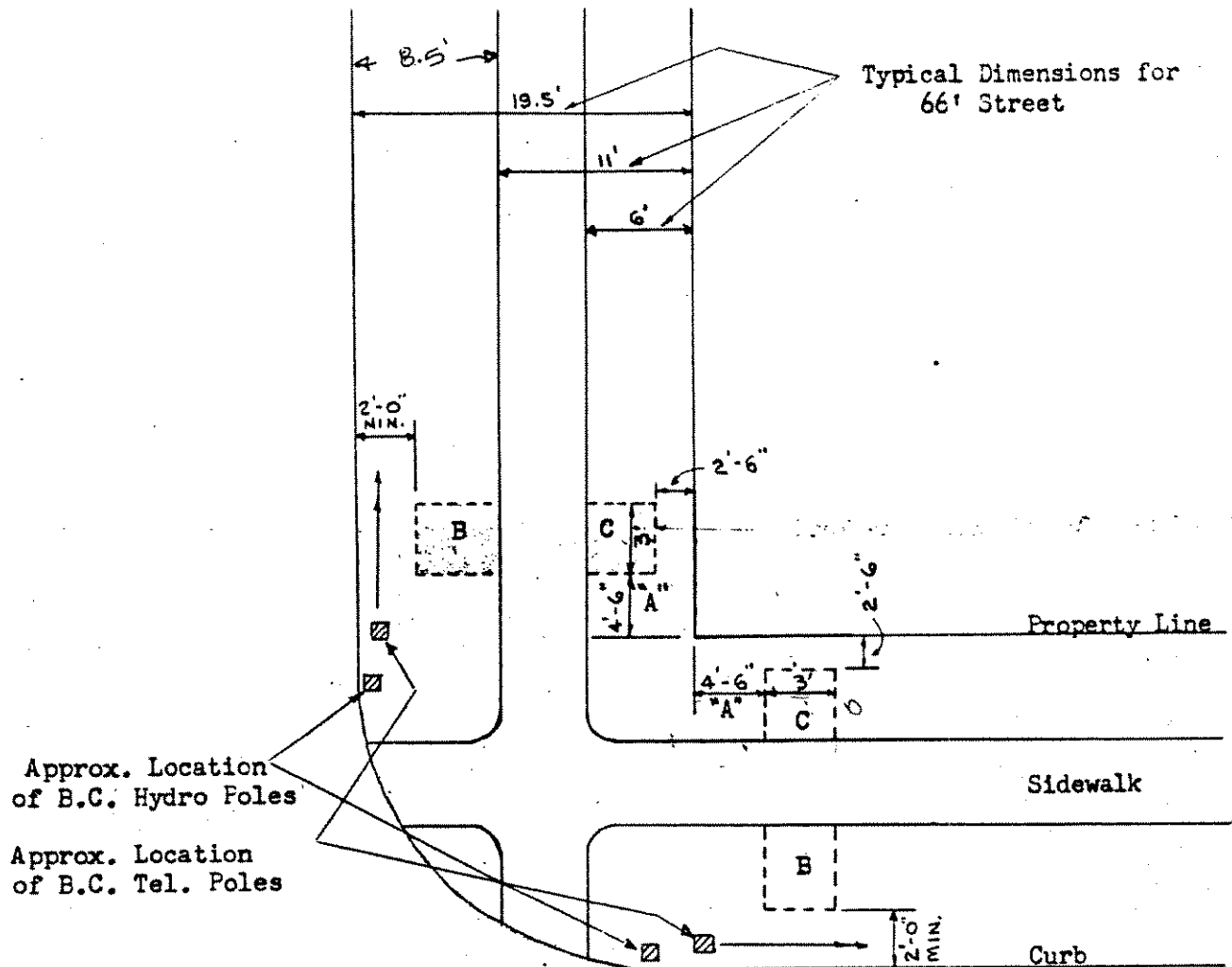


TIE ROD SIZE	
UP TO 8" PIPE - 3/4" ROD	
UP TO 12" PIPE - 7/8" ROD	
OVER 12" PIPE - 1 1/8" ROD	
OR APPROVAL BY WATER WORKS ENGINEER	

PS10180

<p>ISSUE (DATE) Oct 3 '63 APPROVED T.J.S. <i>[Signature]</i></p>	<p>PIPE LAYOUT Hydrants</p>	<p>STANDARD 301 SECTION 2 PAGE 1</p>
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PREFERRED LOCATIONS OF HYDRANTS



Notes

1. When pavement is likely to be widened, dimension "A" will be increased to 7'-6" max.
2. The minimum distance from any vertical obstruction is to be 3'-6", or 5'-6" in the line of any port.
3. Area B is preferred to area C.
4. The preferred distance from the corner is 6'-0" with the hydrant lined up with the permanent lamp standards.
5. No structure will interfere with the laying line of a hose for 5'-6", within 60 degrees of each side of the pumper port.
6. Hydrant locations are measured from the centre line of the hydrant to the respective positions.

[Signature]
CITY ENGINEER

PS10100

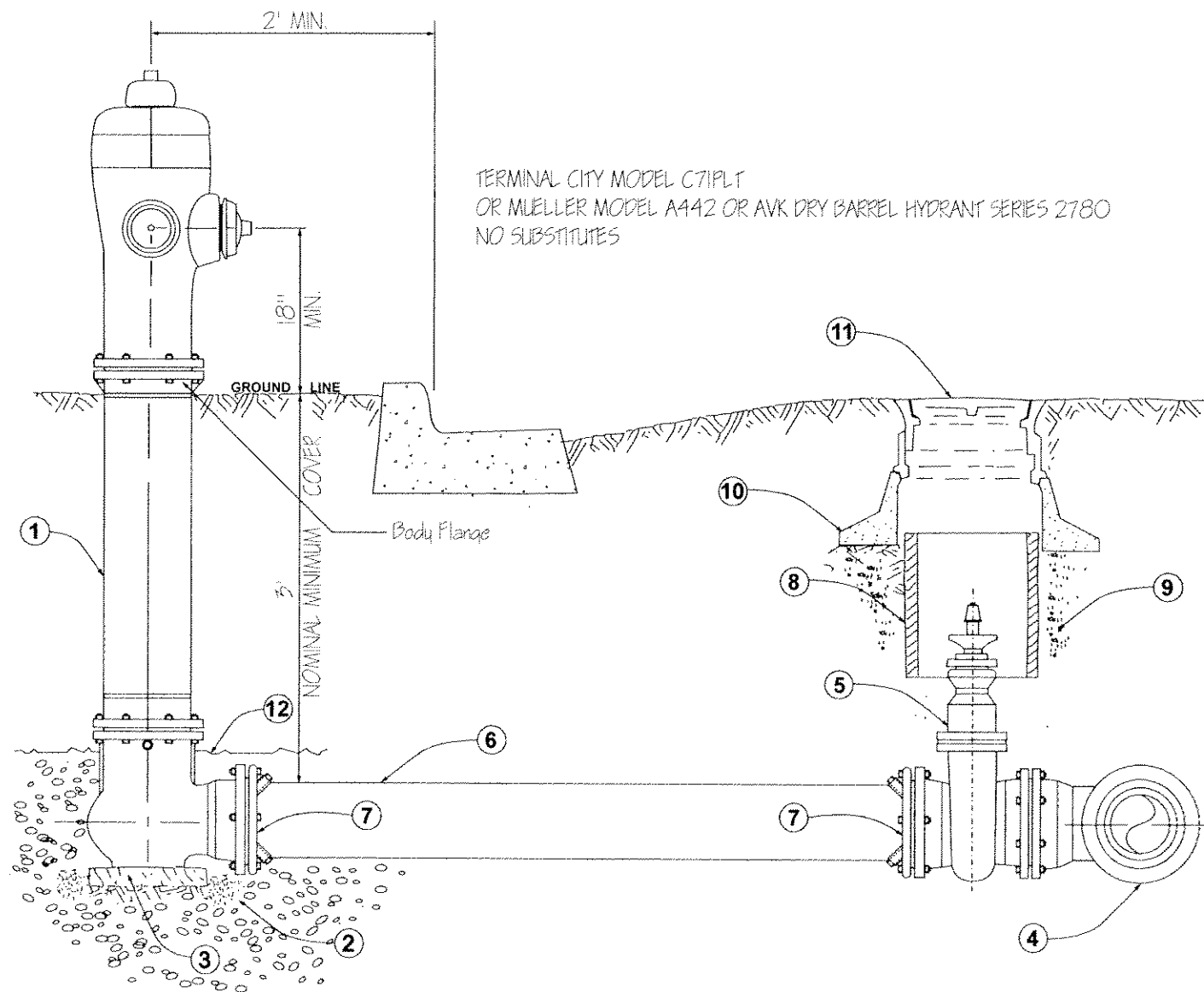
ISSUE (Feb. 21/08)
APPROVED

PIPE LAYOUT

Hydrants

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1. STANDARD HYDRANT WITH MJ BELL.
2. DRAINROCK TO FACILITATE DRAINAGE - MAXIMUM SIZE 2 INCH.
3. PRESSURE-TREATED WOOD BLOCK BASE - SIZE APPROXIMATELY 2 INCH x 12 INCH x 12 INCH LONG.
4. FLANGED TEE AT WATERMAIN - BRANCH SIZE 6 INCH DIAMETER.
5. HYDRANT CONTROL VALVE - 6 INCH D.I. RESILIENT SEAT GATE VALVE, FLANGE x MJ ENDS, 2" A.W.W.A. OPERATING NUT.
6. NIPPLE - SIZE 6 INCH DIAMETER x A MINIMUM OF 1' IN LENGTH.
7. USE WEDGE ACTION RESTRAINTS BACK TO HYDRANT CONTROL VALVE.
8. VALVE EXTENSION PIPE - 10" INSIDE DIAMETER, PVC, MIN. 1/8" WALL THICKNESS.
9. COMPACTED COV #9 BACKFILL FOR VALVE EXTENSION PIPE AND VALVE BOX BASE.
10. PRECAST CONCRETE VALVE BOX BASE.
11. CAST IRON TELESCOPIC VALVE BOX.



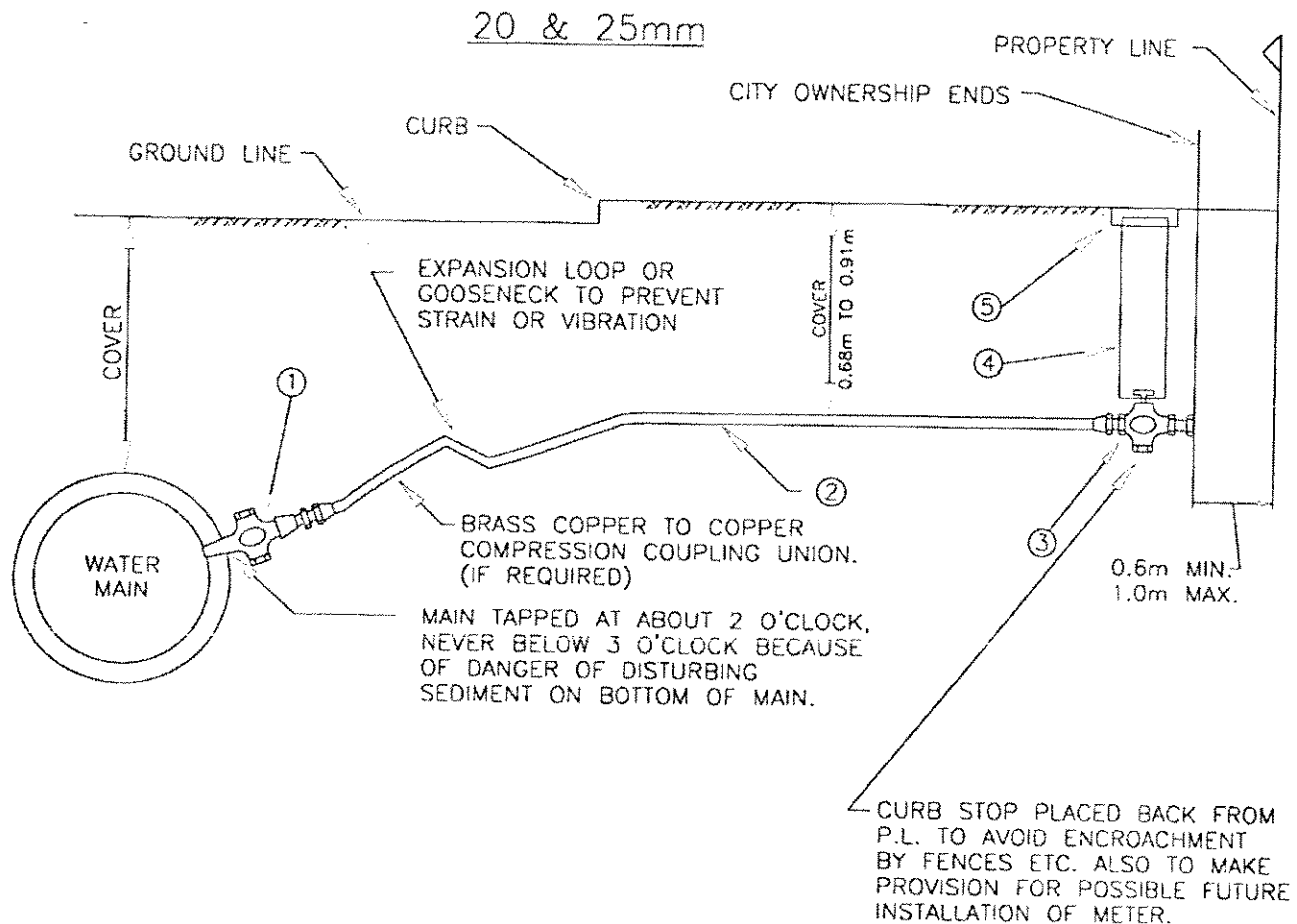
PS10180

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APPROVED *B. Lowe*

PIPE LAYOUT

SERVICES

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- | | | |
|-----|-------------------|---|
| (1) | MAIN STOP | BRASS, MUELLER THREAD (MALE) WITH SUITABLE END CONNECTION FOR COPPER TUBE BURIED. |
| (2) | COPPER SERVICE | COPPER WATER TUBE CONFORMING TO A.S.T.M. B88 TYPE K SOFT, ANNEALED AND SUPPLIED IN COILS. |
| (3) | CURB STOP | BRASS, END FOR COPPER TO IRON PIPE THREAD (FEMALE) OR END FOR IPS POLYETHYLENE PIPE TO I.P. THREAD (FEMALE) |
| (4) | SERVICE BOX | "NO-CO-RODE" PIPE 100mm DIA. (UNMETERED SERVICE ONLY) |
| (5) | SERVICE BOX COVER | CAST IRON, DWG. NO. TF 55 (UNMETERED SERVICE ONLY) |

ENGINEERING SERVICES DEPARTMENT
VANCOUVER, B.C.

