CONTRACT DOCUMENTS
for
2013 SEWER RELINING

Contract No. 1470

August 2013
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INVITATION TO TENDER

2013 Sewer Relining
Tender No. 1470

Sealed tenders, clearly marked "2013 Sewer Relining" will be received by the Manager of Purchasing & Stores up to 3:00 p.m. local time, 2013-SEP-11 at the Purchasing office, City of Nanaimo, 2020 Labieux Rd, Nanaimo, BC, V9T 6J9, Fax Number: 250-756-5327. Tenders will be opened in public, in the Purchasing Department, immediately after the closing time.

It is the sole responsibility of the person(s) submitting to deliver the tender to the Manager of Purchasing & Stores before the closing time.

The work consists of the CIPP relining of 825 metres of 150mm diameter, 55 metres of 200mm diameter, 100 metres of 450mm diameter mains and 30 metres of 100mm diameter service laterals. Work also includes installation of manholes, cleanouts and inspection chambers and some point repairs. Most of the work area is located on private property with mature landscaping and limited access.

This tender is subject to the MASH Procurement Agreement Annex 502.4.

Digital copies of the contract documents are available at no charge on the City of Nanaimo’s website at www.nanaimo.ca. Alternatively, contract documents may be examined and obtained from the Purchasing Department at 2020 Labieux Road, Nanaimo, BC, on or after 2013-AUG-28, upon payment of the non-refundable sum of $210.00 (GST included).

All inquiries shall be directed to Steve Ricketts, Manager, Construction, Engineering & Public Works Department, 2020 Labieux Road, Nanaimo, B.C., V9T 6J9, Telephone: 250-756-5321, Email: steve.ricketts@nanaimo.ca

The City of Nanaimo reserves the right to waive informalities in, or reject any or all tenders, or accept the tender deemed most favorable in the interest of the City.

Kurtis Felker, C.P.P., Manager
City of Nanaimo, Purchasing & Stores Department
2020 Labieux Road, Nanaimo, BC, V9T 6J9
INSTRUCTIONS TO TENDERERS

ARTICLE 1. TENDER

Sealed tenders marked "2013 Sewer Relining" will be received by the Manager of Purchasing and Stores, Purchasing Department, 2020 Labieux Rd, Nanaimo, BC, V9T 6J9, up to 3:00 p.m. local time, 2013-SEP-11.

ARTICLE 2. SCOPE OF WORK

The work consists of the CIPP relining of 825 metres of 150mm diameter, 55 metres of 200mm diameter, 100 metres of 450mm diameter mains and 30 metres of 100mm diameter service laterals. Work also includes installation of manholes, cleanouts and inspection chambers and some point repairs. Most of the work area is located on private property with mature landscaping and limited access.

ARTICLE 3. PAYMENT FOR CONTRACT DOCUMENTS

$210.00 (GST included) non-refundable.

ARTICLE 4. EXAMINE

The Tenderer must carefully examine the Contract Documents and the site of the proposed works, judging for and satisfying himself as to the probable conditions to be encountered. Should a Tenderer find discrepancies in, or omissions from the drawings or other documents, or should he be in doubt as to their meaning, he should, prior to submitting his tender, notify the Engineer in writing. The Tenderer may not claim, after the submission of a tender, that there was any misunderstanding with respect to the conditions imposed by the documents.

The Tenderer's attention is drawn to any addenda which may be issued prior to the time of tender closure.

No verbal agreement or conversation made or had at any time with any officer, agency or employee of the Owner or the Engineer shall affect or modify any of the terms or obligations herein stated, nor deemed to be any representation of warranty.

ARTICLE 5. STANDARDS AND SPECIFICATIONS

The Tenderer is advised that this contract uses the November 2009 City of Nanaimo Standards, Specifications and Measurement and Payment clauses.

It is the Tenderers responsibility to familiarize himself with all tender documentation prior to submission of a tender. The Tenderer may not claim, after submission of a tender, that there was any misunderstanding with respect to the conditions imposed by the documents.

Section numbers referred to in the Measurement and Payment clauses are for guidance only. Tenderers are advised that descriptions of pay items may be in more than one section of the documents. It is the Tenderers responsibility to familiarize himself with these pay item descriptions.

ARTICLE 6. FORM OF SUBMISSION

A digital copy of the Tender Form is also available on the City's website www.nanaimo.ca. The tender should be submitted on a hard copy of this form and accompanied by the specified Bid Bond in a sealed envelope. E-mail or facsimile tender submissions will not be accepted.
INSTRUCTIONS TO TENDERERS

The Schedule of Quantities and Prices in Excel format is available on the City's website to assist Tenderers with data entry. This information is provided for convenience only and the Tenderer is responsible to confirm accuracy of the digital information provided.

The City of Nanaimo is not a member of Public Construction Council of British Columbia, the British Columbia Construction Association or any other construction association.

The City of Nanaimo does not adopt or agree to be bound by "The Procedures and Guidelines Recommended for Use on Publicly Funded Construction Projects" produced by the Public Construction Council of British Columbia, September, 1989, or any other procedure/guidelines recommended, adopted or produced by any construction association in the tendering and award of the contract on this project.

ARTICLE 7. SCHEDULE OF FORCE ACCOUNT RATES

The Schedule of Force Account Rates shall be completed and a unit price shall be inserted for each item in accordance with Article 40 of Section 2 - General Conditions. The low Tenderer will be required to demonstrate that the force account rates tendered are, in fact, the direct cost of his labour. Failure to submit a correct and complete list may result in the tender being considered incomplete.

ARTICLE 8. TENDERER'S QUESTIONNAIRE

The Tenderer must furnish evidence that he has the necessary experience and is prepared to use the necessary personnel and equipment to carry out the work satisfactorily and within the time stated in the Tender Form. The Tenderer's Questionnaire shall be completed in order that his capabilities in this regard can be assessed by the Owner. Failure to complete the Questionnaire may result in the tender being considered incomplete.

ARTICLE 9. LIST OF SUBCONTRACTORS

The Tenderer must indicate, in the list of Subcontractors in the Tender Form, the name of the subcontractor he proposes to employ in each subtrade he proposes to subcontract.

A Tenderer shall submit on the List of Subcontractors of the Tender Form, only one Subcontractor for each subtrade proposed to be subcontracted. The listing of more than one Subcontractor for any subtrade on the List of Subcontractors in the Tender Form shall constitute grounds for rejection of the Tenderer’s tender.

Subcontractors shall not be changed or additional subcontractors employed without the written authorization of the Engineer. Failure to submit a complete list may result in the tender being considered incomplete.

Subcontractors should be aware of Articles 20 and 34 of the General Conditions of the Contract as they apply to permits and licences for construction of the works.

ARTICLE 10. PROPOSED ALTERNATE MATERIALS

If a Tenderer intends to use equipment or material other than that specified or shown on the drawings, he must provide the required information in the List of Proposed Alternate Materials in the Tender Form, together with the applicable price variation. Evaluation of proposed alternate materials will be made by the Owner following closing of tenders. The total Tender must be based on use of specified materials.
ARTICLE 11. TEST EXCAVATIONS

Prior to the excavation of test holes on road allowances or privately owned property, the Tenderer is expected to obtain permission from the appropriate governmental agency or owner of the property and to comply with their requirements for restoration of disturbed services and utilities. Failure to comply with ordinances restricting this practice may result in prosecution of the offending party.

ARTICLE 12. FEDERAL AND PROVINCIAL SALES TAXES

Unit and lump sum prices shall include provincial sales tax payable on all applicable materials and equipment incorporated in the work.

GST is not to be included in the unit and lump sum prices. GST shall be shown separately on the Schedule of Quantities Summary page based on the total contract value.

ARTICLE 13. TENDER PRICE

Unit and lump sum prices shall be filled in where indicated in the Schedule of Quantities and Prices of the Tender Form. The unit prices shall be extended in accordance with the quantities shown and the extensions shall be inserted in the space provided. The total tender must be an accurate extension of the unit and lump sum prices submitted and the quantities shown.

In the event of a discrepancy between the unit prices and extended totals, the unit prices will govern and the Engineer will correct the extended totals accordingly.

In the event of a discrepancy between a maximum allowable lump sum price and the submitted lump sum price, the maximum allowable price shall govern and the Engineer will correct the price and extend totals accordingly.

The prices tendered shall include the supply of all materials except those specified to be supplied by others, all supervision, labor and equipment and a provision for overhead and profit, and shall represent the entire cost to the Owner for the completed works as specified and shown on the drawings.

ARTICLE 14. REVISIONS TO TENDER

Any revision to the tender by the Tenderer must be in writing by letter or faxcom only, properly executed, and received by the Manager of Purchasing and Stores at the closing location before the closing time.

(a) Letter

Revisions by letter must originate on the Tenderer’s letterhead and be headed “CITY OF NANAIMO TENDER”. The revision must substantially comply with the following requirements:

i) state the tender number and description;
ii) state the closing time; and,
iii) state the amount by which the tender is to be increased or decreased AND the increase or decrease to each unit price affected.

The revision must be signed by an Authorized Signatory. The positions or titles of the Authorized Signatory should be indicated below the signature.
Letter revisions should be enclosed in an envelope marked "Revision to City of Nanaimo Tender", showing the tender number and description.

(b) Faxcom

Faxcom revisions must comply with the requirements in Article 14 (a).

Faxcom revisions must be faxed to the fax number indicated in the advertisement. The Tenderer assumes all responsibility for the timely and effective delivery of any faxcom transmission. The City will make reasonable efforts to ensure that the faxcom receiving equipment is in good working order but has no responsibility to ensure that the equipment is able to receive transmissions in an accurate or timely manner.

(c) Amount of Bid Bond

The Tenderer must ensure that the total amount of the bid bond is not less than ten percent (10%) of the total tender price. The Tenderer should consider the effect of revisions on the tender price and the bid bond requirements.

(d) Multiple Revisions

Where a Tenderer submits multiple revisions to the original tender price, each revision should be numbered sequentially by the Tenderer. Unless the Tenderer clearly stipulates to the contrary on the face of the revision, each successive revision will nullify and replace any previous revision to the identified item or tender price.

(e) Unclear or Ambiguous Revisions

If in the opinion of the City, any revision is unclear, ambiguous as to meaning or intent, or does not comply with the requirements of Article 14, that revision will be disregarded and the original tender price, or the tender price determined by consideration of any other revisions will prevail.

The City, its employees and agents will not assume any responsibility for timely receipt of any revisions.

ARTICLE 15. TENDER SIGNING

The tender must be executed by an authorized signatory in a position to legally bind their Company to the information contained in the Tender Form.

If the Tenderer is a joint venture, each party to the joint venture shall execute the tender in the manner appropriate to such party.
ARTICLE 16. BID BOND

The tender must be accompanied by a Bid Bond using CCDC Document #220 – Bid Bond (2002), or certified cheque, in an amount not less than ten percent (10%) of the tender price. The Bid Bond must be issued by a surety company licenced to conduct business in the Province of British Columbia.

If the successful Tenderer fails for any reason to execute the Contract Agreement and to provide the insurance and surety bonds stipulated in the General Conditions within ten (10) calendar days after the Notice of Award, such time limit being extended only on the written approval of the Owner, his Bid Bond or certified cheque will be forfeited to and retained by the owner in the amount of the difference in money between the total tender and the amount for which the Owner may legally contract with another party to perform the work, if the latter amount be in excess of the former.

Bid Bonds or certified cheques submitted by unsuccessful Tenderers will be returned to them as soon as the successful Tenderer has delivered to the Owner, the insurance and surety bonds stipulated in the General Conditions and a fully executed contract for the work, or when the period for which tenders are irrevocable has elapsed, whichever shall first happen.

ARTICLE 17. TENDER WITHDRAWAL

A Tenderer may, without prejudice to himself, withdraw his tender on written request received by the Manager of Purchasing and Stores any time prior to the time set for the closing of tenders.

ARTICLE 18. TENDER REJECTION

1. The City of Nanaimo reserves the right to reject any or all tenders, or accept other than the lowest tender and to accept the tender which it deems most advantageous to the City of Nanaimo.

2. To determine whether a Tenderer is qualified to do the work, the following criteria will be used:

   a) The Tenderer’s ability and agreement to complete the work within the Construction Schedule;

   b) The Tenderer’s ability to work with the owners, consultants and representatives;

   c) The Tenderer’s ability to effectively manage and do the work using the named superintendent and submitted contractors and subcontractors;

   d) The Tenderer’s history with respect to quality of the work, scheduling, changes in the work, and force account work.

A Tenderer is requested to provide any information it determines will assist the City of Nanaimo in using these criteria.
.3 The City of Nanaimo may reject a tender if:

   a) After investigation and consideration, the City concludes that the Tenderer is not qualified to do the work and/or cannot do the work and perform the Contract in a manner satisfactory to the City of Nanaimo.

   b) A tender contains qualifying conditions or otherwise fails to conform to these Instructions to Tenderers.

   c) A tender is incomplete, is considered incomplete in the Instructions to Tenderers, is obscure or irregular, which has erasures or corrections in the Tender Form, in which prices are omitted or are unbalanced, or which has an insufficient or irregular surety. The Tenderer’s attention is drawn to the requirement in the Tenderer’s Questionnaire to name the superintendent on the project and give his or her previous experience.

   d) The City of Nanaimo may, in its absolute discretion, reject a Tender submitted by Tenderer if the Tenderer, or any officer or director of the Tenderer is or has been engaged either directly or indirectly through another corporation in a legal action against the City of Nanaimo, its elected or appointed officers and employees in relation to:

      (a) any other contract for works or services; or
      (b) any matter arising from the City of Nanaimo’s exercise of its powers, duties, or functions under the Local Government Act or another enactment

within five years of the date of this Call for Tenders.

In determining whether to reject a tender under this clause, the City of Nanaimo will consider whether the litigation is likely to affect the Tenderer’s ability to work with the City of Nanaimo, its consultants and representatives and whether the City of Nanaimo’s experience with the Tenderer indicates that the City of Nanaimo is likely to incur increased staff and legal costs in the administration of this contract if it is awarded to the Tenderer.

   e) The City of Nanaimo, however, may at its sole discretion elect to retain for consideration a tender which is non-conforming because it does not contain the content or form required by these Instructions to Tenderers or because a Tenderer has not complied with the procedures set out in the Instructions to Tenderers.

.4 The City may reject all tenders if for any reason the City considers to be in its best interest to do so, including without limitation for any of the following reasons;

   a) the lowest tender that the City considers otherwise acceptable is higher than the funds budgeted or otherwise available for the project;
   b) the City decides not to proceed with the project or to defer the project;
   c) if only one bid is received, then the tender will be reissued unless a financial analysis indicates that the sole bid represents a good value for the taxpayers; or
   d) the City is delayed in obtaining, or is unable to obtain, all approvals or consents it considers necessary, whether required by law or otherwise.

.5 The City of Nanaimo reserves the right to consider and to reject any tender or all tenders without notice to a Tenderer or Tenderers and without permitting a Tenderer to provide additional information.

.6 In no event will the City of Nanaimo be responsible for a Tenderer’s costs of preparing or submitting a tender.
ARTICLE 19. AWARD

Awards shall be made on tenders that will give the greatest value based on quality, service and price.

The Owner will, following receipt of an acceptable tender, issue in writing a Notice of Award to the successful Tenderer. This notice will be given as soon as possible following the closing of tenders and unless otherwise agreed to by the Tenderer, not later than sixty (60) days following the closing of tenders.

ARTICLE 20. NO CLAIM FOR COMPENSATION

Except as expressly and specifically permitted in these Instructions to Tenderers, no Tenderer shall have any claim for any compensation of any kind whatsoever, as a result of participating in the tender, and by submitting a bid each Tenderer shall be deemed to have agreed that it has no claim.

ARTICLE 21. SOLICITATION OF COUNCIL MEMBERS

“If a member of Council, or a person who was a member of Council in the previous six months has a direct or indirect interest in the contract, then the Tenderer shall report this to Council in accordance with Section 107 of the Community Charter upon being notified of the award of the contract.

The Tenderer warrants and represents that it has not received any information or a record from any Council member or former Council member contrary to Section 108 of the Community Charter.”

The successful Tenderer will be required to direct all communications related to their contract through the appropriate staff members as set out in Article 9 and Article 21 of the General Conditions of Contract.

ARTICLE 22. CONSTRUCTION SCHEDULE

The City of Nanaimo requires that this contract be completed by 2013-NOV-15.

The Tenderer is advised to schedule excavation work required on private property early in the schedule to take advantage of drier weather and to minimize damage to private property. The Tenderer is also advised some properties require specific times when the work can be completed. Refer to Property Condition sheets in Appendix 3 for more details.

ARTICLE 23. CONSTRUCTION LAYOUT

Layout for construction shall be as detailed in Article 7 of the General Conditions of the Construction Contract.

The Contractor shall be required to maintain an "as-constructed" drawing set for the project, with all changes and notes marked in red ink. This set shall be available to the Engineer for review on request and, submitted to the Engineer upon completion of the project along with the “as-constructed” digital survey file.

The lump sum bid price under Item 2.1 shall not exceed 5% of the total contract price and shall be full compensation for:

1. All construction layout of the work required to execute the contract and construct the works in accordance with the Design, Standard Specifications, and other listed specifications forming part of this contract.
(2) Development of an "as-constructed" drawing set and digital survey file for the project.

Payment shall be made by a percentage of the lump sum bid equal to the percentage of work completed for each progress payment.

ARTICLE 24. TESTING

The City of Nanaimo may employ a Materials Testing Consultant during the work to test all work and materials deemed necessary and determine whether they are in accordance with the Specifications. The Contractor shall coordinate his work with the Consultant to ensure that the testing is done efficiently and that no delays are caused. (See General Conditions Article 26).