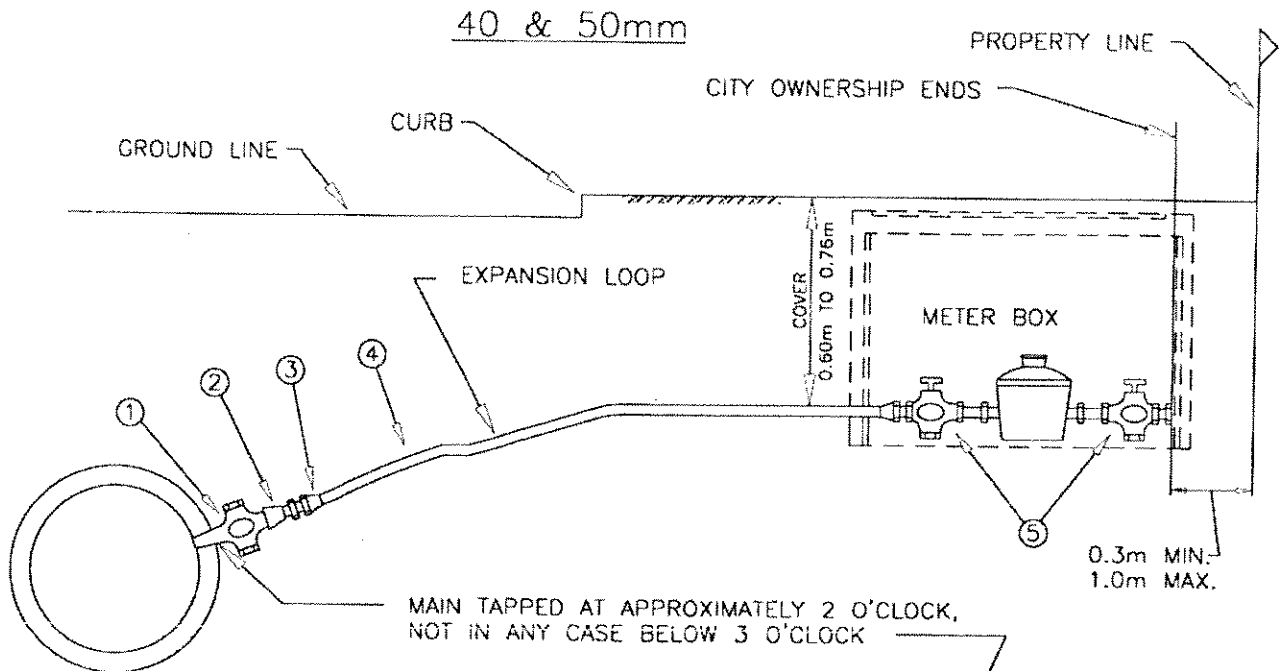
WATER-STANDARDS

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Jan 6/2000

PIPE LAYOUT

SERVICES

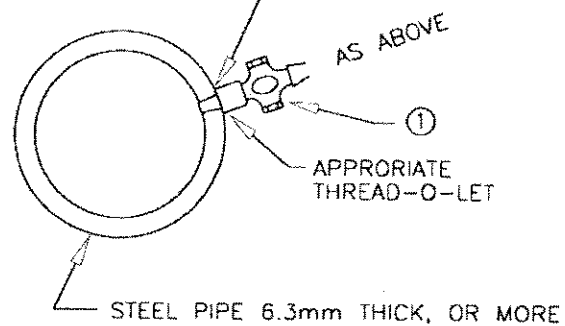
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FOR CLASS 52 DUCTILE IRON

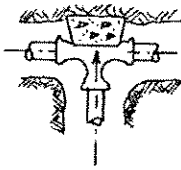

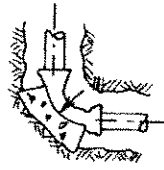
PIPE DIAMETER (mm)	MAXIMUM TAP WITHOUT SADDLE (mm)	MAXIMUM TAP WITH SADDLE (mm)
100	20	50
150	20	50
200	25	50
250	25	50
300	40	75

TAPPING SLEEVE REQUIRED FOR CI WATERMAIN 300 Ø & SMALLER

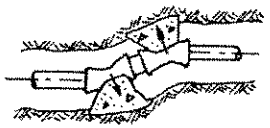


- | | | |
|-----|-------------------|---|
| (1) | Main Stop | Brass (40 or 50mm) Mueller Thread (male) to (50 or 65mm) respectively, Iron Pipe thread (male) |
| (2) | Reducing Coupling | Brass (65 or 50mm) Iron Pipe thread (female) (40 or 50mm) respectively, Iron Pipe thread (female) |
| (3) | Coupling | Brass Iron Pipe thread (male) to end for copper |
| (4) | Copper Service | Copper Water Pipe conforming to A.S.T.M. B88 Type K, annealed (40mm) Dia. supplied in coils & lengths (50mm) Dia. in lengths. |
| (5) | Curb Stop | Brass, End for Copper to Iron Pipe thread (female) |

PS10180

ISSUE (DATE) 24/8/76 APPROVED <i>M. J. Brattin</i>		PIPE LAYOUT Thrust Blocks			STANDARD 301 SECTION 6 PAGE 1
		CAPS PLUGS & TEES		90° ELBOWS	
TABLE BASED ON: - CLASS 52 D.I. PIPE I.D. - 150 PSI STATIC PRESSURE - 50 PERCENT WATER-HAMMER ALLOWANCE (SAME AS TEST PRESSURE)		 			
MAX. ALLOWABLE SOIL BEARING LOADS P.S.F.	FITTING SIZE	THRUST LBS.	MINIMUM BLOCK BASE AREA SQ. FT.	THRUST LBS.	MINIMUM BLOCK BASE AREA SQ. FT.
20,000 — HARD PAN — OR SHALE —	4"	3620	0.6	5120	0.9
	6"	7480	1.2	10580	1.5
	8"	12860	1.8	18200	2.7
	12"	27360	4.2	38700	5.7
12,000 — HARD CLAY —	4"	3620	0.9	5120	1.2
	6"	7480	1.8	10580	1.8
	8"	12860	3.3	18200	4.5
	12"	27360	6.9	38700	9.6
6000 — SAND — — COARSE, LOOSE — OR FINE, COMPACT	4"	3620	1.8	5120	2.7
	6"	7480	3.6	10580	5.4
	8"	12860	6.3	18200	9.0
	12"	27360	13.8	38700	19.5
2000 — SOFT CLAY —	4"	3620	8.4	5120	7.8
	6"	7480	11.1	10580	15.9
	8"	12860	19.2	18200	27.3
	12"	27360	41.1	38700	57.9
CITY ENGINEERING DEPARTMENT VANCOUVER, B.C.			WATERWORKS — STANDARDS		

PS10180

ISSUE (DATE) 24/8/76 APPROVED <i>A.M. Burtin</i>		PIPE LAYOUT Thrust Blocks			STANDARD 301 SECTION 6 PAGE 2
		45° ELBOWS		22 1/2° ELBOWS	
TABLE BASED ON : - CLASS 52 D.I. PIPE I.D. - 150 PSI STATIC PRESSURE - 50 PERCENT WATER-HAMMER ALLOWANCE (SAME AS TEST PRESSURE)		SEE 22 1/2° ELBOW			
MAX. ALLOWABLE SOIL BEARING LOADS P.S.F.	FITTING SIZE	THRUST LBS.	MINIMUM BLOCK BASE AREA SQ. FT.	THRUST LBS.	MINIMUM BLOCK BASE AREA SQ. FT.
20,000 — HARD PAN — OR SHALE —	4"	2760	0.3	1420	0.21
	6"	5720	0.9	2920	0.3
	8"	9840	1.5	5020	0.9
	12"	20940	3.0	10680	1.5
12,000 — HARD CLAY —	4"	2760	0.6	1420	0.3
	6"	5720	1.5	2920	0.6
	8"	9840	2.4	5020	1.2
	12"	20940	5.1	10680	2.7
6000 — SAND — COARSE, LOOSE OR FINE, COMPACT	4"	2760	1.5	1420	0.6
	6"	5720	3.0	2920	1.5
	8"	9840	4.8	5020	2.4
	12"	20940	10.2	10680	5.4
2000 — SOFT CLAY —	4"	2760	4.2	1420	2.1
	6"	5720	8.7	2920	4.5
	8"	9840	14.7	5020	7.5
	12"	20940	31.5	10680	15.9
CITY ENGINEERING DEPARTMENT VANCOUVER, B.C.			WATERWORKS — STANDARDS		

PS40180

ISSUE (DATE) 24/8/76

APPROVED

[Signature]

PIPE LAYOUT

Thrust Blocks

STANDARD

301

SECTION

6

PAGE

3

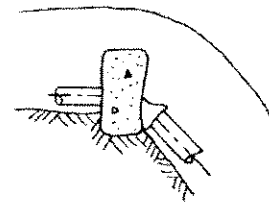
11 1/4° ELBOWS

VERTICAL BENDS

TABLE BASED ON:

- CLASS 52 D.I. PIPE I.D.
- 150 PSI STATIC PRESSURE
- 50 PERCENT WATER-HAMMER ALLOWANCE (SAME AS TEST PRESSURE)

SEE 22 1/2° ELBOW



SEE NOTE 5

MAX. ALLOWABLE
SOIL BEARING
LOADS P.S.F.

FITTING
SIZE

THRUST
LBS.

MINIMUM
BLOCK BASE
AREA SQ. FT.

20,000

- HARDPAN
OR SHALE -

4"

720

0.12

6"

1460

2.1

8"

2520

0.3

12"

5360

0.9

12,000

- HARD CLAY -

4"

720

0.18

6"

1460

0.3

8"

2520

0.6

12"

5360

1.2

6000

- SAND -
COARSE, LOOSE
OR
FINE, COMPACT

4"

720

0.3

6"

1460

0.6

8"

2520

1.2

12"

5360

2.7

2000

- SOFT CLAY -

4"

720

1.2

6"

1460

2.1

8"

2520

3.9

12"

5360

8.1

CITY ENGINEERING DEPARTMENT

VANCOUVER, B.C.

WATERWORKS - STANDARDS

PS40180 ISSUED: 5/29/01 APPROVED: <i>[Signature]</i>	PIPE LAYOUT Thrust Blocks	STANDARD 301 SECTION 6 PAGE 4
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NOTES

1. Concrete thrust blocks shall extend into undisturbed soil. Thrusts in soft unstable soils will require removal and replacement with non-shrink fill (fillcrete or approved equal) to provide adequate bearing capacity to resist thrust or special anchor block as directed by the Waterworks Engineer.
2. Thrust blocks shall be required for all elbows, tees, plugs, caps, and other fittings where thrust forces are developed unless alternate thrust restraint measures are specified.
3. Thrust blocks concrete shall have a 28-day strength of 14 MPa min. High-early strength concrete may be used for construction expediency.
4. Place 6 mil polyethylene on interface between concrete and fitting. Concrete shall be kept clear of pipe joints.
5. At vertical bends alternate thrust restraint methods (other than gravity blocks) are preferred. Where gravity blocking is specified for a vertical bend, the gravity block shall be of sufficient weight to resist the corresponding thrust force (as provided herein). Use a concrete density of 2300 kg/m³ (5060 lb/m³). Gravity blocks shall not be used where saturated soil conditions may be present.
6. Where interference with other utilities, soil bearing capacity, or other factors make use of thrust blocks impractical, the Waterworks Engineer may specify alternate thrust restraint measures.

ENGINEERING SERVICES CITY OF VANCOUVER	WATERWORKS – STANDARDS
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May 24, 2001

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PS10180

ISSUE: (Feb 06/09)

APPROVED: _____

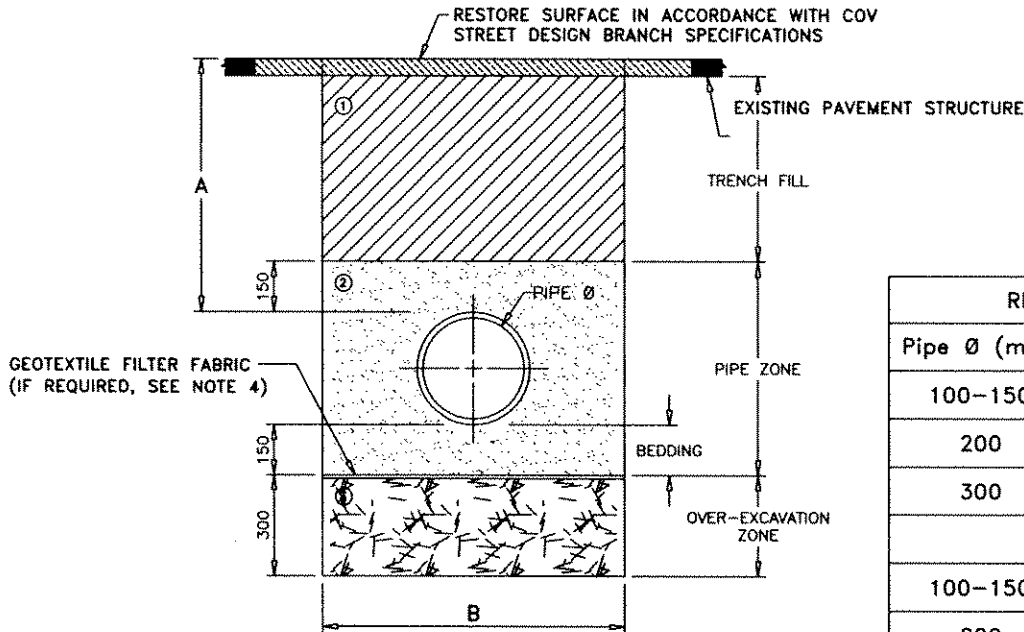
MAIN LAYING BEDDING & BACKFILL

STANDARD 305

SECTION 1

PAGE 4a

TYPICAL TRENCH CROSS SECTION



RESIDENTIAL ROADS		
Pipe Ø (mm)	A	B
100-150	750	750
200	750	800
300	750	900
ARTERIAL ROADS		
100-150	900	750
200	900	800
300	900	900

1. TRENCH FILL
20mm MINUS, COMBINED, CRUSHED AGGREGATE (C.O.V. #9)
COMPACTED TO 95% MODIFIED PROCTOR.
2. PIPE ZONE
20mm MINUS, COMBINED, CRUSHED AGGREGATE (C.O.V. #9)
COMPACTED TO 95% MODIFIED PROCTOR. FOR POLYBAGGED
INSTALLATIONS USE SAND (COV #17) COMPACTED TO 95%
MODIFIED PROCTOR.
3. OVER-EXCAVATION ZONE (IF REQUIRED)
80 mm MINUS CRUSHED TAILINGS (COV#13) COMPACTED TO
95% MODIFIED PROCTOR, OR DRAIN ROCK (COV#15)
IF GROUNDWATER IS A PROBLEM.
4. GEOTEXTILE FABRIC LAYER
PLACE ABOVE OVER-EXCAVATION ZONE ONLY IF SAND IS USED
IN THE PIPE ZONE ABOVE DRAIN ROCK IN THE OVER-EXCAVATION
ZONE. USE TYPE OF FABRIC AS SPECIFIED BY ENGINEER.
5. PROTRUDING ROCK, BOULDERS, LARGE STONES, FOREIGN
MATERIAL AND SHORING MUST BE REMOVED TO MAINTAIN A
MINIMUM CLEARANCE OF 150mm AROUND ALL PIPES, VALVES
AND FITTINGS BEFORE COMPACTION.
6. BEDDING
BEFORE THE FINAL RAKING OR SCREENING, IT SHALL BE COMPACTIONED
BY MECHANICAL PLATE TAMPER TO MIN 95% MODIFIED PROCTOR.
COMPACTIONING BY HAND IS NOT PERMITTED.