ARTICLE 25. MATERIALS

No claim by the Contractor of unsuitability or unavailability of any material, nor his unwillingness to use, nor his inability to produce, first class work with same, will be considered unless submitted to the Engineer in writing 7 days before the tender closing date.

ARTICLE 26. WorkSafeBC

1. The Tenderer is advised the workplace may have the following known operations and/or site conditions that could present a potential hazard to workers and other persons at the workplace. Other hazards may exist.
   - Asbestos Pipe
   - Confined Space
   - Underground Utilities
   - Excavations
   - Overhead Power Lines
   - Energized Equipment
   - Traffic > 30 km/h
   - Tree Removal
   - Hazardous Materials
   - Mobile Equipment

2. As excavation and removal of asbestos cement pipe is required, the Contractor will be required to complete a risk assessment and develop the necessary safework procedures in accordance with WorkSafeBC regulations. For the Contractor’s information, the City of Nanaimo’s “Asbestos Cement Pipe Safe Work Procedures” are included in Appendix “2”

3. The work will require excavation around and near buried electrical, communication and gas utilities. The Contractor will be required to complete a risk assessment and develop the necessary safework procedures in accordance with Worksafe BC regulations. BC Hydro and Fortis BC will provide safety orientations regarding working around their utilities prior to starting construction.

4. If the successful Tenderer is designated as the Prime Contractor in the Tender Form, they shall fulfill the Prime Contractor responsibilities as defined in:
   a) WorkSafeBC Occupational Health and Safety Regulation, Notice of project, Section 20.2, and Coordination of multiple employer workplaces, Section 20.3;
   b) Workers Compensation Act (BC), Coordination at multiple-employer workplaces, Section 118, Subsections (1) & (2); and
   c) General Requirements, Section 3.10 WorkSafe BC.

5. The Prime Contractor will be required to coordinate the safety of all workers on the work site, including their employees, their subcontractors, City work crews and their contractors, and private utilities, (BC Hydro, Telus, Shaw and FortisBC).
6. Prior to commencing work, the successful Tenderer will be required to forward a copy of their current OH&S Safety Program document, WorkSafeBC Notice of Project, and WorkSafeBC Clearance Letter.

ARTICLE 27. LOCAL PREFERENCE

Preference shall be given to suppliers located within the Regional District of Nanaimo where quality, service, and price are equivalent.

ARTICLE 28. FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT

All documents submitted to the City will be held in confidence by the City, subject to the provisions of the Province of British Columbia’s *Freedom of Information and Protection of Privacy Act*.

ARTICLE 29. EXISTING SANITARY SEWER VIDEOS

Existing sewer videos are included in Appendix 5.

ARTICLE 32. PRIVATE PROPERTY RESTORATION

1. The Tenders are advised the sewer relining will require the Contractor to work on private property which has mature landscaping.

2. The City has obtained permission to enter private property from the affected property owners. The conditions for entering private property are included in Appendix 3. Also included is a summary of conditions which outlines which are the responsibility of the Contractor and which are the responsibility of the City.

3. The Contractor shall employ construction methods which minimize damage to private property, (e.g., placing plywood or bark mulch to minimize equipment damage, using tarps to place excavated material, etc). Venting of steam shall be directed away from vegetation.

4. The Contractor shall provide plan and schedule for accessing private properties at least one week prior to starting work to allow the City to arrange for landscaping and fence removal.

5. The City has retained a Landscape Contractor to complete the landscape restoration. The Contractor is responsible to prepare the disturbed areas so they are suitable for landscaping in accordance with Section 4.27 and as outlined on the property condition sheets. No extra payment will be made to prepare disturbed areas for landscaping. Costs for this work shall be included in the applicable unit price in Section 6 or 16.
BID BOND

No. $ 

Know All Men by These Presents That

as Principal
hereinafter called the Principal, and
the laws of
, and duly authorized to transact the business of Suretyship in
, as Surety, hereinafter called the Surety, are held and firmly bound unto

as Obligee,
hereinafter called the Obligee, in the amount of

Dollars,

($ ) lawful money of Canada, for the payment of which sum, well and truly to be made, the
Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly
and severally, firmly by these presents

Whereas the Principal has submitted a written tender to the Obligee, dated the
day of 20__, for

Now, Therefore, the Condition of This Obligation is such that if the aforesaid Principal shall
have the tender accepted within sixty (60) days from the closing date of tender and the said Principal will within
the time required, enter into a formal contract and give the specified security to secure the performance of the
terms and conditions of the Contract, then this obligation shall be null and void; otherwise the Principal and the
Surety will pay unto the Obligee the difference in money between the amount of the bid of the said Principal and
the amount for which the Obligee legally contracts with another party to perform the work if the latter amount be
in excess of the former.

The Principal and the Surety shall be liable for a greater sum than the specified penalty of this Bond.

Any suit under this Bond must be instituted before the expiration of six months from the date of this Bond.

In Witness Whereof the Principal and the Surety have Signed and Sealed this Bond this
day of 20__

Signed and Sealed ( ) (SEAL)
In the presence of ( ) (SEAL)
( ) (SEAL)

Endorsed by
The Royal Architectural Institute of Canada
The Association of Consulting Engineers of Canada
The Canadian Construction Association
The Engineering Institute of Canada
The Specification Writers Association of Canada

Approved by
Insurance Bureau of Canada

__________________________ Attorney-in-fact
We, the undersigned Surety Company, do hereby consent and agree to become bound as guarantor in a Performance Bond and Labour and Material Payment Bond each in the amount of fifty percent (50%) of the total tender for the fulfillment of the Contract, with

as principal for the works specified in the Contract Documents entitled

which Contract may be awarded within sixty (60) days from the closing date of tenders to

at the price(s) set forth in the tender. The Bonds shall be issued in the form and manner specified within the Contract Documents.

We hereby further declare that our Company is licensed to conduct business in the province or territory wherein the work is located and has a net worth greater than the amount of the required guarantee.

______________________________
Surety Company

______________________________
Signature for Surety Company

______________________________
Title

PLACE _________________________

DATE: _________________________
TO: Manager of Purchasing and Stores
City of Nanaimo
2020 Labieux Rd
Nanaimo, BC V9T 6J9

To Whom It May Concern:

The undersigned Tenderer, having carefully examined the Contract Documents and the locality of the proposed work, and having full knowledge of the work required and of the materials to be furnished and used, hereby agrees to provide all necessary materials, supervision, labour, and equipment and perform and complete all work and fulfill everything as set forth and in strict accordance with the Contract Documents and Addenda numbered *______ for the prices stated in the Schedule of Unit Prices and Approximate Quantities of the Tender Form.

The under signed also agrees:

1. That the Owner is in no way obligated to accept this Tender.

2. That, should the Tender Form be improperly completed or be incomplete, the Owner shall have the right to disqualify and/or reject this Tender.

3. That this Tender is made without knowledge of the Tender prices to be submitted for this work by any other company, firm or person.

4. That this Tender is made without any connection or arrangement with any company, firm, or person submitting a Tender for this work.

5. That this Tender is made without any undisclosed connection or arrangement with any other company, firm, or person having an interest in this Tender or in the proposed Contract.

6. That this Tender is irrevocable for sixty (60) days after the closing date for receipt of Tenders, and that the Owner may at any time within such period accept this Tender whether any other Tender has previously been awarded or not, and whether notice of Award of another Tender has been given or not.

♦ To be Completed by the Tenderer
TENDER FORM

7. To execute the Contract Agreement and deposit with the Owner a Performance Bond and Labour and Material Payment Bond as specified in Article 32 of the General Conditions of the Construction Contract and the insurance documents as specified in Article 52 of the General Conditions of the Contract within ten (10) days of the date of the Notice of Award of the Contract, such time limit being extended only on the written approval of the Owner.

8. To commence and proceed actively with the work within fourteen (14) days following receipt of the Notice to Proceed, and to complete all work under the Contract within the time limit set out in Article 22 of the Instructions to Tenderers and subject to the provisions of Article 41 of the General Conditions of the Construction Contract - Extension of Contract Time.

9. That should the undersigned fail to complete the work in the time specified above he shall compensate the Owner in accordance with Article 37 of the General Conditions of the Construction Contract.

10. To do all extra work not reasonably inferable from the Specifications or Drawings but called for in writing by the Engineer and to accept as full compensation therefore, payment in accordance with the provisions of Article 39 of the General Conditions of the Construction Contract.

11. That it is understood the estimate of quantities shown in the Tender Form serves only to provide a basis for comparing tenders, and that no representations have been made by either the owner or the Engineer that the actual quantities will approximately correspond therewith, and further, that the Owner has the right to increase or decrease the quantities in any or all items and to eliminate items entirely from the work.

12. That payment for the work done will be made on the basis of the quantities measured by the Engineer and at the prices shown in the Tender Form which includes the cost of all pre-selected materials and equipment and which shall be compensation in full for the work done under the terms of the Contract.

♦ To be Completed by the Tenderer
The following tendered rates shall be in accordance with Article 40 of the General Conditions and will form the basis of payment for personnel force account work for this contract. List all occupations to be used on the project.

**PERSONNEL**

<table>
<thead>
<tr>
<th>LIST OF OCCUPATIONS</th>
<th>HOURLY RATE (incl. 20% markup)</th>
<th>O.T. HOURLY (incl. 20% markup)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPERINTENDENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOREMAN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPERATOR</td>
<td></td>
<td></td>
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<tr>
<td>PIPELAYER</td>
<td></td>
<td></td>
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<tr>
<td>LABOURER</td>
<td></td>
<td></td>
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<tr>
<td>FLAGGER</td>
<td></td>
<td></td>
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</tbody>
</table>

Tenderer’s Initial ________________
TENDER FORM

TENDERER’S QUESTIONNAIRE

We provide the following information in order that the Owner may judge our ability to fulfill the Contract requirements.

1. The size, model and make of the equipment which we will place on the project and use during the course of the work is as follows:

<table>
<thead>
<tr>
<th>EQUIPMENT</th>
<th>YEAR</th>
<th>SIZE</th>
<th>MODEL</th>
<th>MAKE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

2. The average number of men we will employ and maintain on the project is ______; of which an average number of _________ will be from the Nanaimo area.

3. The name of the superintendent that we propose to place on the project and his previous experience on this type of construction is as follows:

Name: ________________________________

Qualifications: ________________________________

______________________________

______________________________

Tenderer’s initial _____________
TENDER FORM

TENDERER'S QUESTIONNAIRE

Years with Company: ___________  Years of Experience: _____________

Description of projects completed by the above personnel:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

4. I, the Tenderer, have read and understood this agreement and safework procedures relating to this project. By signing this document, I am stating I have the necessary qualifications and accept the responsibilities as the Prime Contractor for this project as defined in the WorkSafeBC Occupational Health and Safety Regulations, Notice of projects, section 20.2, and Coordination of multiple employer workplaces, section 20.3; and in the Workers Compensation Act, Coordination at multiple-employer workplaces, sections 118, subsections (1) and (2).

I also acknowledge I understand the duties of the Owner as defined in the Workers Compensation Act, General duties of owner, section 119.

________________________________________________________________________

(Name & Title)      (Signature)

5. The Contractor and all Subcontractors must have a current City of Nanaimo Business Licence. State Contractor’s Business Licence Number __________________. The Contractor’s business licence must be obtained before the contract is awarded. Subcontractors must obtain their business licence before their work commences.

Tenderer’s initial _____________
TENDER FORM

LIST OF SUBCONTRACTORS

It is our intention that the following work will, subject to the Engineer’s approval, be subcontracted to the firms indicated below. All other work will be performed by our forces, except as authorized in writing by the Engineer. NOTE: In accordance with the Instructions to Tender, list only one Subcontractor for each subtrade you propose to subcontract.

<table>
<thead>
<tr>
<th>TRADE</th>
<th>NAME &amp; ADDRESS OF SUBCONTRACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Work (manholes, cleanouts &amp; inspection chambers)</td>
<td></td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

Tenderer’s Initial _____________________
**TENDER FORM**

**PROPOSED ALTERNATE MATERIALS**

We propose using the following materials as alternates to those specified and shown on the drawings. Should any of these proposed alternates be accepted, we will adjust our total Tender in accordance with the price variation shown below. These prices will represent the total cost difference to the Owner for supply and installation of the proposed alternate products in lieu of those specified.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PRODUCT BRAND NAME OF MANUFACTURER</th>
<th>SUPPLIER</th>
<th>PRICE VARIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Tenderer’s Initial ________________
This Tender is executed at ______________________ this ______ day of __________, 2013.

Name of firm: __________________________________________
Address: __________________________________________
City/Postal Code: ________________________________

SIGNED AND DELIVERED BY

Full Name of Company

Authorized Signing Officer Signature ____________________________ Print Name ____________________________

Position/Title __________________________________________

Authorized Signing Officer Signature ____________________________ Print Name ____________________________

Position/Title __________________________________________

NOTE: If the Tender is by joint venture, add additional forms of execution for each member of the Joint venture in the appropriate form or forms as above.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Est Qty.</th>
<th>Units</th>
<th>Unit Price</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 2</strong></td>
<td><strong>General Conditions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>Location of Works - Project Layout (Article 7) (not to exceed 5% of the total contract price)</td>
<td>1</td>
<td>lump sum</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Section 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Section 3</strong></td>
<td><strong>General Requirements</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Control of Public Traffic (Section 3.73)</td>
<td>1</td>
<td>lump sum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2</td>
<td>Removal of Existing Structures (Section 3.75)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Clean outs</td>
<td>6</td>
<td>no.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Remove Existing AC Pipe and dispose offsite (various pipe sizes)</td>
<td>43</td>
<td>m</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Section 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Section 4</strong></td>
<td><strong>Trench Excavation, Bedding and Backfill</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1</td>
<td>Imported Granular Fill (Section 4.73)</td>
<td>220</td>
<td>t</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.2</td>
<td>Surface Restoration (Section 4.76)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TRAVELLED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) 50mm coldmix &amp; 100mm of Base</td>
<td>30</td>
<td>m²</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Section 4</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Section 6</strong></td>
<td><strong>Sanitary Sewer System</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1</td>
<td>Service Junctions (Section 6.71)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) 100mm dia.</td>
<td></td>
<td>no.</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>Connections to Existing Pipe (Section 6.71)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) 150 mm dia.</td>
<td></td>
<td>no.</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) 100mm dia. services</td>
<td></td>
<td>no.</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>Pre-cast Manhole Sections (Section 6.73)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) 1050mm dia.</td>
<td></td>
<td>vm</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>Concrete Bases, Frames and Covers (Section 6.74)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) 1050mm dia.</td>
<td></td>
<td>no.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>Cleanouts (Section 6.77)</td>
<td></td>
<td>unit</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6.6</td>
<td>Service Connection Pipe (Section 6.79)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) 100mm dia.</td>
<td></td>
<td>m</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>6.7</td>
<td>Service Connection Inspection Assembly (Section 6.81)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) 100mm dia.</td>
<td></td>
<td>no.</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>6.8</td>
<td>Point Excavation and Repair (Section 16.5.9)</td>
<td></td>
<td>no.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Section 6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Section 16  
**CIPP Lining**

### 16.1 Liner Installation (Section 16)

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Value (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>38</td>
</tr>
<tr>
<td>150</td>
<td>962</td>
</tr>
<tr>
<td>200</td>
<td>106</td>
</tr>
<tr>
<td>450</td>
<td>100</td>
</tr>
</tbody>
</table>

### 16.2 Sewer Service Reconnection (Section 16.5.14)

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Value (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>42</td>
</tr>
</tbody>
</table>

### 16.3 Cutting of Intruding Connections (Section 16.5.8.2)

<table>
<thead>
<tr>
<th>Value (no.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>inc.</td>
</tr>
</tbody>
</table>

### 16.4 Mobilization/Demobilization (Section 16.5.1)

<table>
<thead>
<tr>
<th>Value (lump sum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
</tbody>
</table>
## SUMMARY

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL SECTION 2</td>
<td>$ _______</td>
</tr>
<tr>
<td>TOTAL SECTION 3</td>
<td>$ _______</td>
</tr>
<tr>
<td>TOTAL SECTION 4</td>
<td>$ _______</td>
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<tr>
<td>TOTAL SECTION 6</td>
<td>$ _______</td>
</tr>
<tr>
<td>TOTAL SECTION 16</td>
<td>$ _______</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td>$ _______</td>
</tr>
<tr>
<td>GST</td>
<td>$ _______</td>
</tr>
<tr>
<td>TOTAL CONTRACT</td>
<td>$ _______</td>
</tr>
</tbody>
</table>

Name of Company

Signature of Signing Officer

Date
CONTRACT AGREEMENT

THIS AGREEMENT made this ____ day of _________________ in the year 20__ by and between the City of Nanaimo, herein called the "Owner", and ___________________________________ herein called the "Contractor".

WITNESSETH: That the Contractor and the Owner undertake and agree as follows:

ARTICLE 1.

The Contractor shall:

(i) Provide all necessary materials, labour, supervision and equipment and perform all work, and fulfill everything as set forth and in strict accordance with the Contract Documents and Addenda numbered ______________ for the project, entitled, "2013 Sewer Relining"

(ii) Commence and proceed actively with the work of the Contract within a period of fourteen (14) days of receipt of the Notice to Proceed and complete all work under this Contract by 15th day of November in the year of 2013, subject to the provisions herein for the extension of Contract time, and shall guarantee all materials furnished and work performed, for a period of one (1) year from the date of acceptance contained in the Notice of Acceptance.

ARTICLE 2.