ISSUE (DATE) <i>July 21/76</i> APPROVED <i>H. N. Bratton</i>	FITTINGS Waterworks Brass & Screwed Brass	STANDARD 413 SECTION 4 PAGE 1
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1. Scope
 These specifications cover the supply of Corporation Brass and Screwed Brass Fittings for water works service.

2. Material
 Material shall conform to A.S.T.M. Standard Specification for Composition Bronze or Ounce Metal Castings - B62-70

3. Pressure
 The working pressure for all fittings shall be 150 p.s.i.

4. Threading
 Pipe threads shall be in accordance with the American Waterworks Association (hereafter referred to as A.W.W.A.) Standard for Threads for Underground Service Line Fittings C800-66, which will form part of this specification. All threads shall be right-hand unless stated otherwise.

5. Compression Joints (General)
 Compression connections shall be of the following type: Mueller 110, Mueller Insta-tite, Ford Pack Joint or an Engineer approved equal.

6. Compression Joints for P.E. Pipe
 Compression joints for polyethylene pipe shall fit pipe of the following outside diameter.

<u>P.E. Pipe Size</u>	<u>O.D.</u>
3/4"	1.068
1"	1.359

7. Drains or Waste Plugs
 Main stops and curb stops shall be without waste or drain plugs

8. Curb Stops
 All curb stops shall be of the Tee Head type and of the low torque variety unless otherwise noted.

9. Main Stops
 All main stops shall be of a design which makes them adaptable for a Mueller tapping machine.

10. Repair
 Pluggins or peening of defects as a method of salvage or repair of fittings is prohibited. Repair of fittings by brazing, welding, or impregnation is subject to prior approval.

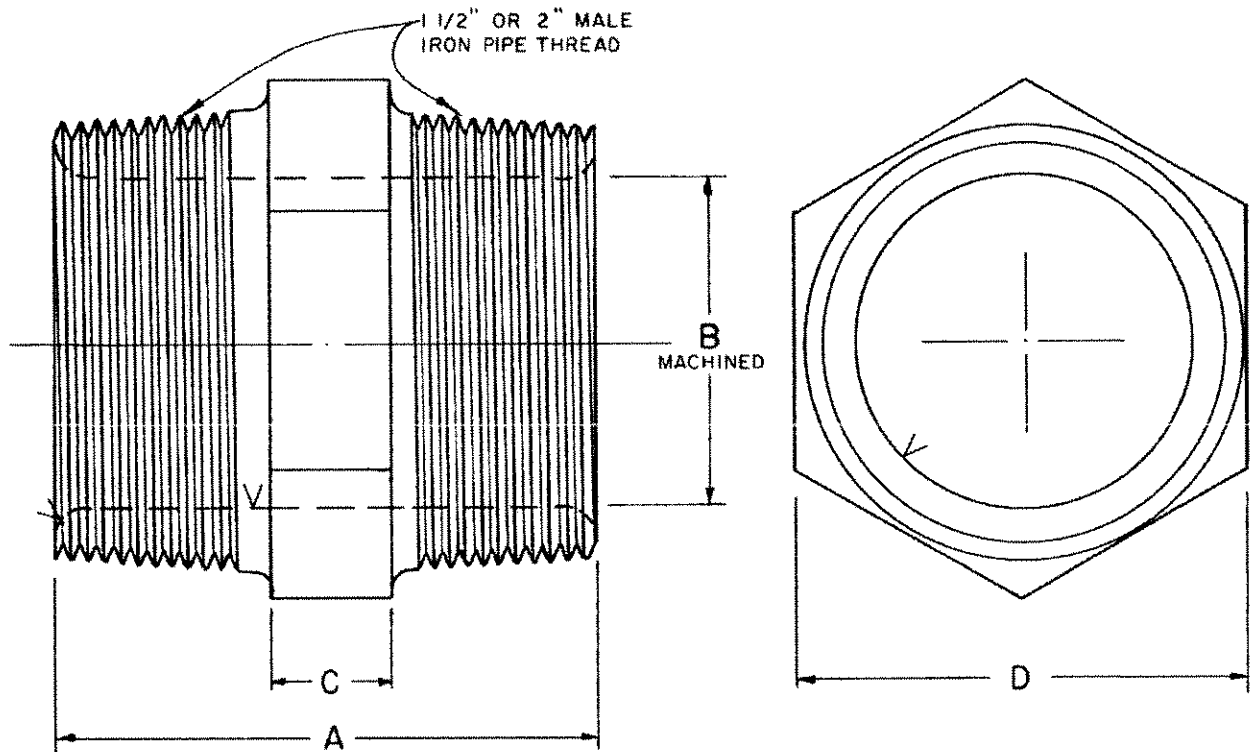
11. Workmanship
 Workmanship shall be in accordance with the best modern practice for the class of work involved.

CITY ENGINEERING DEPARTMENT VANCOUVER, B.C.	WATERWORKS — STANDARDS
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PS10180

ISSUE (DATE) APPROVED	FITTINGS WATERWORKS BRASS & SCREWED BRASS	STANDARD 413 SECTION 4 PAGE 2
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1 1/2" & 2" MALE IRON & MALE IRON ADAPTERS
MATERIAL : BRASS A.S.T.M. B 62

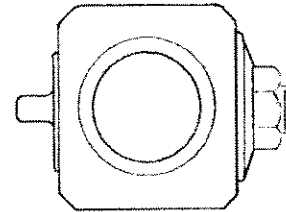


SIZE	1 1/2"	2"
A	3"	3"
B	1 3/8"	1 7/8"
C	9/16"	11/16"
D	2 1/8"	2 1/2"

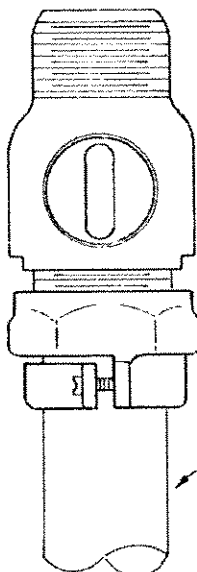
ISSUE (DATE) 10/93
APPROVED
A. Crowe

INSULATING CORPORATION COCK
WATERWORKS BRASS & SCREWED BRASS

STANDARD 413
SECTION 4
PAGE 3

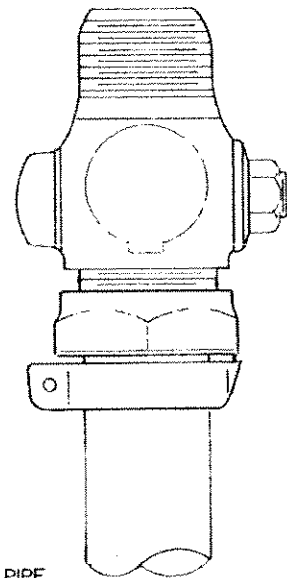


END VIEW

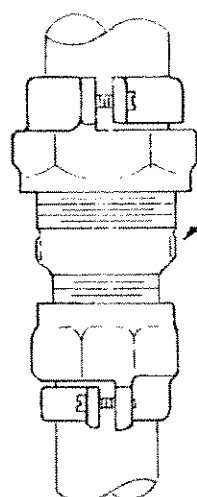


20 mm - 50 mm CORPORATION
COCK WITH C.C. THREADS x
I.P. SIZED POLYETHYLENE
TUBING COMPRESSION END
(FORD MODEL F-1002-3,4,6,7
OR CITY OF VANCOUVER
APPROVED EQUAL)

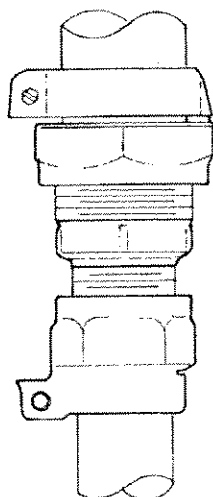
100 mm MINIMUM, 150 mm MAXIMUM
LENGTH OF I.P. SIZE A.S.T.M. STANDARD
D2239-65 POLYETHYLENE PIPE
SDR-DR DESIGN, 160 PSI WORKING
PRESSURE POLYETHYLENE TUBING,
OR FOR 40-50 mm SIZES - SCHEDULE 40 P.V.C. PIPE



DIRECTION OF FLOW




20 mm - 50 mm PLASTIC x COPPER
UNION WITH COMPRESSION ENDS
(FORD MODEL # C47-33,44,66 & 77
OR CITY OF VANCOUVER
APPROVED EQUAL)



TOP VIEW

SIDE VIEW

PS10180

ISSUE (DATE) Nov 15 APPROVED 	Service Saddles Specification	STANDARD 415 SECTION 4 PAGE 1
<p>1. SCOPE</p> <p>This specification is for the manufacture, supply and deliver of service saddles complete with gaskets, straps, washers and nuts for underground water service pipe for the supply of potable water.</p> <p>2. SPECIFICATIONS</p> <p>The service saddle shall be designed to provide a drip-tight connection when used as a service connection to the watermain. The body of the service saddle shall be made to conform to the outside configuration of the watermain. The materials used to produce the service saddle body shall be ductile iron and shall conform to the latest edition of the American Society for Testing and Materials (hereinafter referred to as A.S.T.M.) Standard Specifications for Ductile Iron Castings, designation A536, grade 65-45-12 with the following additional information and requirements.</p> <p>3. SIZES AND TYPE</p> <p>Service saddles shall be supplied in 3/4", 1", 1-1/2" and 2" service sizes to be used for ductile or cast iron pipe size 4", 6", 8" and 12" in diameter. All saddles shall use double U-bolt straps.</p> <p>4. GASKETS</p> <p>Gaskets shall be made of nitrile type (Acrylonitrile Butadiene, NBR) material to resist oil, natural gas, acids, alkalines, hydrocarbon fluids and water. Rubber (SBR) gaskets will not be accepted.</p> <p>5. NUTS, WASHERS AND U-BOLT STRAPS</p> <p>Nuts, washers and U-bolt straps shall be made of high tensile strength, low alloy steel (Corten) conforming to Section 11-7.5, AWWA C-111-85 composition specifications.</p> <p>6. TYPE OF THREADS AT OUTLET</p> <p>Internal threads at the outlet shall be C.C. or I.P. threads, as specified in the Schedule of Quantities and Prices.</p>		
CITY ENGINEERING DEPARTMENT VANCOUVER, B.C.	WATERWORKS — STANDARDS	

PS10180
ISSUE (DATE) Dec/93

APPROVED

B. Love

STEEL TIE ROD SPECIFICATION

STANDARD 415
SECTION 5
PAGE 1

Material

Tie rods shall be made of high tensile strength, low alloy steel (corten) conforming to Section 11-7.5, AWWA C-111-85 composition specification. Stainless steel rods are not to be used unless otherwise specified by the Waterworks Engineer.

Installation

Tie rods are to be installed using "Densotape" (or Engineer-approved equivalent tape) around all nuts and threads to facilitate the removal of these nuts in the future. Nuts are to be tightened to a minimum torque of 75 ft.-lbs. (10 kg-m.). All tie rods are to be installed along the center line of the pipe section joining the various fittings together. The length of these tie rods are to be sized such that they will clear the flange of the fitting to enable the restraining nuts to have their full body length over the available tie rod threads.

Tie Rod Size

All tie rods are to be sized according to the following:

- up to 8" pipe - 3/4" Rods
- up to 12" pipe - 7/8" Rods
- over 12" pipe - 1 1/8" Rod

(or sized according to the Waterworks Engineer and Section 415.3.1)

PS10180

ISSUE: — Oct 24/06
APPROVED: _____

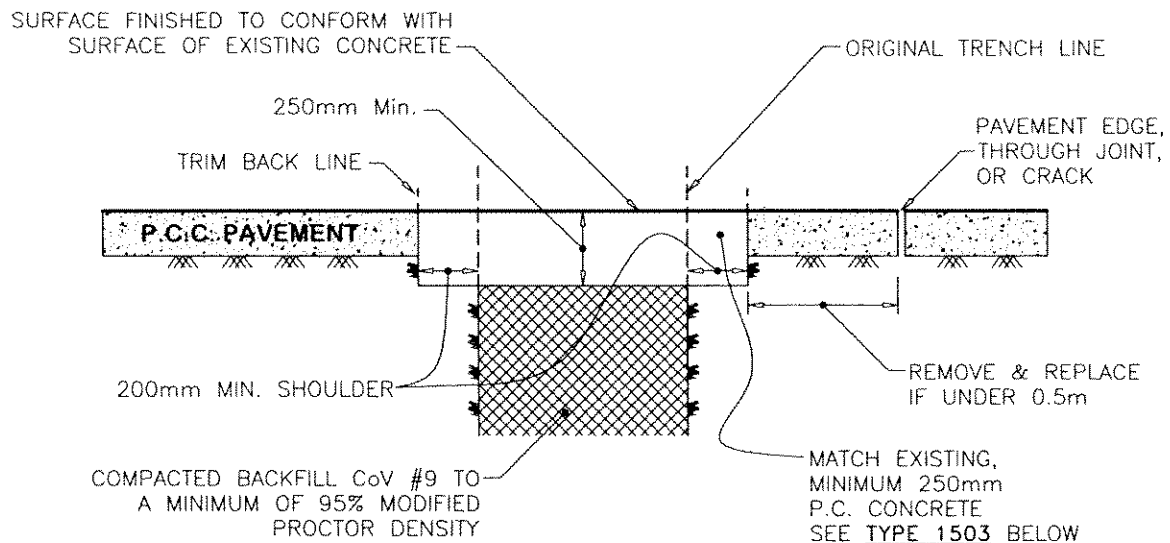
STANDARD DETAIL DRAWINGS

Pavement Restoration for Cuts & Trenches

STANDARD
SECTION
PAGE

DWG P1

PORTLAND CEMENT CONCRETE SURFACE



CITY OF VANCOUVER - SUPPLY OF READY-MIX CONCRETE SCHEDULE OF STANDARD SPECIFICATION

PROPERTIES	1503 (PERFORMANCE SPEC.)
CEMENT TYPE	CSA 30
MAXIMUM AGGREGATE SIZE	20mm
SLUMP	80mm
TOTAL AIR CONTENT %	5-8
CALCIUM CHLORIDE (AS % BY WEIGHT OF CEMENT)	1 - 3% AS DIRECTED
HOT WATER	BELOW 5° C
EXPOSURE CLASS (CSA TABLE 7)	C2
COMPRESSIVE STRENGTH	AT 28 DAYS: 28MPA AT 3 DAYS: 15MPA

PS10180

ISSUE: - May 17/10
APPROVED: _____

STANDARD DETAIL DRAWINGS

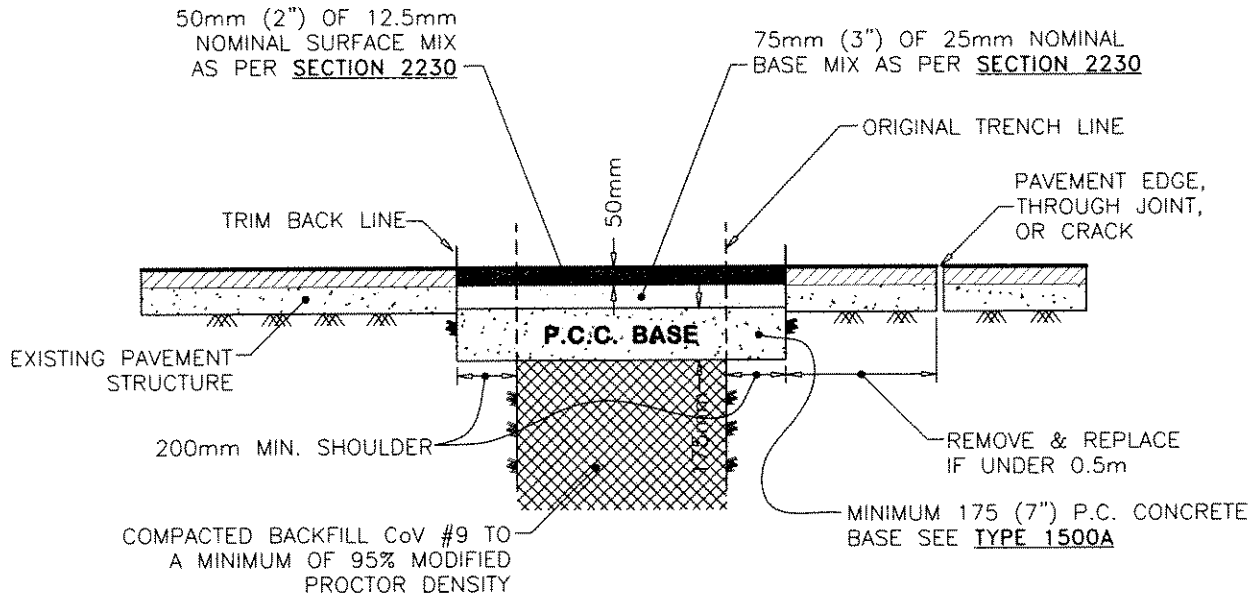
Pavement Restoration for Cuts & Trenches

STANDARD
SECTION
PAGE

DWG P2

ASPHALTIC CONCRETE SURFACE

FULL DEPTH ARTERIAL, INDUSTRIAL & TRANSIT ROUTES (G5)



CITY OF VANCOUVER - SUPPLY OF READY-MIX CONCRETE SCHEDULE OF STANDARD SPECIFICATION

CITY MIX NUMBER	1500 (No-Slump Concrete)
CEMENT TYPE	CSA Type GU (HE if required)
MAX. AGGREGATE SIZE	20mm
OPTIMUM MOISTURE CONTENT	To be determined as per CSA A23.2-12C
COMPACTED DENSITY	To within $\pm 2\%$ of the design concrete density
STRENGTH ACCELERATOR	As needed
HOT WATER	When required
EXPOSURE CLASS	F1 (CSA A23.1-04 Table 2)
COMPRESSIVE STRENGTH, MPa	15 @ 5 hours & 30 @ 28 days
AGGREGATES	As per CSA 23.1-04 Clauses 4.2.3.3, 4.2.3.4, 4.2.3.5, 4.2.3.6 & 4.2.3.7
MIX PROPORTIONS	As per CSA A23.1-04 Clause 4.3 and City specified requirements as above

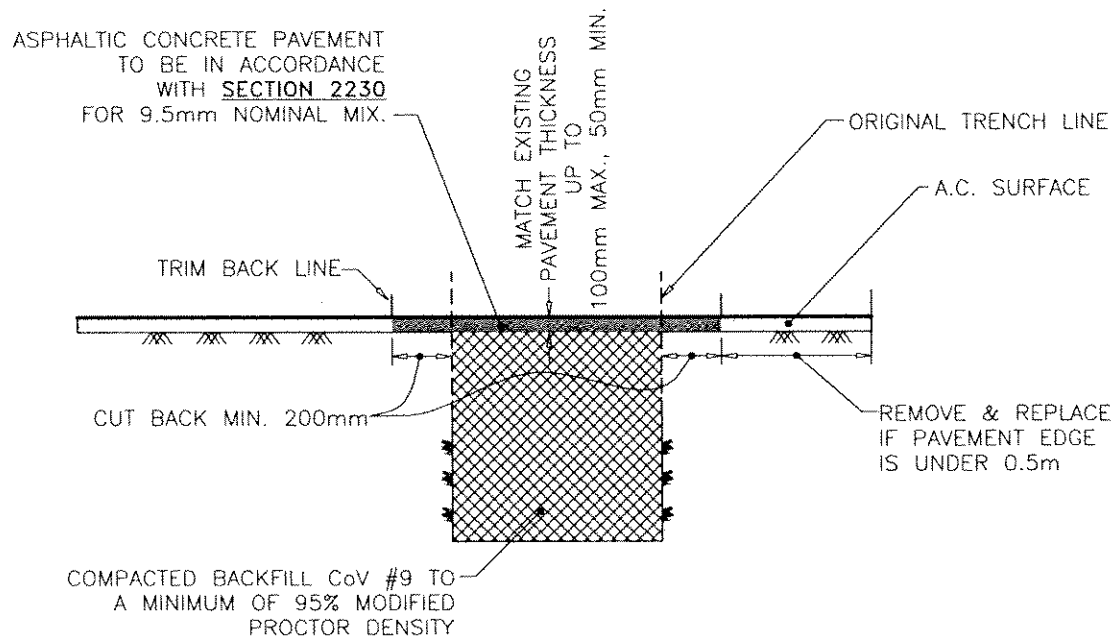
ISSUE: - Oct 24/06
APPROVED: _____

STANDARD DETAIL DRAWINGS
Pavement Restoration for Cuts & Trenches

STANDARD
SECTION
PAGE

DWG P3

**LIGHT DUTY RESIDENTIAL
ASPHALT SURFACED ROADS**



ISSUE: - Oct 24/06
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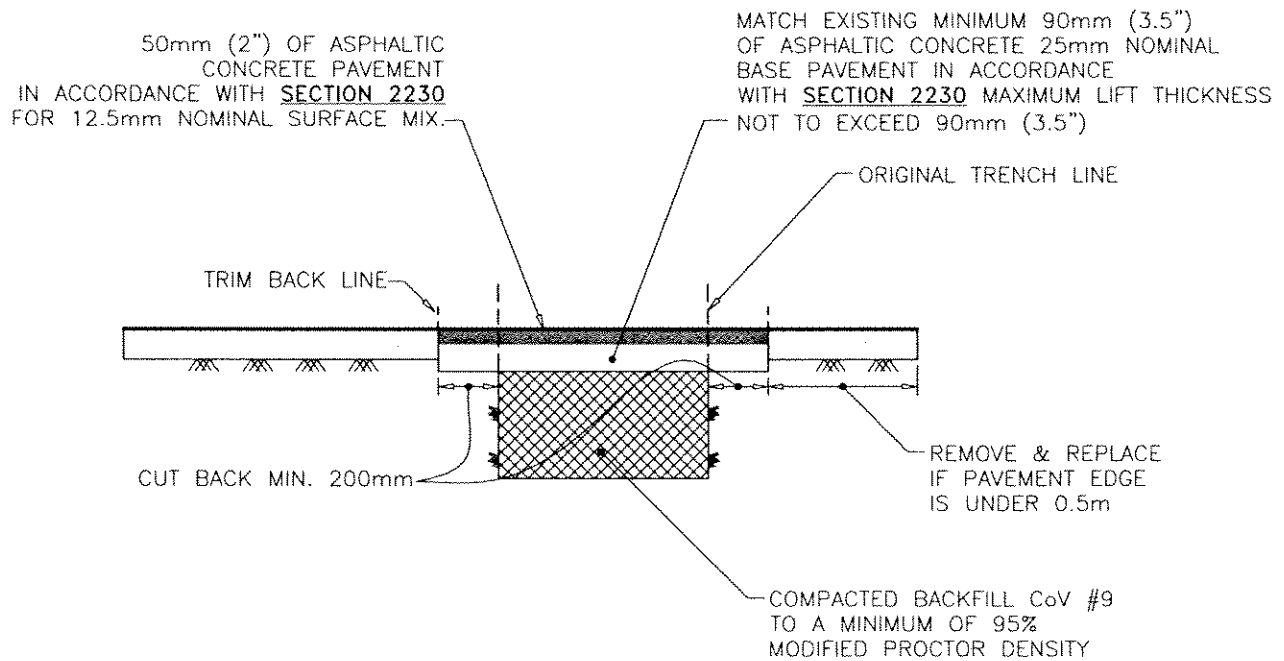
STANDARD DETAIL DRAWINGS
Pavement Restoration for Cuts & Trenches

STANDARD
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DWG P4

ASHPALT SURFACED ROADS

HIGHER ZONED ROUTES (RM1 OR HIGHER)



PS10180

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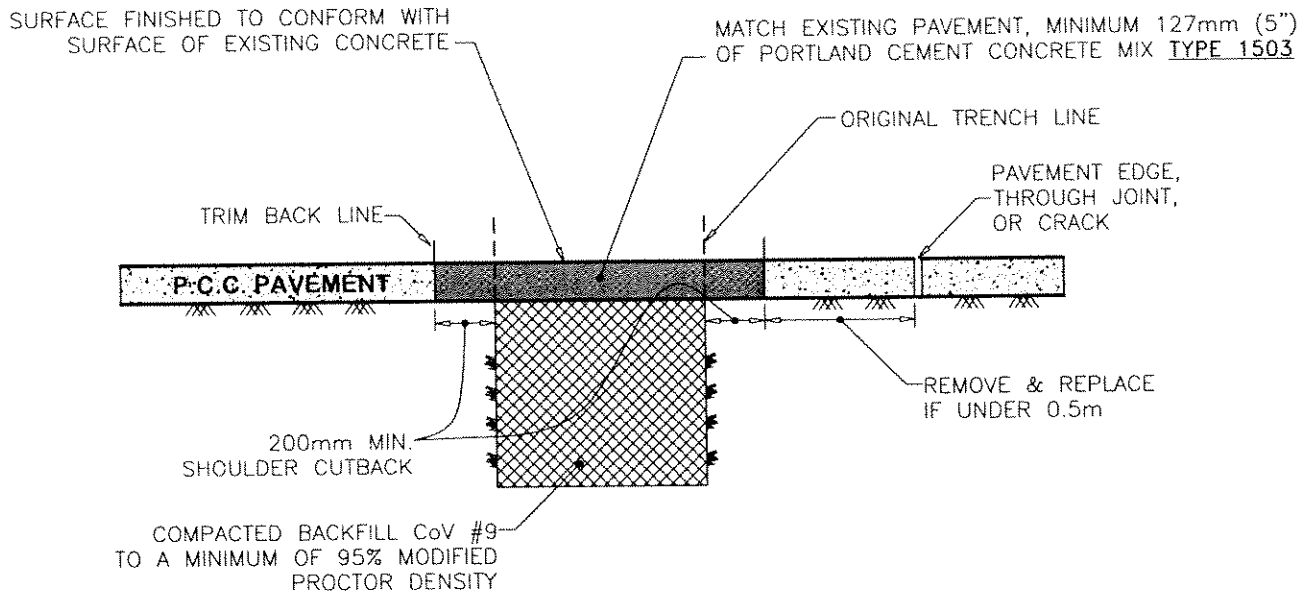
STANDARD DETAIL DRAWINGS

Pavement Restoration for Cuts & Trenches

STANDARD
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PAGE

DWG P5

CONCRETE DRIVEWAY



CITY OF VANCOUVER - SUPPLY OF READY-MIX CONCRETE SCHEDULE OF STANDARD SPECIFICATION

PROPERTIES	1503 (PERFORMANCE SPEC.)
CEMENT TYPE	CSA 30
MAXIMUM AGGREGATE SIZE	20mm
SLUMP	80mm
TOTAL AIR CONTENT %	5-8
CALCIUM CHLORIDE (AS % BY WEIGHT OF CEMENT)	1 - 3% AS DIRECTED
HOT WATER	BELOW 5° C
EXPOSURE CLASS (CSA TABLE 7)	C2
COMPRESSIVE STRENGTH	AT 28 DAYS: 28MPA AT 3 DAYS: 15MPA

PS10180

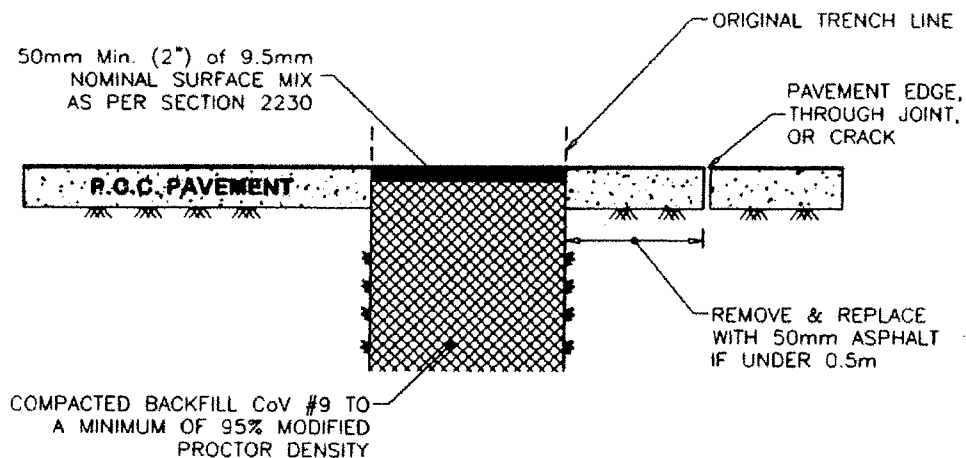
ISSUE: - Jan 27/2010
APPROVED: _____

STANDARD DETAIL DRAWINGS
Pavement Restoration for Cuts & Trenches

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DWG P6

**EXISTING PORTLAND CEMENT
CONCRETE SURFACE**



DATE 2010-01-23 - P.13mm (mm)
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JAN/24/10 - JN

ENGINEERING SERVICES DEPARTMENT
VANCOUVER, B.C.

WATER-STANDARDS

INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART H- DESIGN DRAWINGS

Design drawings available in CD form.