The Owner will pay to the Contractor as full compensation for the performance and fulfillment of this Contract, the sum or sums of money specified herein in the manner and at the times specified in the Contract Documents.

ARTICLE 3.

The Invitation to Tender, Instructions to Tenderers, executed Tender Form, Supplementary General Conditions, Specifications, Appendices, Drawings and all Addenda incorporated herein, are annexed hereto and form a part of this Agreement as fully to all intents and purposes as though recited in full herein, and the whole shall constitute the Contract between the parties, and it shall ensure to the benefit of and be binding upon them and their successors, executors, administrators, and assigns.

ARTICLE 4.

No implied contract of any kind whatsoever, by or on behalf of the Owner, shall arise or be implied from anything contained in this Contract or from any position or situation of the parties at any time, it being understood and agreed that the express contracts, covenants and agreements contained herein and make by the parties hereto are and shall be the only contracts, covenants and agreements on which any rights against the Owner may be founded.

ARTICLE 5.

Subject to Article 3, this Agreement shall supersede all communications, negotiations and agreements, either written or verbal, made between the parties hereto in respect of matters pertaining to this Agreement prior to the execution and delivery hereof. The terms and conditions of this Agreement shall remain in force and effect notwithstanding the completion of the work to be performed by the Contractor under the Agreement.
CONTRACT AGREEMENT

ARTICLE 6.

All Communications in writing between the parties or between them and the Engineer shall be deemed to have been received by the addressee if delivered to the individual, or to a member of the firm, or to any officer of the corporation for whom they are intended, or if sent by mail or hand delivery addressed as follows:

The Contractor at ________________________________________________________________

(Address)

The Owner at Engineering & Public Works Department, 2020 Labieux Road, Nanaimo, BC, V9T 6J9

(Address)

IN WITNESS WHEREOF the parties hereto have executed this Agreement the day and year above first written.

For Contractor:

____________________________________

Full Name of Company

____________________________________  ______________________________________

Authorized Signing Officer Signature            Print Name

____________________________________

Position/Title

____________________________________  ______________________________________

Authorized Signing Officer Signature            Print Name

____________________________________

Position/Title
CONTRACT AGREEMENT

For Owner:

CITY OF NANAIMO
Full Name of Company

Authorized Signing Officer Signature
Print Name

Position/Title

Authorized Signing Officer Signature
Print Name

Position/Title

NOTE: If the Tender is by a joint venture, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.
PERFORMANCE BOND

No. $ 

Know All Men by These Presents That

hereinafter called the Principal, and a corporation created and existing under the laws of

, and duly authorized to transact the business of Suretyship in

, as Surety, hereinafter called the Surety, are held and firmly bound unto

hereinafter called the Obligee, in the amount of

Dollars, ($ ) lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents

Whereas the Principal has submitted a written tender to the Obligee, dated the day of 20__, for

in accordance with the Specifications and Drawings submitted therefor which contract, Specifications and Drawings, are by reference made part hereof and are hereinafter referred to as the Contract.

Now Therefore the Condition of This Obligation is such that if the Principal shall promptly and faithfully perform the Contract then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever the Principal shall be, and declared by the Obligee to be, in default under the Contract, the Obligee having performed the Obligee's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

(1) complete the Contract in accordance with its terms and conditions or
(2) obtain a bid or bids for submission to the Obligee for completing the Contract in accordance with its terms and conditions, and upon determination by the Obligee and the Surety of the lowest responsible bidder, arrange for a contract between such bidder and the Obligee and make available as work progresses (even though there should be a default, or a succession of defaults, under this paragraph) sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the Contract price," as used in this paragraph, shall mean the total amount payable by the Obligee to the Principal under the Contract, less the amount properly paid by the Obligee to the Principal.

Any suit under this Bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

No right of action shall accrue on this Bond, to or for the use of, any person or cooperation other than the Obligee named herein, or the heirs, executors, administrators or successors of the Obligee.

In Witness Whereof the Principal and the Surety have Signed and Sealed this Bond this day of 20__

Signed and Sealed (SEAL)
In the presence of (SEAL)

Endorsed by
Insurance Bureau of Canada
The Royal Architectural Institute of Canada
The Association of Consulting Engineers of Canada
The Engineering Institute of Canada
The Specification Writers Association of Canada

Approved by
Insurance Bureau of Canada

Approved by Canadian Construction Association, 1972

Attorney-in-fact
LABOUR AND MATERIAL PAYMENT BOND
(Trustee Form)

No. $ 

NOTE: This Bond is issued simultaneously with another Bond in favour of the Obligee conditioned by the full and faithful performance of the Contract.

Know All Men by These Presents That

as Principal

hereinafter called the Principal, and a corporation created and existing under the laws of

, and duly authorized to transact the business of Suretyship in

, as Surety, hereinafter called the Surety, are held and firmly bound unto

as Trustee, hereinafter called the Obligee, for the use and benefit of the Claimants, their and each of their heirs, executors, administrators, successors and assigns in the amount of

($ ) of lawful money of Canada for the payment of which sum well and truly to be made the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas the Principal has entered into a written contract with the Obligee, dated the day of 20__, for

which contract, Specifications & Drawings are by reference made a part hereof, and is hereinafter referred to as the Contract.

No, Therefore the Condition of This Obligation is such that if the Principal shall make payment to all Claimants for all labour and material used or reasonably required for use in the performance of the Contract then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

(1) A Claimant for the purpose of this Bond is defined as one having a direct contract with the Principal for labour, material, or both, used or reasonably required for use in the performance of the Contract, labour and material being construed to include that part of water, gas power, light, heat, oil, gasoline, telephone service or rental equipment directly applicable to the Contract provided that a person, firm or cooperation who rents equipment to the Principal to be used in the performance of the Contract under a contract which provides that all or any part of the rent is to be applied towards the purchase price thereof, shall only be a Claimant to the extent of the prevailing industrial rental value of such equipment for the period during which the equipment was used in the performance of the Contract. The prevailing industrial rental value of equipment shall be determined, insofar as it is practical to do so, in accordance with and in the manner provided for in the latest revised edition of the publication of the Canadian Construction Association titled "Rental Rates on Contractors' Equipment" published prior to the period during which the equipment was used in the performance of the Contract.

(2) The Principal, and the Surety hereby jointly and severally agree with the Obligee, as Trustee, that every Claimant who has not been paid as provided for under the terms of his contract with the Principal, before the expiration of a period of ninety (90) days after the date on which the last of such Claimant's work or labour was done or performed or materials were furnished by such Claimant, may as a beneficiary of the trust herein provided for, sue on this Bond, prosecute the suit to final judgment for such sum or sums as may be justly due to such Claimant under the terms of his contract with the Principal and have execution thereon. Provided, that the Obligee is not obliged to do or take any act, action or proceeding against the Surety on behalf of the Claimants, or any of them, to enforce the provisions of this Bond. If any act, action or proceeding is taken either in the name of the Obligee or by joining the Obligee as a party to such proceeding, then such act, action or proceeding shall be taken on the understanding and basis that the Claimants, or any of them, who take such act, action or proceeding shall indemnify and save harmless the Obligee against all costs, charges and expenses or liabilities incurred thereon and any loss or damage resulting to the Obligee by reason thereof. Provided still further that, subject to the foregoing terms and conditions, the Claimants, or any of them, may use the name of the Obligee to sue on and enforce the provisions of this Bond.
(3) No suit or action shall be commenced hereunder by any Claimant:

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

(1) in respect of any claim for the amount or any portion thereof required to be held back from the Claimant by the Principal, under either the terms of the Claimant's contract with the Principal, or under the Mechanics' Liens Legislation applicable to the Claimant's contract with the Principal, whichever is the greater, within one hundred and twenty (120) days after such Claimant should have been paid in full under the Claimant's contract with the Principal;

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

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

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

(4) The Surety agrees not to take advantage of Article 1959 of the Civil Code of the Province of Quebec in the event that, by an act or an omission of a Claimant, the Surety can no longer be subrogated in the rights, hypothecs and privileges of said Claimant.

(5) The amount of this Bond shall be reduced by, and to the extent of any payment or payments made in good faith, and in accordance with the provisions hereof, inclusive of the payment by the Surety of Mechanics' Liens which may be filed of record against the subject matter of the Contract, whether or not claim for the amount of such lien be presented under and against this Bond.

(6) The Surety shall be liable for a greater sum than the specified penalty of this Bond.

In Witness Whereof, the Principal and the Surety have Signed and Sealed this Bond this day of

Signed and Sealed
In the presence of

Endorsed by
The Royal Architectural Institute of Canada
The Association of Consulting Engineers of Canada
The Canadian Construction Association
The Engineering Institute of Canada
The Specification Writers Association of Canada

Approved by
Insurance Bureau of Canada

Attorney-in-fact
Letter of Credit No. ________________

Amount $ ________________

Initial Expiry Date: ________________

City of Nanaimo
455 Wallace Street
Nanaimo, B.C.
V9R 5J6

Dear Sir:

We hereby authorize you to draw on the ________________ (Name of Bank) for the account of ________________ (Address) up to an aggregate amount of ________________ (Name of Customer) available on demand.