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INVITATION TO TENDER NO. PS10180
WATERMAIN SUPPLY AND INSTALLATION (2B)
PART I- WATERWORKS CONNECTION DATABASE SERVICE LISTS

WATERWORKS CONNECTION DATABASE SERVICE LISTS

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1300 to 1400 W 46TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1307 W 46TH AV	Active	Domestic	20	COP	14-Jul-1931	2.7 E OF W	16.4 W OF HUDSON		
1308 W 46TH AV	Active	Fire/Domestic	50	COP	16-Sep-2003	11.1 E OF W	7.6 W OF HUDSON		
1308 W 46TH AV	TBD	Domestic	20	COP	29-Oct-1931	6 E OF W	12.4 W OF HUDSON		
1319 W 46TH AV	Active	Domestic	20	COP	01-Jan-1931	6 W OF E	24.9 W OF HUDSON		
1320 W 46TH AV	Active	Domestic	20	COP	22-Jul-1937	7 W OF E	26.8 W OF HUDSON		
1331 W 46TH AV	Active	Domestic	20	COP	18-Jul-1930	8.5 E OF W	51.5 W OF HUDSON		
1338 W 46TH AV	Active	Domestic	20	COP	11-May-1931	6 E OF W	50.9 W OF HUDSON		
1343 W 46TH AV	Active	Domestic	20	COP	29-Apr-1931	6 W OF E	63.3 W OF HUDSON		
1344 W 46TH AV	Active	Domestic	20	COP	20-Apr-1959	6.4 W OF E	64 W OF HUDSON		
1355 W 46TH AV	Active	Domestic	20	COP	24-Jun-1930	4.5 W OF E	71.6 E OF CARTIER		
1363 W 46TH AV	Discontinued	Fire/Domestic	50	COP	13-Dec-2001	7 E OF W	46 E OF CARTIER		
1363 W 46TH AV	Discontinued	Domestic	20	COP	03-Oct-1958	6 W OF E	50.9 W OF HUDSON		
1366 W 46TH AV	Active	Fire/Domestic	50	COP	12-Jun-1995	14.3 E OF W	80.8 W OF HUDSON		
1366 W 46TH AV	Discontinued	Domestic	20	COP	11-Oct-1933	3.9 W OF E	72.8 E OF CARTIER		
1368 W 46TH AV	Active	Domestic	20	COP	10-Jul-1931	7.9 W OF E	49 E OF CARTIER		
1379 W 46TH AV	Active	Domestic	20	COP	10-Sep-1935	6.7 W OF E	31.3 E OF CARTIER		
1380 W 46TH AV	Active	Fire/Domestic	40	COP	17-Mar-2006	2.8 W OF E	35.9 E OF CARTIER		
1380 W 46TH AV	Discontinued	Domestic	20	COP	30-Apr-1942	2.1 W OF E	35.9 E OF CARTIER		
1388 W 46TH AV	Active	Domestic	50	COP	30-Sep-1993	1.8 W OF E	10.6 E OF CARTIER		
1388 W 46TH AV	Discontinued	Domestic	20	COP	24-Apr-1947	1.8 W OF E	17 E OF CARTIER		
1391 W 46TH AV	Active	Domestic	20	COP	30-Apr-1942	4.5 W OF E	14.6 E OF CARTIER		
1407 W 46TH AV	Active	Fire/Domestic	50	COP	18-Feb-1997	2.4 E OF W	15.4 W OF CARTIER		
1407 W 46TH AV	Discontinued	Domestic	20	COP	20-Jan-1932	0.3 E OF W	0		
1408 W 46TH AV	Active	Fire/Domestic	50	COP	04-Oct-1995	3.6 W OF E	14.3 E OF CARTIER		
1408 W 46TH AV	Discontinued	Domestic	20	COP	15-Jul-1931	3.6 W OF E	14.3 E OF CARTIER		
1419 W 46TH AV	Active	Domestic	20	COP	09-Mar-1937	5.7 W OF E	24 W OF CARTIER		
1420 W 46TH AV	Active	Domestic	20	COP	17-Mar-1938	1.8 E OF W	34.1 W OF CARTIER		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1300 to 1400 W 46TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1428 W 46TH AV	Active	Domestic	20	COP	14-May-1931	2.4 W OF E	41.4 W OF CARTIER		68739694
1431 W 46TH AV	Active	Domestic	20	COP	28-Apr-1931	5.7 W OF E	41.7 W OF CARTIER		68739707
1438 W 46TH AV	Discontinued	Domestic	20	COP	12-Jul-1943	6.4 W OF E	60.9 W OF CARTIER		
1438 W 46TH AV	Active	Domestic	50	COP	08-Oct-1993	6.4 E OF W	60.9 W OF CARTER		
1443 W 46TH AV	Active	Domestic	20	COP	14-Mar-1930	4.5 W OF E	58.5 E OF CARTIER		
1455 W 46TH AV	Active	Domestic	20	COP	26-Jun-1959	4.2 W OF E	77.4 E OF GRANVILLE		
1458 W 46TH AV	Discontinued	Domestic	20	COP	20-Feb-1931	3 W OF E	77.1 E OF GRANVILLE		
1458 W 46TH AV	Active	Domestic	50	COP	29-Apr-1994	3.9 W OF E	76.2 E OF GRANVILLE		
1469 W 46TH AV	Active	Domestic	20	COP	27-May-1936	2.1 W OF E	14.6 E OF LANE E OF GRANVILLE		
1482 W 46TH AV	Active	Domestic	20	COP	21-Feb-1931	3.3 W OF E	16.4 E OF LANE		
1488 W 46TH AV	Active	Domestic	20	COP	25-May-1948	0	23.1 E OF GRANVILLE		
1491 W 46TH AV	Active	Domestic	20	COP	02-Aug-1945	19.3 W OF E	18.6 E OF GRANVILLE		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1300 to 1400 W 47TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1307 W 47TH AV	Active	Domestic	20	COP	09-Jul-1936	0	8.8 W OF HUDSON		
1316 W 47TH AV	Active	Domestic	20	COP	29-Oct-1936	0.6 E OF W	18.2 W OF HUDSON		
1319 W 47TH AV	Active	Fire/Domestic	40	COP	17-May-2004	5.6 E OF W	33.3 W OF HUDSON		
1319 W 47TH AV	Discontinued	Domestic	20	COP	15-Jul-1937	9.1 E OF W	29.2 W OF HUDSON		
1328 W 47TH AV	Active	Fire/Domestic	50	COP	12-Jan-1995	3.7 E OF W	36 W OF HUDSON		
1328 W 47TH AV	Discontinued	Domestic	20	COP	07-Aug-1936	3.6 E OF W	33.8 W OF HUDSON		
1331 W 47TH AV	Active	Domestic	20	COP	07-Oct-1935	7 E OF W	50.9 W OF HUDSON		
1332 W 47TH AV	Active	Domestic	20	COP	30-Aug-1933	5.1 E OF W	51.8 W OF HUDSON		
1343 W 47TH AV	Active	Domestic	20	COP	09-Apr-1936	5.5 W OF E	61.7 E OF HUDSON		
1344 W 47TH AV	Active	Domestic	20	COP	09-Apr-1936	5.1 W OF E	62.7 W OF HUDSON		
1355 W 47TH AV	Discontinued	Domestic	20	COP	01-May-1936	4.5 W OF E	40.5 E OF CARTIER		
1355 W 47TH AV	Active	Domestic	40	COP	12-Mar-1993	4.5 W OF E	40.5 E OF CARTIER		
1356 W 47TH AV	Active	Domestic	20	COP	09-Nov-1936	1.8 W OF E	78 W OF HUDSON		
1367 W 47TH AV	Active	Domestic	20	COP	06-Apr-1936	9.1 E OF W	49 E OF CARTIER		
1368 W 47TH AV	Active	Domestic	20	COP	05-Mar-1936	2.4 W OF E	54.5 E OF CARTIER		
1379 W 47TH AV	Active	Domestic	20	COP	28-Jul-1981	5.1 W OF E	32 E OF CARTIER		
1380 W 47TH AV	Active	Domestic	20	COP	15-Aug-1934	3.9 W OF E	34.7 E OF CARTIER		
1391 W 47TH AV	Active	Domestic	20	COP	22-Jun-1931	3.9 W OF E	14.3 E OF CARTIER		
1392 W 47TH AV	Active	Domestic	20	COP	04-Jan-1932	14.3 W OF E	5.1 E OF CARTIER		
1408 W 47TH AV	Active	Fire/Domestic	50	COP	14-Aug-2003	3.4 E OF W	15.8 W OF CARTIER		
1408 W 47TH AV	Discontinued	Domestic	20	COP	10-Jun-1937	7.9 E OF W	10.9 W OF CARTIER		
1417 W 47TH AV	Active	Fire/Domestic	50	COP	18-Mar-1996	2.4 E OF W	16.4 W OF CARTIER ON W 47TH AVE.		
1417 W 47TH AV	Discontinued	Domestic	20	COP	29-Apr-1941	0.9 E OF W	17.9 W OF CARTIER		
1419 W 47TH AV	Active	Domestic	20	COP	31-Aug-1931	5.4 E OF W	32.6 W OF CARTIER		
1420 W 47TH AV	Active	Fire/Domestic	40	COP	11-Oct-2006	2.7 E OF W	35 W OF CARTIER		
1420 W 47TH AV	Discontinued	Domestic	20	COP	12-Apr-1937	2.7 E OF W	35.6 W OF CARTIER		
1428 W 47TH AV	Active	Fire/Domestic	50	COP	11-Jan-1995	7 W OF E	46.6 W OF CARTIER		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1300 to 1400 W 47TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1428 W 47TH AV	Discontinued	Domestic	20	COP	22-Jun-1936	7 W OF E	46.6 W OF CARTIER		
1431 W 47TH AV	Active	Fire/Domestic	50	COP	20-Oct-1997	2.2 E OF W	54.4 W OF CARTIER		
1431 W 47TH AV	Discontinued	Domestic	20	COP	20-Jan-1932	1.8 E OF W	0		
1438 W 47TH AV	Discontinued	Domestic	20	COP	30-Jan-1936	0.9 E OF W	77.7 E OF GRANVILLE		
1438 W 47TH AV	Active	Domestic	50	COP	16-Jan-1992	1.2 E OF W	78 E OF GRANVILLE		
1439 W 47TH AV	Active	Fire/Domestic	50	COP	28-May-1996	4.2 E OF W	82.5 W OF CARTIER ON W 47TH		
1439 W 47TH AV	Discontinued	Domestic	20	COP	18-Nov-1931	4.2 E OF W	82.6 W OF CARTIER		
1455 W 47TH AV	Active	Domestic	20	COP	11-Jan-1932	3.6 E OF W	0		
1456 W 47TH AV	Discontinued	Domestic	20	COP	23-May-1936	4.8 W OF E	71.9 E OF GRANVILLE		
1456 W 47TH AV	Active	Domestic	50	COP	31-Aug-1993	4.8 W OF E	71.9 E OF GRANVILLE		
1467 W 47TH AV	Active	Domestic	20	COP	27-May-1936	8.5 E OF W	46.6 E OF GRANVILLE		
1468 W 47TH AV	Active	Domestic	20	COP	11-Jan-1940	7 W OF E	48.4 E OF GRANVILLE		
1475 W 47TH AV	Active	Domestic	20	COP	05-Apr-1949	1.8 S OF N	48.7 N OF 47TH		
1488 W 47TH AV	Active	Domestic	20	COP	01-Nov-1945	2.1 N OF S	17.9 S OF 47TH ON GRANVILLE		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1300 to 1400 W 48TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1305 W 48TH AV	Active	Domestic	20	COP	26-Nov-1945	10.3 E OF W	8.5 W OF HUDSON		
1308 W 48TH AV	Active	Domestic	20	COP	08-Oct-1943	4.7 E OF W	14 W OF HUDSON		
1319 W 48TH AV	Active	Domestic	20	COP	09-May-1938	4.5 W OF E	23.4 W OF HUDSON		
1328 W 48TH AV	Discontinued	Domestic	20	COP	08-Mar-1940	0.6 W OF E	19.8 W OF HUDSON		
1328 W 48TH AV	Active	Domestic	50	COP	22-Feb-1994	0.9 W OF E	19.5 W OF HUDSON		
1331 W 48TH AV	Active	Domestic	20	COP	24-Oct-1944	10.9 W OF E	49 W OF HUDSON		
1338 W 48TH AV	Active	Domestic	20	COP	23-May-1985	2.7 E OF W	55.1 W OF HUDSON		
1339 W 48TH AV	Active	Domestic	20	COP	24-Feb-1944	7 W OF E	64.6 W OF HUDSON		
1348 W 48TH AV	Discontinued	Domestic	20	COP	17-Oct-1940	3 W OF E	60.3 W OF HUDSON		
1348 W 48TH AV	Active	Domestic	50	COP	25-May-1994	3 W OF E	61.5 W OF HUDSON		
1355 W 48TH AV	Active	Domestic	20	COP	11-Jun-1941	6 E OF W	63.3 E OF CARTIER		
1356 W 48TH AV	Discontinued	Domestic	20	COP	15-Feb-1945	2.7 E OF W	60.6 E OF CARTIER		
1356 W 48TH AV	Active	Domestic	40	COP	18-May-2010	3.15 E OF W	61 E OF CARTIER		
1367 W 48TH AV	Active	Domestic	20	COP	22-Jul-1941	3.9 E OF W	42.6 E OF CARTIER		
1368 W 48TH AV	Active	Fire/Domestic	40	COP	13-Oct-2006	3.5 W OF E	53 E OF CARTIER		
1368 W 48TH AV	Discontinued	Domestic	20	COP	10-Jun-1941	4.2 W OF E	53.6 E OF CARTIER		
1388 W 48TH AV	Active	Domestic	20	COP	06-Mar-1941	7.9 E OF W	27.1 E OF CARTIER		
1389 W 48TH AV	Active	Fire/Domestic	50	COP	13-Dec-2000	8.3 W OF E	30.3 E OF CARTIER ON 48TH		
1389 W 48TH AV	Discontinued	Domestic	20	COP	05-Jul-1939	2.7 W OF E	35.3 E OF CARTIER		
1391 W 48TH AV	Active	Fire/Domestic	40	COP	03-Feb-2005	3.7 E OF W	3.4 E OF CARTIER		
1391 W 48TH AV	Discontinued	Domestic	20	COP	16-Jun-1941	6.4 W OF E	12.8 E OF CARTIER		
1398 W 48TH AV	Active	Domestic	20	COP	24-Sep-1937	0	3.6 E OF CARTIER		
1407 W 48TH AV	Active	Domestic	20	COP	05-Sep-1941	4.5 E OF W	13.4 W OF CARTIER		
1408 W 48TH AV	Active	Domestic	50	COP	05-Feb-1991	16.4 E OF W	8.2 W OF CARTIER		
1408 W 48TH AV	Discontinued	Domestic	20	COP	16-Sep-1941	0	8.2 W OF CARTIER		
1419 W 48TH AV	Active	Fire/Domestic	50	COP	12-Aug-2003	0.7 E OF W	35.9 W OF CARTIER		
1419 W 48TH AV	Discontinued	Domestic	20	COP	28-Jun-1940	0.6 E OF W	35.3 W OF CARTIER		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1300 to 1400 W 48TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1426 W 48TH AV	Active	Domestic	50	COP	16-Jun-1992	8.8 W OF E	33.2 W OF CARTIER		
1426 W 48TH AV	Discontinued	Domestic	20	COP	10-Feb-1941	8.8 W OF E	33.2 W OF CARTIER		
1428 W 48TH AV	Active	Fire/Domestic	50	COP	27-Jun-1996	7.9 W OF E	55.4 W OF CARTIER		
1428 W 48TH AV	Discontinued	Domestic	20	COP	07-Jul-1941	7.9 W OF E	55.4 W OF CARTIER		
1433 W 48TH AV	Active	Domestic	20	COP	13-Mar-1940	3.9 E OF W	50.9 W OF CARTIER		
1443 W 48TH AV	Active	Fire/Domestic	50	COP	02-Dec-1996	4.2 E OF W	85.6 E OF GRANVILLE		
1443 W 48TH AV	Discontinued	Domestic	20	COP	17-Feb-1941	4.5 E OF W	85.6 E OF GRANVILLE		
1455 W 48TH AV	Active	Domestic	20	COP	30-May-1941	1.5 W OF E	79.5 E OF GRANVILLE		
1467 W 48TH AV	Active	Domestic	20	COP	14-Feb-1941	5.1 E OF W	50.2 E OF GRANVILLE		
1489 W 48TH AV	Active	Domestic	20	COP	13-Mar-1950	15.8 W OF E	21.9 E OF GRANVILLE		
1492 W 48TH AV	Active	Domestic	40	COP	07-Oct-1947	0	29.5 E OF GRANVILLE		
1492 W 48TH AV	Active	Domestic	20	COP	26-Aug-1958	9.7 S OF N	42 N OF 49TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5988 to 6532 CYPRESS ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
5988 CYPRESS ST	Active	Domestic	20	COP	27-Jun-1941	0.6 N OF S	69.1 S IF 43RD AVE		
5998 CYPRESS ST	Active	Domestic	20	COP	28-May-1946	10.6 S OF N	80.4 S OF 43RD AVE		
6018 CYPRESS ST	Active	Fire/Domestic	40	COP	16-Jul-2004	8.6 S OF N	84 N OF W 45		
6018 CYPRESS ST	Discontinued	Domestic	20	COP	18-Jun-1931	0.3 S OF N	93.2 S OF 43RD		
6046 CYPRESS ST	Active	Domestic	20	COP	18-Jun-1931	3.3 S OF N	66.1 N OF 45		
6128 CYPRESS ST	Active	Domestic	40	COP	20-Mar-1992	5.1 N OF S	33.5 S OF 45TH AVE		
6128 CYPRESS ST	Discontinued	Domestic	20	COP	16-Feb-1940	0.9 N OF S	37.7 S OF 45TH		
6150 CYPRESS ST	Active	Domestic	20	COP	18-Aug-1938	0.6 S OF N	38.7 S OF 45TH		
6170 CYPRESS ST	Active	Fire/Domestic	40		09-Apr-2008	4.8 N OF S	70.7 S OF 45TH		
6170 CYPRESS ST	Discontinued	Domestic	20	COP	15-Apr-1936	0.3 S OF N	57.6 S OF 45TH		
6190 CYPRESS ST	Active	Domestic	20	COP	17-Dec-1940	6.4 S OF N	81.6 S OF 45TH AVE		
6199 CYPRESS ST	Discontinued	Fireline	50		13-Oct-1988	0	81 N OF 47TH ON CYPRESS		
6199 CYPRESS ST	Discontinued	Domestic	20	GAL	31-May-1943	0.9 W OF E	61.5 E OF MAPLE ON W 45		
6199 CYPRESS ST	Active	Fireline	150	DICL	22-Aug-2003	83.7 N OF S	83 N OF 47TH ON CYPRESS	Tapped on Property side (DUAL)	60356503
6210 CYPRESS ST	Active	Domestic	20	COP	20-Jul-1938	0.9 N OF S	76.2 N OF 47TH		
6230 CYPRESS ST	Active	Domestic	40	COP	10-Oct-1991	1.2 S OF N	74.6 N OF W 47TH		
6230 CYPRESS ST	Discontinued	Domestic	20	COP	18-Mar-1941	0.3 S OF N	75.5 N OF 47TH		
6238 CYPRESS ST	Active	Domestic	40	COP	18-Sep-1992	6.7 N OF S	41.1 N OF 47TH		
6238 CYPRESS ST	Discontinued	Domestic	20	COP	15-Jul-1941	4.2 N OF S	42.9 N OF 47TH		
6270 CYPRESS ST	Active	Domestic	20	COP	12-Jun-1962	1.2 N OF S	21.6 N OF 47TH		
6307 CYPRESS ST	Active	Domestic	20	COP	10-Mar-1964	7.6 N OF S	7 S OF 47TH		
6310 CYPRESS ST	Active	Fire/Domestic	50	COP	10-Apr-1995	4.2 N OF S	15.5 S OF 47TH		
6310 CYPRESS ST	Discontinued	Domestic	20	COP	15-Sep-1937	4.2 N OF S	15.5 S OF 47TH		
6321 CYPRESS ST	Active	Domestic	20	COP	31-Dec-1945	2.1 S OF N	16.7 S OF 47TH		
6328 CYPRESS ST	Active	Domestic	20	COP	02-Jun-2003	4.5 N OF S	18.7 W OF 47		
6335 CYPRESS ST	Active	Fire/Domestic	40	COP	22-Nov-2006	7.9 N OF S	33 S OF 47TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5988 to 6532 CYPRESS ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
6335 CYPRESS ST	Discontinued	Domestic	20	COP	24-Jul-1941	5.4 N OF S	34.1 S OF 47TH		
6338 CYPRESS ST	Active	Domestic	20	COP	22-Jul-1941	2.7 S OF N	22.8 S OF 47TH		
6350 CYPRESS ST	Active	Domestic	20	COP	06-Jun-1940	1.5 S OF N	40.5 S OF 47TH		
6363 CYPRESS ST	Active	Domestic	20	COP	14-Feb-1964	1.5 N OF S	50.5 S OF 47TH		
6370 CYPRESS ST	Active	Domestic	20	COP	07-May-1941	1.2 N OF S	67.6 S OF 47TH		
6377 CYPRESS ST	Active	Domestic	20	COP	27-May-1958	3.3 S OF N	56 S OF 47TH		
6388 CYPRESS ST	Active	Domestic	20	COP	04-Sep-1940	0.3 N OF S	97.2 N OF 49TH		
6391 CYPRESS ST	Active	Domestic	20	COP	08-May-1941	2.7 S OF N	67.6 S OF 47TH		
6407 CYPRESS ST	Active	Domestic	20	COP	11-Mar-1968	4.8 S OF N	100.5 N OF 49TH		
6412 CYPRESS ST	Active	Domestic	20	COP	01-May-1939	1.8 S OF N	87.4 S OF 47TH AVE		
6421 CYPRESS ST	Active	Domestic	20	COP	12-Aug-1977	2.4 S OF N	94.4 N OF 49TH		
6435 CYPRESS ST	Active	Fire/Domestic	50	COP	30-Sep-1982	10 S OF N	76.2 N OF 49TH AVE		
6438 CYPRESS ST	Active	Fire/Domestic	50	COP	02-Jun-2003	3.8 S OF N	74.8 N OF 49TH		
6438 CYPRESS ST	Discontinued	Domestic	20	COP	29-Jun-1955	3.6 S OF N	75.8 N OF 49TH		
6439 CYPRESS ST	Active	Domestic	20	COP	20-Aug-1941	8.8 N OF S	75.2 N OF 49TH		
6443 CYPRESS ST	Active	Domestic	20	COP	01-Feb-1964	0.8 N OF S	57.6 N OF 49TH		
6468 CYPRESS ST	Active	Domestic	20	COP	17-Jun-1940	2.7 S OF N	60 N OF 49TH		
6477 CYPRESS ST	Active	Domestic	20	COP	26-Oct-1961	8.2 S OF N	47.8 N OF 49TH		
6507 CYPRESS ST	Active	Domestic	20	COP	14-Oct-1929	4.8 N OF S	14.6 S OF 49TH		
6508 CYPRESS ST	Active	Domestic	20	COP	17-Oct-1947	0.9 N OF S	18.2 S OF 49TH		
6519 CYPRESS ST	Active	Domestic	20	COP	01-Nov-1964	1.2 N OF S	33.5 S OF 49TH		
6520 CYPRESS ST	Active	Fire/Domestic	40	COP	05-Jan-2005	3.1 N OF S	31.1 S OF 49TH		
6520 CYPRESS ST	Discontinued	Domestic	20	COP	01-Nov-1964	0.9 S OF N	20.4 S OF 49TH		
6532 CYPRESS ST	TBD	Domestic	20	COP	30-Jun-1964	0.9 N OF S	49.9 S OF 49TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1850 to 1950 W 49TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1869 W 49TH AV	Active	Domestic	40	COP	05-Sep-1991	1.2 W OF E	36.2 E OF CYPRESS		
1869 W 49TH AV	Discontinued	Domestic	20	COP	30-Sep-1960	0.9 W OF E	36.5 E OF CYPRESS		
1889 W 49TH AV	Active	Domestic	20	COP	25-Sep-1959	4.8 W OF E	15.5 E OF CYPRESS		
1905 W 49TH AV	Active	Domestic	20	COP	29-Sep-1960	1.5 E OF W	10.6 W OF CYPRESS		
1911 W 49TH AV	Active	Domestic	20	COP	29-Sep-1960	0.6 W OF E	12.8 W OF CYPRESS		
1923 W 49TH AV	Active	Domestic	20	COP	29-Sep-1960	0.9 E OF W	41.1 W OF CYPRESS		
1927 W 49TH AV	Active	Domestic	20	COP	27-Dec-1974	3.6 W OF E	36.8 E OF LABURNUM		
1931 W 49TH AV	Active	Domestic	20	COP	29-Sep-1960	7.3 E OF W	54.5 W OF CYPRESS		
1945 W 49TH AV	Active	Domestic	20	COP	28-Oct-1988	1.2 E OF W	11.2 E OF LABURNUM		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1850 to 1950 W 47TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1899 W 47TH AV	Active	Fire/Domestic	50	COP	21-Jan-2003	11 S OF N	15.5 N OF 47TH		
1899 W 47TH AV	Discontinued	Domestic	20	COP	21-May-1947	9.4 S OF N	20.1 N OF 47TH		
1938 W 47TH AV	Active	Domestic	20	COP	09-Feb-1990	2.4 N OF S	12.1 S OF 47TH ON LABURNUM		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1850 to 1950 W 44TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1906 W 44TH AV	Active	Domestic	20	COP	30-Jun-1938	1.2 E OF W	15.2 W OF CYPRESS		
1913 W 44TH AV	Active	Fire/Domestic	40	COP	05-Jan-2006	5.1 E OF W	28.2 W OF CYPRESS		
1913 W 44TH AV	Discontinued	Domestic	20	COP	15-Jun-1939	1.2 E OF W	30.4 W OF CYPRESS		
1914 W 44TH AV	Discontinued	Domestic	20	COP	05-Aug-1937	0.9 W OF E	17.6 W OF CYPRESS		
1918 W 44TH AV	Active	Domestic	50	COP	11-Jun-1992	14.3 E OF W	17.9 W OF CYPRESS		
1921 W 44TH AV	Active	Fire/Domestic	40	COP	18-Oct-2004	4.3 E OF W	41.8 W OF CYPRESS		
1921 W 44TH AV	Discontinued	Domestic	20	COP	08-May-1940	1.2 W OF E	32.9 W OF CYPRESS		
1922 W 44TH AV	Active	Fire/Domestic	40		10-Apr-2008	0.9 E OF W	47.4 W OF CYPRESS		
1922 W 44TH AV	Discontinued	Domestic	20	COP	03-Jun-1938	0.9 E OF W	46.3 W OF CYPRESS		
1928 W 44TH AV	Active	Domestic	20	COP	01-Feb-1964	2.1 W OF E	49 W OF CYPRESS		
1929 W 44TH AV	Active	Domestic	20	COP	01-May-1939	3 W OF E	50.2 W OF CYPRESS		
1937 W 44TH AV	Active	Domestic	20	COP	07-May-1934	1.5 E OF W	75.8 W OF CYPRESS		
1938 W 44TH AV	Active	Fire/Domestic	50	COP	28-Apr-1995	8.5 E OF W	77 W OF CYPRESS		
1938 W 44TH AV	Discontinued	Domestic	20	COP	08-Mar-1937	1.2 E OF W	76.2 W OF CYPRESS		
1945 W 44TH AV	Active	Domestic	20	COP	07-May-1934	1.2 W OF E	78.3 W OF CYPRESS		
1948 W 44TH AV	Active	Domestic	20	COP	08-Mar-1937	0.9 W OF E	78 W OF CYPRESS		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1850 to 2100 W 45TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1876 W 45TH AV	Active	Domestic	20	COP	29-May-1941	6.4 N OF S	14 S OF 45TH ON CYPRESS		
1883 W 45TH AV	Active	Domestic	50	COP	08-Feb-1996	1.2 E OF W	24 E OF CYPRESS		
1883 W 45TH AV	Discontinued	Domestic	20	COP	13-Apr-1937	1.5 E OF W	24.3 E OF CYPRESS		
1887 W 45TH AV	Active	Domestic	20	COP	22-Sep-1938	0.3 W OF E	22.2 E OF CYPRESS		
1905 W 45TH AV	Active	Domestic	20	COP	02-Aug-1933	7.9 E OF W	10.6 W OF CYPRESS		
1913 W 45TH AV	Active	Domestic	20	COP	26-Nov-1941	1.2 W OF E	17.3 W OF CYPRESS		
1925 W 45TH AV	Active	Domestic	20	COP	18-Apr-1941	0.9 E OF W	45.7 W OF CYPRESS		
1929 W 45TH AV	Active	Fire/Domestic	50	COP	17-Oct-2002	4.2 E OF W	58.4 W OF CYPRESS		
1929 W 45TH AV	Discontinued	Domestic	20	COP	19-Jul-1940	1.2 W OF E	48.4 W OF CYPRESS		
1937 W 45TH AV	Active	Domestic	20	COP	29-Aug-1940	1.7 E OF W	75.6 W OF CYPRESS		
1945 W 45TH AV	Active	Domestic	20	COP	03-Mar-1941	1.2 W OF E	78.6 W OF CYPRESS		
1950 W 45TH AV	Discontinued	Domestic	20	COP	30-Nov-1949	1.2 E OF W	83.8 E OF MAPLE		
1953 W 45TH AV	Active	Fire/Domestic	40	COP	16-Apr-2007	4.5 E OF W	79.9 E OF MAPLE		
1953 W 45TH AV	Discontinued	Domestic	20	COP	10-Jun-1935	1.2 E OF W	78.6 E OF MAPLE		
1958 W 45TH AV	Discontinued	Domestic	20	COP	09-Sep-1937	0.9 W OF E	81.6 E OF MAPLE		
1961 W 45TH AV	Active	Fire/Domestic	40	COP	08-Aug-2006	2.4 E OF W	65.3 E OF MAPLE		
1961 W 45TH AV	Discontinued	Domestic	20	COP	01-Feb-1964	0.3 E OF W	77.1 E OF MAPLE		
1964 W 45TH AV	Discontinued	Domestic	20	GAL	31-May-1943	0.9 E OF W	63.3 E OF MAPLE		
1969 W 45TH AV	Active	Domestic	20	COP	02-May-1933	1.5 E OF W	48.4 E OF MAPLE		
1974 W 45TH AV	Discontinued	Domestic	20	COP	04-Jul-1934	3.6 E OF W	46.3 E OF MAPLE		
1977 W 45TH AV	Active	Domestic	20	COP	02-May-1933	0.3 W OF E	46.6 E OF MAPLE		
1981 W 45TH AV	Active	Domestic	40	COP	16-May-1991	4.8 E OF W	23.4 E OF MAPLE		
1981 W 45TH AV	Discontinued	Domestic	20	COP	06-Jan-1939	0.9 E OF W	17.6 E OF MAPLE		