Pursuant to the request of our customer, we hereby establish and give you an Irrevocable Standby Letter of Credit in your favour in the above amount which may be drawn on by you at any time and from time to time, upon written demand for payment made upon us by you, which demand we shall honor without inquiring whether you have the right as between yourself and the said customer to make such demand, and without recognizing any claim of our said customer, or objection by it to payment by us. All demands shall be delivered to: ________________ (Address of Bank) registered mail at least 30 days prior to the present or future expiration date.

You may make partial drawings or full drawings at any time.

The Letter of Credit relates to those Municipal services and/or financial obligations set out in an Agreement between the customer and the Municipality and briefly described as:

_________________________________________________________________

The amount of this Letter of Credit may be reduced from time to time as advised by notice in writing to the undersigned from time to time by the City of Nanaimo.

This Letter of Credit will continue in force for a period of 1 year, but shall be subject to the condition hereinafter set forth.

It is a condition of this Letter of Credit that it shall be deemed to be automatically extended without amendment from year to year from the present or any future expiration date hereof, unless at least 30 days prior to the present or any future expiration date, we notify you in writing by registered mail, that we elect not to consider this Letter of Credit to be renewable for any additional period.

Dated at ________________ , British Columbia, this ________________ day of ________________, 20___.

_________________________________________________________________

(Name of Bank)

_________________________________________________________________

(Address of Bank)

_________________________________________________________________

Per:

_________________________________________________________________

(Authorized Signature)

_________________________________________________________________

(Authorized Signature)
City of Nanaimo  
Engineering & Public Works Department  
2020 Labieux Rd  
Nanaimo, B.C.  V9T 6J9

Attention of S. Clift, Director of Engineering & Public Works.

RE:

Please find attached our Final Invoice # __________ for the sum of $ ______________ as being the full and final amount accruing to the undersigned by virtue of the said contract, said amount also covering full payment for the cost of all extra work and material furnished by the undersigned in the fulfillment of said work, and all incidentals thereto, and the undersigned hereby releases the said corporation from all claims whatsoever growing out of said contract.

And these presents are to certify that all persons doing work upon or furnishing materials for said work under the foregoing contract have been paid in full.

COMPANY NAME: ___________________________________________________________

ADDRESS: ________________________________________________________________

______________________________________________________________

AUTHORIZED SIGNATORY: ________________________________________________

POSITION: _______________________________________________________________

DATED: ____________________

p.c. Stephen Ricketts, Construction Manager
STATUTORY DECLARATION
TO BE MADE BY CONTRACTOR TO EFFECT RELEASE OF THE HOLDBACK ACCOUNT

Province of British Columbia, Canada
In the matter of contract entered into with ______________________________________________________, Owner by
_________________________________________________________________________________________, Contractor
At Project ___________________________________________ Contract No. ______________________

TO WIT:
I, ______________________________________ of the _______________________ of __________________________
in the Province of ______________________________________________ do solemnly declare: -

1. That I am __________________________________________ of ______________________________________
   (President, Vice-President, Secretary, Treasure, a Partner)
   the Contractor named in the contract above mentioned and as such have personal knowledge of the facts hereunder declared:

2. That all subcontractors, labour, and accounts for materials and equipment whatsoever entering into the construction of
   the project built under the said contract have been duly paid except for holdbacks on subcontracts which amount in
   total in all subcontracts to ____________________________________________ ($ _________________________);

3. That all assessment and levies under the Unemployment Insurance Acts, the Workers’ Compensation Acts or other
   social or labour legislation in respect of the said contract have been duly paid:

4. That the following is a list of subcontractors who have been employed under the said contract:

AND I MAKE THIS SOLEMN DECLARATION conscientiously believing it to be true and knowing that it is of the same force
and effect as if made under oath and by virtue of the Canada Evidence Act.

DECLARED before me at the ___________________________ of __________________________
in the ___________________________ of __________________________
this ___________________________ day of 2 ____________.

SIGNED: _______________________________________
A Commissioner for Oaths, Notary Public, Justice of the Peace

Note 1. Where the Contractor is a corporation or a partnership, declarant’s position in the corporation partnership, and
the corporation or partnership name should be clearly shown in No. 1. Where the Contractor is the person who
makes the Declaration, strike out “of” in the first line of No. 1.

Note 2. Where the Contractor is an individual, they must make the Declaration themselves. Where the Contractor is a
partnership the declaration must be made by one of the partners. Where the Contractor is an incorporated
company, the declaration must be made by the President, Vice-President, Secretary, Treasurer or Director. If
any other person makes this Declaration two copies of the bylaw issued under the Corporation seal, authorizing
the individual to execute documents, must be submitted with the first declaration on each contract.
## SECTION 2 - GENERAL CONDITIONS

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2.01 DRAWINGS, SPECIFICATIONS AND RELATED DATA

ARTICLE 1. DEFINITION OF TERMS

.1 "APPROVAL" shall mean the approval granted by the City Engineer unless otherwise noted.

.2 "CITY" shall mean a duly authorized representative of the City of Nanaimo.

.3 "CITY ENGINEER" shall mean the person appointed to the office of City Engineer, by Council, acting, either directly or through authorized staff acting severally within the scope of the particular duties entrusted to them.

.4 "CONSULTANT" shall mean a Professional Engineer acting either directly or through his authorized agents, acting severally within the scope of the particular duties entrusted to them.

.5 "CONTRACT DOCUMENTS" OR "CONTRACT" shall mean the complete set of documents, specifications, drawings, and addenda incorporated therein, as listed in the Table of Contents.

.6 "CONTRACTOR" shall mean the Contractor named in the Contract Agreement.

.7 "DIRECTOR OF ENGINEERING AND PUBLIC WORKS" shall mean the City Engineer.

.8 "ENGINEER" shall mean:

(a) the City Engineer acting either directly or through his properly authorized agents, Professional Engineers, Consultants, and authorized staff, acting severally within the scope of the particular duties entrusted to them or,

(b) notwithstanding Article 1.8 (a), for City construction contracts, the Manager of Construction acting either directly, or through his properly authorized agents, Professional Engineers, Consultants and staff, acting severally within the scope of the particular duties entrusted to them.

(c) notwithstanding Article 1.8 (a), for Private Developments, the Consultant acting on behalf of the developer. The City Engineer will monitor the Consultant and retains the right to direct the Consultant's application of the Engineer's responsibilities.

.9 "EQUIPMENT" shall mean anything and everything except persons used by the Contractor in performance of the work and except material as defined herein.

.10 "HEREIN" and "HEREOF" and similar expressions wherever used in the Contract Documents, shall relate to the whole of the Contract Documents and not to any one (1) paragraph alone, unless the context specifically requires it.

.11 "INSPECTOR" shall mean a person or company authorized by the Engineer or by the Owner to inspect the work or any part of it.

.12 "MATERIAL" or "MATERIALS" shall, unless otherwise specified, mean anything and everything other than persons or the Contractor's equipment which is manufactured, processed, or transported to the site, or existing on the site, and incorporated into the completed works.

.13 "OWNER" shall mean the City of Nanaimo.
.14 "PLANT" shall mean the same as EQUIPMENT.

.15 "PROFESSIONAL ENGINEER" shall mean a person registered with the Association of Professional Engineers of British Columbia as a Professional Engineer.

.16 "PROVIDE" shall mean the same as SUPPLY.

.17 "SUBCONTRACTOR" shall mean any person, engaged by the Contractor or another Sub-Contractor to perform or provide part or parts of the work or to supply material intended to be incorporated into the completed works, but does not include a worker or a person engaged by an architect, an engineer or a material supplier.

.18 "SUPPLY" shall mean supply and pay for or provide and pay for.

.19 "WORK" or "WORKS" shall, unless the context otherwise requires, mean the whole of the work, equipment, materials, labour, matters and things required to be done, furnished, and performed by the Contractor under this Contract.

ARTICLE 2. INTENT OF CONTRACT

.1 The intent of the Contract is that the Contractor shall provide all materials, supervision, Labour, equipment, and all else necessary for, or incidental to, the proper execution of the work unless specifically noted otherwise. The Contractor shall do all the work shown on the drawings and/or described in the specifications and all other things necessary to complete the works.

ARTICLE 3. DRAWINGS AND SPECIFICATIONS FURNISHED

.1 Except as provided for otherwise, a maximum of six (6) copies of drawings and specifications for the execution of the work shall be furnished to the Contractor without charge. Additional instructions may be issued by the Engineer during the progress of the work by means of drawings or otherwise for clarification of the drawings and specifications, or as may be necessary to explain or illustrate changes in the work to be done. One (1) complete set of all drawings and specifications shall be maintained at the jobsite by the Contractor and shall be available to the Engineer at all times.