1984 W 45TH AV	Discontinued	Domestic	20	GAL	31-Dec-1962	0	41.7 E OF MAPLE		
1993 W 45TH AV	Active	Domestic	20	COP	01-Jan-1901	0.3 W OF E	16.1 E OF MAPLE		
1993 W 45TH AV	Active	Domestic	40	COP	05-Jul-1993	0.3 W OF E	16.1 E OF MAPLE		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1850 to 2100 W 45TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1998 W 45TH AV	Discontinued	Domestic	20	LEAD	17-Jan-1940	10.9 W OF E	11.2 E OF MAPLE	S/C	
2005 W 45TH AV	Active	Domestic	40	COP	22-Jan-1991	11.8 E OF W	5.1 W OF MAPLE		
2005 W 45TH AV	Discontinued	Domestic	20	COP	29-Mar-1940	3.6 E OF W	13.1 W OF MAPLE		
2006 W 45TH AV	Active	Domestic	40	COP	10-Dec-1991	0	12.1 S OF 45TH		
2006 W 45TH AV	Active	Domestic	20	COP	13-Feb-1941	0.9 E OF W	14.6 W OF MAPLE		
2017 W 45TH AV	Active	Domestic	20	COP	06-May-1941	6 W OF E	23.1 W OF MAPLE		
2018 W 45TH AV	Active	Fire/Domestic	50		31-Oct-1997	6.7 E OF W	24.2 E OF MAPLE		
2018 W 45TH AV	Discontinued	Domestic	20	COP	31-May-1940	0.9 W OF E	16.4 W OF MAPLE		
2020 W 45TH AV	Active	Domestic	20	COP	12-May-1942	0.9 E OF W	44.8 W OF MAPLE		
2028 W 45TH AV	Active	Fire/Domestic	50	COP	15-Nov-1996	0.9 W OF E	45.7 W OF MAPLE		
2028 W 45TH AV	Discontinued	Domestic	20	COP	26-Mar-1941	1.2 W OF E	47.2 E OF MAPLE		
2031 W 45TH AV	Active	Domestic	20	COP	10-Feb-1964	0.3 E OF W	52.1 W OF MAPLE		
2037 W 45TH AV	Active	Fire/Domestic	50	COP	23-Sep-1997	4.6 E OF W	63.7 W OF MAPLE		
2037 W 45TH AV	Discontinued	Domestic	20	COP	10-Feb-1964	7.9 W OF E	60.3 W OF MAPLE		
2038 W 45TH AV	Active	Domestic	40	COP	03-Apr-1991	1.2 E OF W	75.5 W OF MAPLE		
2038 W 45TH AV	Discontinued	Domestic	20	COP	18-Jun-1941	1.2 W OF E	75.5 W OF MAPLE		
2043 W 45TH AV	Active	Domestic	20	COP	13-May-1941	0.9 E OF W	71.3 W OF MAPLE		
2045 W 45TH AV	Active	Domestic	40	COP	20-Oct-1992	0.9 W OF E	73.1 W OF MAPLE		
2045 W 45TH AV	Discontinued	Domestic	20	COP	07-Jun-1933	0.9 W OF E	73.1 W OF MAPLE		
2046 W 45TH AV	Active	Fire/Domestic	40	COP	16-Aug-1993	0.8 W OF E	77.9 E OF LANE		
2046 W 45TH AV	Discontinued	Domestic	20	COP	01-Jan-1901	0.6 W OF E	77.4 W OF MAPLE		
2046 W 45TH AV	Active	Domestic	40		12-Feb-2008	0	0		
2051 W 45TH AV	Active	Domestic	20	COP	29-Jun-1979	2.4 E OF W	89.9 W OF MAPLE		
2054 W 45TH AV	Active	Domestic	20	COP	11-Aug-1955	1.2 E OF W	89.3 E OF E BOULEVARD		
2061 W 45TH AV	Active	Domestic	20	COP	10-Oct-1969	0.6 W OF E	92.6 W OF MAPLE		
2062 W 45TH AV	Active	Domestic	20	COP	06-Sep-1930	3.3 E OF W	76.5 E OF E BOULEVARD		
2067 W 45TH AV	Active	Domestic	20	COP	01-Feb-1964	0.9 E OF W	84.7 E OF E BOULEVARD		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1850 to 2100 W 45TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
2070 W 45TH AV	Active	Domestic	20	COP	19-Jun-1930	0.6 E OF W	58.8 E OF E BOULEVARD		
2073 W 45TH AV	Active	Domestic	20	COP	25-Jun-1963	4.5 W OF E	78.9 E OF E BOULEVARD		
2079 W 45TH AV	Active	Domestic	20	COP	25-Aug-1941	0.9 E OF W	65.8 E OF E BOULEVARD		
2083 W 45TH AV	Active	Domestic	20	COP	13-Jun-1967	0.6 W OF E	18.2 E OF LANE		
2085 W 45TH AV	Active	Domestic	20	COP	18-Aug-1939	1.2 E OF W	46.9 E OF E BOULEVARD		
2090 W 45TH AV	Active	Fireline	150	DICL	02-Mar-2000	31.9 W OF E	26.4 E OF E BLVD		
2090 W 45TH AV	Active	Fireline	50	COP	26-May-1955	22.5 W OF E	35.3 E OF E BOULEVARD		45231232
2103 W 45TH AV	Discontinued	Domestic	25		02-Apr-1970	20.1 E OF W	15.5 W OF W BOULEVARD ON 45TH		
2103 W 45TH AV	Active	Fireline	150	DICL	30-Jun-2004	1.2 S OF N	20.3 N OF W 45TH	Tapped on Property side (DUAL)	60379048
2110 W 45TH AV	Active	Domestic	20	COP	03-Jul-1935	1.2 E OF W	52.1 W OF W BOULEVARD		
2113 W 45TH AV	Active	Domestic	20	COP	21-Feb-1931	3.3 W OF E	45.7 W OF W BOULEVARD		
2116 W 45TH AV	Active	Domestic	20	COP	03-Jul-1935	0.6 W OF E	53.9 W OF W BOULEVARD		
2123 W 45TH AV	Active	Domestic	20	COP	16-Nov-1987	2.4 W OF E	55.4 W OF W BOULEVARD		
2125 W 45TH AV	Active	Domestic	20	COP	08-Apr-1935	1.2 W OF E	63.3 W OF W BOULEVARD		
2126 W 45TH AV	Active	Domestic	20	COP	11-Jan-1932	0.3 E OF W	83.5 W OF W BOULEVARD		
2135 W 45TH AV	TBD	Domestic	20	COP	10-Feb-1961	0.3 W OF E	72.5 W OF W BOULEVARD		
2135 W 45TH AV	Discontinued	Domestic	20	GAL	10-Feb-1961	0	71.3 W OF W BOULEVARD		
2138 W 45TH AV	Active	Fire/Domestic	40	COP	30-Apr-2008	4.2 W OF E	48.1 W OF WEST BLVD		
2138 W 45TH AV	Discontinued	Domestic	20	COP	11-Jan-1932	0.9 W OF E	84.7 W OF W BOULEVARD		
2141 W 45TH AV	Active	Domestic	20	COP	26-Feb-1930	0.6 W OF E	83.2 W OF W BOULEVARD		
2145 W 45TH AV	Active	Domestic	20	COP	08-Jun-1984	1.2 W OF E	93.8 W OF W BOULEVARD		
2148 W 45TH AV	Active	Fire/Domestic	40		09-Jul-2007	0.4 E OF W	82.3 E OF YEW ST		
2148 W 45TH AV	Discontinued	Domestic	20	COP	04-Jul-1957	0.6 E OF W	82.6 E OF YEW		
2154 W 45TH AV	Active	Domestic	20	COP	25-Nov-1960	1.2 W OF E	80.4 E OF YEW		
2155 W 45TH AV	Active	Domestic	20	COP	21-Jun-1937	0.9 E OF W	84.4 E OF YEW		
2159 W 45TH AV	Active	Domestic	20	COP	16-May-1947	0.9 W OF E	82.2 E OF YEW		
2165 W 45TH AV	Active	Domestic	20	COP	15-Oct-1948	23.7 E OF W	64.3 E OF YEW		
2166 W 45TH AV	Active	Domestic	20	COP	30-Jun-1941	1.2 E OF W	52.7 E OF YEW		
2174 W 45TH AV	Active	Domestic	20	COP	01-Jan-1922	0.8 W OF E	51.2 E OF YEW		
2184 W 45TH AV	Active	Domestic	20	COP	02-May-1940	0.9 E OF W	22.2 E OF YEW		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1850 to 2100 W 45TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
2190 W 45TH AV	Active	Domestic	20	COP	22-Aug-1960	1.2 W OF E	20.7 E OF YEW		
2195 W 45TH AV	Active	Domestic	25	COP	03-Jan-1950	22.2 W OF E	39 E OF YEW		49212772
2196 W 45TH AV	Active	Domestic	20	COP	08-Jan-1957	32 N OF S	9.8 S OF N ON YEW		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 6000 to 6100 EAST BOULEVARD Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
6020 EAST BOULEVARD	Active	Domestic	40	COP	04-Sep-1952	14.6 N OF S	6.7 S OF 44TH		43369096
6040 EAST BOULEVARD	Active	Domestic	40	COP	23-Apr-1952	7.3 S OF N	28.6 S OF 44TH		94404704
6060 EAST BOULEVARD	Active	Domestic	40	COP	08-Dec-1944	5.1 S OF N	22.8 N OF 45TH		94404680
6070 to 6080 EAST BOULEVARD	Active	Domestic	40	COP	29-Sep-1956	1.5 S OF N	20.4 N OF 45TH		60621048
6158 to 6162 EAST BOULEVARD	Active	Domestic	20	COP	08-Apr-1937	6 S OF N	40.5 N OF 46TH		49132049
6170 to 6178 EAST BOULEVARD	Active	Domestic	20	COP	11-Jul-1967	1.5 S OF N	30.4 N OF 64TH		49101054
6192 EAST BOULEVARD	Active	Domestic	20	COP	23-Aug-1935	13.7 N OF S	13.7 N OF 46TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 1282 to 1522 W 45TH AV Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
1282 W 45TH AV	Discontinued	Domestic	20	COP	05-Mar-1946	2.7 E OF W	41.7 W OF MONTGOMERY		
1282 W 45TH AV	Active	Domestic	50	COP	11-Apr-1994	0.3 E OF W	46.3 W OF MONTGOMERY		
1288 W 45TH AV	Discontinued	Domestic	20	COP	02-May-1946	15.2 N OF S	21.3 S OF 45TH		
1288 W 45TH AV	Active	Domestic	50	COP	21-May-1993	15.2 N OF S	21.3 S OF 45TH ON HUDSON		
1289 W 45TH AV	Active	Domestic	50	COP	19-May-1992	13.4 W OF E	27.7 E OF LANE		
1308 W 45TH AV	Active	Domestic	20	COP	14-Jan-1993	11.5 E OF W	6 W OF HUDSON		
1320 W 45TH AV	TBD	Domestic	20	COP	24-Dec-1941	8.5 W OF E	28 W OF HUDSON		
1332 W 45TH AV	Active	Domestic	50	COP	22-Oct-1991	3.3 W OF E	42 W OF HUDSON		
1332 W 45TH AV	Discontinued	Domestic	20	COP	02-Mar-1934	3.3 W OF E	42 W OF HUDSON		
1338 W 45TH AV	Discontinued	Domestic	20	COP	30-Jul-1941	5.4 W OF E	32.9 E OF CARTIER		
1338 W 45TH AV	Active	Domestic	50	COP	09-Aug-1994	3.7 E OF W	73.5 W OF HUDSON		
1356 W 45TH AV	Active	Fire/Domestic	50	COP	24-Jul-1995	6 E OF W	63 E OF CARTIER		
1356 W 45TH AV	Discontinued	Domestic	20	COP	18-Sep-1929	6 E OF W	63 E OF CARTIER		
1368 W 45TH AV	Active	Domestic	20	COP	12-Feb-1930	1.8 W OF E	0		
1380 W 45TH AV	Active	Domestic	20	COP	29-Jul-1941	8.8 W OF E	27.7 E OF CARTIER		
1388 W 45TH AV	Active	Fire/Domestic	50	COP	12-Aug-1994	7 W OF E	11.9 E OF CARTIER		
1388 W 45TH AV	Discontinued	Domestic	20	COP	05-Sep-1939	3.9 W OF E	14.9 E OF CARTIER		
1408 W 45TH AV	Active	Domestic	50	COP	12-Jun-1992	6.3 E OF W	13.4 W OF CARTIER		
1408 W 45TH AV	Discontinued	Domestic	20	COP	05-Jun-1929	6 E OF W	0		
1420 W 45TH AV	Active	Domestic	20	GAL	11-Aug-1931	8.5 W OF E	0		
1432 W 45TH AV	Active	Domestic	20	COP	22-Jul-1940	6.7 W OF E	44.1 W OF CARTIER		
1444 W 45TH AV	Active	Domestic	20	COP	17-Dec-1942	13.4 E OF W	62.4 W OF CARTIER N		
1456 W 45TH AV	Active	Domestic	20	GAL	30-Oct-1930	3.3 W OF E	0		
1468 W 45TH AV	Active	Domestic	20	COP	01-Oct-1936	4.5 W OF E	52.7 E OF GRANVILLE		
1488 W 45TH AV	Active	Domestic	25	COP	04-Nov-1931	6.4 N OF S	0		
1511 W 45TH AV	Active	Domestic	20	COP	01-Mar-1964	38.4 E OF W	14.3 W OF GRANVILLE ON 45TH		
1522 W 45TH AV	Active	Domestic	40	COP	02-Dec-1992	34.4 E OF W	18.2 W OF GRANVILLE		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 6070 to 6138 GRANVILLE ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
6070 GRANVILLE ST	Active	Domestic	20	COP	20-May-1955	3 S OF N	34.1 N OF 45TH		
6088 GRANVILLE ST	Active	Domestic	20	COP	10-Oct-1956	20.1 E OF W	20.1 E OF GRANVILLE ON 45TH		
6111 GRANVILLE ST	Discontinued	Domestic	20	COP	23-Jan-1946	34.4 E OF W	18.2 W OF GRANVILLE ON 45TH		
6137 GRANVILLE ST	Active	Domestic	20	COP	07-Nov-1945	1.5 S OF N	24.6 S OF 45TH		
6138 GRANVILLE ST	Active	Domestic	20	COP	08-Jan-1946	4.5 S OF N	24.9 S OF 45TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 6070 to 6138 HUDSON ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
6070 HUDSON ST	Active	Fire/Domestic	50	COP	17-Nov-1995	6 N OF S	28 N OF W. 45TH		
6070 HUDSON ST	Discontinued	Domestic	20	COP	03-Aug-1938	1.5 N OF S	24 N OF 45TH		
6089 HUDSON ST	Discontinued	Domestic	20	COP	19-Mar-1935	0	20.4 W OF HUDSON ON 45TH		
6089 HUDSON ST	Active	Domestic	50	COP	28-Jan-1993	20.1 W OF E	25.6 E OF LANE		
6090 HUDSON ST	Active	Domestic	20	COP	20-May-1938	0.6 E OF W	0.6 E OF HUDSON		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5700 to 6100 CARTIER ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
5709 CARTIER ST	Active	Domestic	20	COP	01-Jan-1949	14.6 N OF S	4.2 S OF 41ST		
5716 CARTIER ST	Active	Domestic	20	COP	13-Jun-1941	0.9 N OF S	18.2 S OF 41ST		
5729 CARTIER ST	Discontinued	Domestic	20	COP	14-Jun-1929	7.3 S OF N	26.5 S OF 41ST		
5729 CARTIER ST	Active	Domestic	50	COP	21-Jan-1992	7.3 S OF N	26.5 S OF 41ST		
5730 CARTIER ST	Active	Domestic	20	COP	29-Aug-1939	3.9 N OF S	32.9 S OF 41ST		
5749 CARTIER ST	Active	Domestic	20	COP	06-May-1942	7.3 N OF S	48.1 S OF 41ST		
5750 CARTIER ST	Active	Fire/Domestic	50	COP	13-Mar-1996	1.1 N OF S	54.6 S OF 41ST		
5750 CARTIER ST	Discontinued	Domestic	20	COP	24-May-1957	1.2 N OF S	54.5 S OF 41ST		
5769 CARTIER ST	Active	Domestic	20	COP	01-Apr-1938	3 S OF N	58.2 S OF 41ST		
5788 CARTIER ST	Active	Fire/Domestic	50	COP	16-Nov-1994	5.1 N OF S	69.1 S OF 41ST		
5788 CARTIER ST	Discontinued	Domestic	20	COP	26-Feb-1937	5.1 N OF S	69.1 S OF 41ST		
5789 CARTIER ST	Active	Fire/Domestic	50	COP	24-Jul-1996	0.6 S OF N	93.8 N OF W 43RD		
5789 CARTIER ST	Discontinued	Domestic	20	COP	25-Jul-1941	0.6 S OF N	93.8 N OF 43RD		
5790 CARTIER ST	Active	Domestic	50	COP	25-Sep-1991	15.5 N OF S	77.1 S OF 41ST		
5790 CARTIER ST	Discontinued	Domestic	20	COP	07-Jul-1931	15.2 N OF S	0		
5809 CARTIER ST	Active	Fire/Domestic	50	COP	18-Aug-1999	4.5 N OF S	79 N OF 43		
5809 CARTIER ST	Discontinued	Domestic	25	COP	26-Apr-1962	5.7 S OF N	87.7 N OF 43RD		
5810 CARTIER ST	Active	Domestic	20	COP	11-Jun-1937	0.9 N OF S	75.8 N OF 43RD		
5829 CARTIER ST	Active	Fire/Domestic	50	COP	24-Apr-2003	5.9 N OF S	110.3 S OF 41ST		
5829 CARTIER ST	Discontinued	Domestic	20	COP	11-Jun-1947	3.9 N OF S	59.7 N OF 43RD		
5830 CARTIER ST	Active	Fire/Domestic	50	COP	23-Aug-2000	3.5 N OF S	8.1 N OF 43RD ON CARTIER		
5830 CARTIER ST	Discontinued	Domestic	20	COP	17-Apr-2000	4 S OF N	70.9 N OF 43RD		
5849 CARTIER ST	Active	Fire/Domestic	50	COP	20-Nov-1980	3.9 S OF N	52.1 N OF 43RD		
5850 CARTIER ST	Active	Fire/Domestic	50	COP	24-Jul-1996	4.2 S OF N	52.1 N OF W 43RD		
5850 CARTIER ST	Discontinued	Domestic	20	COP	20-May-1941	4.2 S OF N	52.1 N OF 43RD		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5700 to 6100 CARTIER ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
5869 CARTIER ST	Active	Fire/Domestic	50	COP	25-Nov-1980	3.9 S OF N	33.9 N OF 43RD		
5870 CARTIER ST	Active	Domestic	25	COP	03-Aug-1936	5.7 N OF S	25.6 N OF 43RD		
5889 CARTIER ST	Active	Domestic	20	COP	27-Jun-1967	3.6 S OF N	16.4 N OF 43RD		
5890 CARTIER ST	Active	Domestic	20	COP	29-Apr-1941	4.5 S OF N	14.6 N OF 43RD		
5909 CARTIER ST	Active	Domestic	20	COP	09-Jun-1939	4.5 S OF N	4.5 S OF 43RD		
5910 CARTIER ST	Active	Fire/Domestic	50	COP	10-Jan-1995	7.3 S OF N	7.3 S OF 43RD		
5910 CARTIER ST	Discontinued	Domestic	20	COP	10-Mar-1938	7.3 S OF N	7.3 S OF 43RD		
5929 CARTIER ST	Active	Domestic	20	COP	13-May-1942	2.7 N OF S	36.2 S OF 43RD		
5930 CARTIER ST	Active	Domestic	20	COP	07-May-1942	2.7 N OF S	35.6 S OF 43RD		
5939 CARTIER ST	Active	Fire/Domestic	40		11-May-2007	4.5 S OF N	42.6 S OF W 43RD		
5939 CARTIER ST	Discontinued	Domestic	20	COP	08-Sep-1942	4.5 S OF N	42.6 S OF 43RD		
5950 CARTIER ST	Active	Domestic	20	COP	27-Mar-1942	2.4 N OF S	54.5 S OF 43RD		
5969 CARTIER ST	Active	Fire/Domestic	50	COP	12-Jun-1995	5.4 N OF S	62.1 S OF 43RD		
5969 CARTIER ST	Discontinued	Domestic	20	COP	05-Jun-1940	5.4 N OF S	62.1 S OF 43RD		
5970 CARTIER ST	Active	Fire/Domestic	50	COP	17-Aug-1999	9.3 N OF S	70.9 S OF 43RD		
5970 CARTIER ST	Discontinued	Domestic	20	COP	03-Jul-1941	4.5 S OF N	61.5 S OF 43RD		
5989 CARTIER ST	Active	Domestic	20	COP	07-Feb-1941	13.7 N OF S	80.4 S OF 43RD		
5990 CARTIER ST	Active	Fire/Domestic	40	COP	07-May-2007	4.5 S OF N	79.5 S OF 43RD		
5990 CARTIER ST	Discontinued	Domestic	20	COP	08-Jul-1941	4.5 N OF S	79.8 S OF 43RD		
6009 CARTIER ST	Active	Domestic	20	COP	16-Oct-1940	6 S OF N	89 N OF 45TH		
6011 CARTIER ST	Active	Domestic	20	COP	17-Oct-1969	1.2 S OF N	92.6 N OF 45TH		
6028 CARTIER ST	Discontinued	Domestic	0	GAL	04-Oct-1943	1.8 S OF N	0		
6028 CARTIER ST	Active	Domestic	50	COP	19-Aug-1994	1.5 S OF N	94.8 N OF 45TH		
6029 CARTIER ST	Active	Domestic	20	COP	07-Dec-1942	5.1 S OF N	70.7 N OF 45TH		
6030 CARTIER ST	Active	Domestic	20	COP	29-Jul-1929	4.8 S OF N	70.1 N OF 45TH		
6049 CARTIER ST	Active	Domestic	20	COP	12-Mar-1941	3.3 S OF N	54.2 N OF 45TH		
6050 CARTIER ST	Active	Domestic	20	COP	17-Mar-1971	4.5 N OF S	43.8 N OF 45TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5700 to 6100 CARTIER ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
6068 CARTIER ST	Active	Domestic	50	COP	05-Oct-1992	3.6 S OF N	35.6 N OF 45TH		
6068 CARTIER ST	Discontinued	Domestic	20	COP	20-Dec-1940	3.6 S OF N	35.6 N OF 45TH		
6069 CARTIER ST	Active	Domestic	20	COP	06-May-1937	5.4 N OF S	27.1 N OF 45TH		
6089 CARTIER ST	Active	Domestic	20	COP	01-Nov-1943	9.7 S OF N	12.1 N OF 45TH		
6090 CARTIER ST	Active	Domestic	50	COP	20-Nov-1992	4.8 S OF N	15.8 N OF 45TH		
6090 CARTIER ST	Discontinued	Domestic	20	COP	29-Apr-1940	4.8 S OF N	15.8 N OF 45TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5700 to 6100 ATHLONE ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
5709 ATHLONE ST	Active	Domestic	20	COP	18-Aug-1950	3 N OF S	15.2 S OF 41ST		
5710 ATHLONE ST	Active	Domestic	25	COP	22-Mar-1962	1.5 N OF S	17 S OF 41ST		
5729 ATHLONE ST	Active	Domestic	20	COP	18-Jun-1968	2.4 N OF S	32.9 S OF 41ST		
5730 ATHLONE ST	Active	Domestic	20	COP	14-Sep-1931	4.8 N OF S	32.3 S OF 41ST		
5749 ATHLONE ST	Active	Domestic	20	COP	29-Mar-1940	5.4 S OF N	42.6 S OF 41ST		
5750 ATHLONE ST	Active	Domestic	20	COP	29-Aug-1940	10.3 S OF N	47.8 S OF 41ST		
5769 ATHLONE ST	Active	Domestic	20	COP	09-Feb-1939	7.9 S OF N	63.3 S OF 41ST		
5770 ATHLONE ST	Active	Fire/Domestic	40	COP	20-Jul-2006	6.6 N OF S	64.3 S OF 41ST		
5770 ATHLONE ST	Discontinued	Domestic	20	COP	04-May-1937	4.2 N OF S	7 S OF 41ST		
5775 ATHLONE ST	Active	Domestic	20	COP	22-Mar-1938	0.3 N OF S	85.9 S OF 41ST		
5790 ATHLONE ST	Active	Fire/Domestic	40	COP	22-Feb-2006	5.1 N OF S	70.5 S OF 43RD		
5790 ATHLONE ST	Discontinued	Domestic	20	COP	25-Jun-1951	6.7 S OF N	82 S OF 41ST		
5809 ATHLONE ST	Active	Fire/Domestic	40	COP	30-Jun-2004	12.4 S OF N	80.9 N OF 43		
5809 ATHLONE ST	Discontinued	Domestic	20	COP	03-Mar-1955	6 N OF S	80.7 N OF 43RD		
5818 ATHLONE ST	Active	Domestic	50	COP	03-May-1993	4.9 S OF N	86.3 N OF 43		
5818 ATHLONE ST	Discontinued	Domestic	20	PLAS	06-Jul-1944	4.5 S OF N	86.5 N OF 43RD		
5829 ATHLONE ST	Active	Domestic	20	KITEC	07-Jul-1955	3.3 N OF S	59.4 N OF 43RD		
5838 ATHLONE ST	Discontinued	Domestic	20	COP	30-Jul-1959	6.4 N OF S	62.7 N OF 43RD		
5849 ATHLONE ST	Active	Domestic	20	COP	25-Jul-1932	3.3 S OF N	52.8 N OF 43RD		
5868 ATHLONE ST	Active	Domestic	50	COP	05-Apr-1994	4.8 S OF N	52.1 N OF 43RD		
5868 ATHLONE ST	Discontinued	Domestic	20	COP	13-Jun-1938	4.8 S OF N	50.2 N OF 43RD		
5869 ATHLONE ST	Active	Domestic	50	COP	13-Nov-1992	4.2 S OF N	34.4 N OF 43RD		
5869 ATHLONE ST	Discontinued	Domestic	20	COP	15-Oct-1951	4.2 S OF N	0		
5880 ATHLONE ST	Active	Fire/Domestic	50	COP	02-Jul-1992	6.4 S OF N	3 N OF 43RD		
5880 ATHLONE ST	Discontinued	Domestic	20	COP	04-May-1992	6.4 S OF N	30.7 N OF 43RD		
5889 ATHLONE ST	Active	Domestic	50	COP	17-Mar-1994	1.8 W OF E	42.3 E OF LANE ON 43RD		
5889 ATHLONE ST	Discontinued	Domestic	20	COP	28-Apr-1950	43.2 E OF W	0.9 W OF ATHLONE		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5700 to 6100 ATHLONE ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
5898 ATHLONE ST	Active	Fire/Domestic	50	COP	14-Dec-1994	7.1 S OF N	11.3 N OF 43RD		
5898 ATHLONE ST	Discontinued	Domestic	20	PLAS	06-Aug-1946	7 S OF N	11.5 N OF 43RD		
5909 ATHLONE ST	Active	Domestic	20	COP	03-Aug-1931	3 N OF S	17.3 W OF 43RD		
5910 ATHLONE ST	Active	Domestic	20	COP	15-Oct-1951	5.4 N OF S	15.3 W OF 43RD		
5929 ATHLONE ST	Active	Domestic	20	COP	15-Nov-1957	4.5 S OF N	24.6 S OF 43RD		
5930 ATHLONE ST	Active	Domestic	20	COP	22-Jul-1960	1.2 S OF N	21.3 S OF 43RD		
5938 ATHLONE ST	Active	Fire/Domestic	50	COP	08-Dec-1995	3 N OF S	54 S OF W. 43RD		
5938 ATHLONE ST	Discontinued	Domestic	20	COP	18-Jun-1930	3.3 N OF S	53.3 S OF 43RD		
5949 ATHLONE ST	Active	Domestic	20	COP	08-Sep-1920	5.4 S OF N	43.2 S OF 43RD		
5969 ATHLONE ST	Active	Fire/Domestic	40		25-Feb-2008	6.4 S OF N	63.6 S OF W 43RD		
5969 ATHLONE ST	Discontinued	Domestic	20	COP	17-Jul-1950	6.4 S OF N	0		
5970 ATHLONE ST	Active	Domestic	20	COP	18-Jul-1940	3.9 S OF N	60.6 S OF 43RD		
5986 ATHLONE ST	Active	Domestic	20	COP	24-Jan-1900	4.8 N OF S	0		
5989 ATHLONE ST	Active	Fire/Domestic	50	COP	08-Aug-1995	4.9 N OF S	88.7 S OF 43RD		
5989 ATHLONE ST	Discontinued	Domestic	20	PLAS	21-Sep-1945	4.5 N OF S	88.3 S OF 43RD		
6009 ATHLONE ST	Active	Domestic	20	COP	11-Jul-1958	6.4 S OF N	89.6 N OF 45TH		
6018 ATHLONE ST	Active	Domestic	50	COP	30-Jun-1995	5 N OF S	81.7 N OF 45TH ON ATHLONE		
6018 ATHLONE ST	Discontinued	Domestic	20	COP	16-May-1938	4.8 N OF S	81.9 N OF 45TH		
6029 ATHLONE ST	Active	Domestic	20	COP	04-Jul-1950	2.7 N OF S	61.8 N OF 45TH		
6030 ATHLONE ST	Active	Domestic	20	COP	09-Apr-1942	6 S OF N	71 N OF 45TH		
6033 ATHLONE ST	Active	Fire/Domestic	50	COP	06-Feb-1997	7 S OF N	58.2 N OF 45TH		
6033 ATHLONE ST	Discontinued	Domestic	20	COP	09-Mar-1932	6.4 S OF N	0		
6050 ATHLONE ST	Active	Domestic	20	COP	22-Mar-1939	11.8 S OF N	46.6 N OF 45TH		
6069 ATHLONE ST	Active	Domestic	20	COP	30-Mar-1937	3.6 S OF N	37.1 N OF 45TH		
6070 ATHLONE ST	Active	Domestic	20	COP	11-Jun-1940	4.8 N OF S	25.9 N OF 45TH		
6088 ATHLONE ST	Active	Fire/Domestic	50	COP	06-Mar-1996	9.8 S OF N	12.5 N OF 45 AVE		
6088 ATHLONE ST	Discontinued	Domestic	20	COP	07-Apr-1941	8.5 S OF N	13.4 N OF 45TH		

Waterworks Connection Service Report

City of Vancouver - Water Operations

Criteria: Location: 5700 to 6100 ATHLONE ST Street Side: All

Street Address	Line Status	Line Type	Size (mm)	Pipe Material	First Record Date	Short Offset (m)	Long Offset (m)	Configuration	Meter Body S/N
6089 ATHLONE ST	Discontinued	Domestic	20	PLAS	19-Jul-1944	8.8 S OF N	13.1 N OF 45TH		
6089 ATHLONE ST	Active	Domestic	50	COP	17-Oct-1990	21.9 E OF W	22.2 W OF ATHLONE ON W. 45TH		