ARTICLE 4. DOCUMENTS CONFLICT

.1 In case of any inconsistency or conflict between the provisions of the Contract Documents the provisions of such documents and addenda thereto will take precedence and govern in the following order:

1. Contract Agreement
2. Supplementary General Conditions
3. General Conditions
4. Specifications
5. Drawings
6. Executed Tender Form
7. Instructions to Tenderers
8. Invitation to Tender
9. All other documents
.2 Figured dimensions on a drawing take precedence over measurements scaled from the
drawing, and large scale drawings take precedence over those of smaller scale. 
Supplementary drawings and specifications supersede their antecedents. In case of 
conflict between figured dimensions on a drawing and the dimensions of a specified 
product, the dimensions of the specified product will govern. In case of conflict in materials 
and methods, the specifications govern. The drawings and specifications complement 
each other and anything called for by one will be as binding as if called for by both.

ARTICLE 5. DISCREPANCIES

.1 Any discrepancies found between the drawings and specifications or any errors or 
omissions in the drawings or specifications shall immediately be reported to the Engineer, 
who shall promptly correct such error or omission in writing. Any work done after discovery 
of such discrepancies, errors or omissions shall be done at the Contractor's risk.

ARTICLE 6. SHOP DRAWINGS

.1 The Contractor shall furnish to the Engineer, at proper times, all shop drawings including 
diagrams, illustrations, schedules, performance charts, brochures and other data 
necessary to clarify the work intended or to show its relation to adjacent work of other 
trades. The Contractor shall provide such additional drawings and shall make any 
changes or additions to such drawings or diagrams which the engineer may require 
consistent with the Contract and will submit sufficient copies of the revised prints for 
review, all but three (3) of which all be returned to the Contractor following review

.2 Prior to submission to the engineer the Contractor shall review all shop drawings. By this 
submission, the Contractor represents that he has determined and verified all field 
measurements, field construction criteria, materials, catalogue numbers and similar data 
and that he has checked and coordinated each shop drawing with the requirements of the 
work and of the Contract Documents.

.3 The Contractor shall submit shop drawings to the Engineer for his review with reasonable 
promptness and in orderly sequence so as to cause no delay in the work of other 
contractors. If either the Contractor or the Engineer so requests, they shall jointly prepare a 
schedule fixing the dates for submission and return of shop drawings. Shop drawings shall 
be submitted in the form of a reproducible transparency or prints as the engineer may 
direct. At the time of submission, the Contractor shall notify the engineer in writing of any 
deviations in the shop drawings from the requirements of the Contract Documents.

.4 The Engineer will review and return shop drawings in accordance with any schedule 
agreed upon, or otherwise with reasonable promptness so as to cause no delay. The 
Engineer's review shall be for conformity to the design concept and for general 
arrangement only and such review shall not relieve the Contractor of responsibility for 
errors or omissions in the shop drawings or of responsibility for meeting all requirements of 
the Contract Documents unless a deviation on the shop drawings has been specifically 
approved in writing by the Engineer.

.5 The Contractor shall make any changes in shop drawings, which the Engineer may require 
consistent with the Contract Documents and resubmit unless otherwise directed by the 
Engineer. When resubmitting, the Contractor shall notify the Engineer in writing of any 
revisions other than those requested by the Engineer.
ARTICLE 7. LOCATION OF THE WORKS

.1 Where location dimensions for the proposed works are not shown on the drawings or digital file, the locations are intended to be approximate.

.2 Unless otherwise specified, the Engineer will provide the contractor with a copy of the digital drawing file for the Contractor and/or his surveyor to create a point file to be used for layout to perform the construction works.

.3 The Contractor shall perform all layout as required from the digital drawing file and shall be responsible for all dimensions and elevations determined from the digital information.

.4 The Contractor shall satisfy himself, before commencing any work, as to the meaning, intent, and accuracy of the information in the digital drawing file as it relates to control points, control lines, benchmarks, and the construction drawings.

.5 Should the Contractor discover or suspect any errors in the digital drawing file provided by the Engineer, he shall at once discontinue the affected work until such errors are investigated by the Engineer and, if necessary, rectified.

.6 The Contractor shall carefully preserve bench marks, reference points and stakes. In case of willful or careless destruction or disturbance of such markers, he shall be charged with the expense of replacing them and shall be responsible for any mistakes that may be caused by their destruction, loss or disturbance.

.7 In any dispute between the Contractor and the Engineer on the correctness of grades, locations, elevations of the installations or constructed works, the Contractor shall be responsible for proving by means of cut sheets and undisturbed stakes, that he has made the installation or construction in accordance with the layout provided.

.8 The contractor shall be required to maintain an "as-constructed" drawing set for the project, with all changes and notes marked in red ink and an “as-constructed” digital survey file. This information shall be available to the Engineer for review on request, and shall be submitted to the Engineer prior to issuing the Notice of Acceptance.

.9 Legal survey markers, disturbed or removed by the construction operation that existed at a horizontal distance of 1.0 m or more from the maximum allowable trench width as shown on the standard drawings, shall be replaced at the Contractor’s expense. If it is necessary to remove or disturb existing legal survey markers that are within the above limits, the Engineer shall be so notified a minimum of three working days before such removal or disturbance and replacement will be at the Owner’s expense.

ARTICLE 8. LOCAL CONDITIONS

.1 The Contractor shall, by personal inspection, examination, calculations or tests, or by any other means, satisfy himself with respect to the local conditions to be encountered and the quantities, quality, and practicability of the work and of his methods of procedure. No verbal agreement or conversation with any officer, agent, or employee of the Owner, either before or after the execution of the contract, shall affect or modify any of the terms or obligations herein contained.
.2 Failure to properly assess the local conditions to be encountered and the quantities, quality and practicability of the work and his methods of procedure is a risk to be borne by the Contractor.
ARTICLE 9.  ENGINEER’S STATUS

.1 The Engineer will be the Owner’s representative during the construction period and will observe work in progress on behalf of the owner. The Engineer will have the authority to stop the work whenever such stoppage may be necessary, in his opinion, to ensure the proper execution of the work in accordance with the provisions of the contract. The Contractor shall obey such order immediately. Neither the giving or carrying out of such orders shall thereby entitle the Contractor to any extra payment.

.2 The Engineer may delegate such of the powers of the Engineer to other persons, as the Engineer deems appropriate.

.3 The Engineer or the Owner may appoint any persons or company or the employee of any such person or company or of the Engineer to be an Inspector. Such Inspector shall have the authority of the Engineer to reject materials, procedures or workmanship as not complying with the provisions of the Contract and to order the Contractor to stop work until the materials, procedures or workmanship comply with such provisions.

ARTICLE 10.  INSPECTION OF WORK

.1 The Contractor shall allow the Engineer and/or owner or their duly appointed Inspector access and provide adequate facilities for access to any part of the works at all times. If the specifications, Engineer's instructions, laws, ordinances or any public authority requires any work to be specially tested or approved, the Contractor shall give the Engineer advance notice of his preparedness for such inspection, and if the inspection is by an authority other than the Engineer, of the date fixed for such inspection. The Engineer will inspect the work promptly and without causing unreasonable delay to the Contractor. Extra payment will not be made to the Contractor for delay occasioned by an inspection, and extension of completion time will not be allowed for delay resulting therefrom.

.2 On request by the Engineer, the Contractor shall open for inspection any part of the work that has been covered up. If the Contractor refuses to comply with such request, the Owner may employ other persons to uncover the work. If the work is found to be in accordance with the Contract requirements then the cost of uncovering and recovering the work shall be borne by the Owner. If any of the work was covered by the Contractor in contravention of the Engineer's instructions, or if the uncovered work is found not to be in accordance with the Contract requirements, then the cost of uncovering and recovering the work shall be charged to the Contractor.

.3 The lack of comment on the part of the Engineer, on methods of construction by the Contractor shall not relieve the Contractor of his responsibility for any errors therein, and shall not be regarded as an acceptance of responsibility for work done by the Contractor.
ARTICLE 11. SUPERVISION AND LABOUR

.1 The Contractor shall keep on the work at all times during its progress a competent superintendent who is approved by the Engineer, which approval may be withdrawn at any time. The superintendent shall represent the Contractor in his absence and directions given to him shall be held as being given to the Contractor. The superintendent shall give efficient and effective supervision to the work until its completion.

.2 When competent personnel are available locally they shall, whenever possible, be employed by the Contractor.

ARTICLE 12. LANDS BY OWNER

.1 The Owner will provide the lands upon which the work is to be performed. Where work is to be performed on lands owned by others, the Owner, will obtain the necessary easements or rights-of-way. The Owner will endeavor to obtain the necessary easements or rights-of-entry in time to permit construction to proceed as scheduled by the Contractor. When this is not possible, the Contractor shall withhold work on property owned by others until such easements or rights-of-entry have been obtained. Delay in providing these lands, or in obtaining easements or rights-of-way which, in the opinion of the Engineer, delays the work or results in extra cost to the Contractor, will be deemed proper cause for adjustment in the time of completion and adjustment of the Contract amount to cover the extra cost to the Contractor.

ARTICLE 13. LANDS REQUIRED BY CONTRACTOR

.1 Any lands other than those which are to be provided by the Owner and which may be required by the Contractor for temporary facilities, storage purposes, or access to the work site, shall be obtained by the Contractor at no cost to the Owner.

ARTICLE 14. PRIVATE LAND

.1 It shall be the Contractor's responsibility to ascertain the boundaries within which the work must be confined. The Contractor shall not enter lands other than those provided by the Owner for any purpose without obtaining prior written permission of the land owners and occupiers. The Contractor shall not enter upon lands owned by others on which the Owner has easements or rights-of-entry without having received the written authorization of the Owner for such entry. It shall be the Contractor's responsibility to ascertain from the Owner the conditions on which easements or right-of-entry have been granted on private lands and to abide by these conditions throughout the course of construction.

The Contractor shall notify the Owner and Engineer, in writing, of any supplementary construction agreements made between the Contractor and the Owner of private property in lieu of or in addition to the condition sheets provided by the Owner and forming part of this document.

.2 The Owner will not be responsible for any supplementary construction agreements other than those to which the Owner is a signed party.
SECTION 2 - GENERAL CONDITIONS
ENGINEER, OWNER, CONTRACTOR RELATIONS

ARTICLE 15. ASSIGNMENT OF CONTRACT

.1 Neither party shall sublet, sell, transfer, assign, or otherwise dispose of the Contract or any portions thereof, or his right, title, or interest herein, or his obligations thereunder without written consent of the other party, except for an assignment to a bank of the payments to be received hereunder.

ARTICLE 16. SUSPENSION OF WORK BY OWNER

.1 The Owner may at any time suspend the work, or any portion thereof, provided he gives the Contractor five (5) days written notice of suspension. The Contractor shall resume work upon written notice of the Owner within ten (10) days after the date set forth in such notice, or in a subsequent notice to resume work. The Owner will reimburse the Contractor for costs and expenses incurred by the Contractor necessitated by such suspension of work or portion thereof, but the Contractor shall not recover from the Owner payment for any loss of anticipated profits or damages.

ARTICLE 17. OWNER'S TERMINATION OF THE CONTRACTOR'S RIGHTS

.1 The Owner will have the right to terminate the Contractors right to continue with the work if the Contractor at any time becomes bankrupt, makes an assignment of his property for the benefit of the creditors, or if a receiver or liquidator should be appointed. Such termination shall be effective upon the Owner giving notice thereof.

.2 If at any time the Engineer is of the opinion and so states in writing to the Owner that the Contractor:

(a) has failed to commence work or to recommence work after a suspension within the time specified in the contract documents;
(b) has failed or is failing to furnish or to maintain a detailed work schedule and plan of operation as required by Article 38 - Schedule of Completion thereof;
(c) has failed or is failing to use diligence or has failed to comply with the instructions of the Engineer to expedite his work or is other wise failing to make such progress with the work as is necessary to ensure the completion of the work or any part thereof in the time specified in the contract documents;
(d) has failed or is failing to supply enough competent workmen, management, materials or suitable equipment; or
(e) has failed, or is failing to pay, the minimum rate of pay as described in Article 28 – Personnel and Rates of Pay.
(f) has become in any way unable to carry on the work or any part thereof;

the Owner may give notice in writing to the Contractor of such opinion and requiring that such default or defaults be remedied forthwith. If, within five (5) days of such notice, such default or defaults are not remedied to the satisfaction of the Engineer, the Owner may terminate the Contractor's right to perform further the work under the contract. Such termination shall be effective immediately.

.3 Upon such termination, the Owner may employ such means as he sees fit to complete the works. In such cases:

(a) The Contractor shall have no claim for any further payment in respect of work performed, but shall be liable for all damages and expenses which may be suffered
by the Owner by reason of such default or delay, or the non-completion by the
Contractor of the works;
(b) No objection or claim shall be raised or made by the Contractor by reason of or on
account of the ultimate cost of the works so taken over for any reason proving greater
than, in the opinion of the Contractor, it should have been;
(c) All materials and all rights, proprietary or otherwise, licenses, powers and privileges,
whether relating to or effecting real or personal property, acquired, possessed or
provided by the Contractor for the purposes of the work under the provisions of this
Contract will become or remain and be the property of the Owner for all purposes
incidental to the completion of the works and may be used, exercised, and enjoyed
by the Owner as fully to all intents and purposes connected with the works as they
might therefore have been used, exercised and enjoyed by the Contractor; and,
(d) The Owner may forthwith enter into possession of all the Contractor's equipment on
the site of the work and may use the same in any way it sees fit in order to complete
the works without the Owner being in any way liable for damage or any other cost in
connection with such use by the Owner. Upon completion of the work, such
equipment may be returned to the Contractor or may be sold by the Owner and the
net proceeds of such sale credited to the Contractor's account.

.4 If the Contractor's right to perform the work is terminated in accordance with the provisions
of this clause, the Contractor shall not be entitled to receive any further payment until the
work is completed.

.5 Upon completion of the work the Engineer shall determine:

(a) The amount which would have been due to the Contractor under the Contract if all of
the work had been performed by him;
(b) The costs and expenses borne by the Owner in completing the work and damages
for delay in completion, if any.

.6 The Contractor shall be entitled to receive the balance of the contract price less such costs
and expenses, or if such costs and expenses exceed such price, the Contractor shall pay
the amount of such excess to the Owner on demand.

.7 The Owner shall have the option, under the provisions of this Article, to be exercised in its
absolute discretion, to terminate the right of the Contractor to perform any part or parts of
the work and to permit the Contractor to continue to perform the rest of the work. All the
provisions of this article shall apply to such part or parts with such modifications as the
circumstances may require.

ARTICLE 18. CONTRACTOR'S TERMINATION OF THE CONTRACT

.1 The Contractor shall have the right to terminate the Contract for any of the following
reasons:

(a) In the event of any Order of any Court or other public authority, other than the Owner,
causing the work to be stopped or suspended, and when the period of such stoppage
or suspension exceeds ninety (90) days, and when such stoppage or suspension
occurs through no act or fault of the Contractor, his agent, or servants.
(b) In the event that the Owner fails to pay, except as provided in the Contract
documents, any sum certified by the Engineer within twenty (20) days from the due
date of payment, and fails to remedy such default within ten (10) days of the
Contractor's written notice to do so.
.2 In either event, the Contractor will receive from the Owner payment for all work performed and losses sustained in respect of any materials. For termination under (a) above, the Owner will not be liable for any loss of anticipated profits, damages, or expenses incurred by the Contractor as a result of such stoppage or suspension, but under (b) above, the Contractor will be paid for loss of profits, damages and expenses. Such termination shall be effective upon the Contractor giving notice hereof.

.3 The amount due to the Contractor for work performed and losses sustained shall be determined by the Engineer and certified by him to the Contractor and to the Owner.

ARTICLE 19.  SEPARATE CONTRACTS

.1 The Owner reserves the right to let other contracts in connection with the work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

.2 If any of the Contractor's work, as specified herein and shown on the drawings, depends upon the work of any other contractor, the Contractor shall inspect and measure the work in place and determine whether anything in such work renders it unsuitable for proper execution of his work. He shall promptly report the results of such inspection and measurement to the Engineer if anything in such work renders it unsuitable for proper execution of his work. His failure to inspect and report promptly shall constitute an acceptance of the other contractor's work and he shall have no claim against the Owner by reason of anything in such work rendering the same unsuitable for proper execution of his work.

ARTICLE 20.  SUBCONTRACTS

.1 The subcontractor named in the Tender Form, and others as may be approved by the Engineer following execution of the Contract Agreement, shall not be changed nor shall additional subcontractors be employed except with the written approval of the Engineer. The Contractor is responsible to the Owner for the acts and omissions of his subcontractors and of their employees, to the same extent that he is responsible for the acts or omissions of persons employed by himself. Nothing in the Contract Documents shall create any contractual relation between any subcontractor and the Owner. The Contractor shall bind every subcontractor to the terms of the Contract Documents.

.2 Each Subcontract shall contain a provision that the Certificate of Completion of the work by the Subcontractor shall be binding on the Contractor and Subcontractor.

ARTICLE 21.  ORAL AGREEMENTS

.1 No oral instruction, objection, claim or notice by any party to the other shall affect or modify any of the terms or obligations contained in any of the Contract Documents, and none of the provisions of the Contract Documents shall be held to be waived or modified by reason of any act whatsoever, other than by a waiver or modification thereof in writing and agreed to by the parties to the contract.
ARTICLE 22.  NON-WAIVERS

.1 Any failure by the Owner or the Engineer at any time, or from time to time, to enforce or require the strict keeping and performance of any of the terms or conditions of the contract will not constitute a waiver of such terms or conditions and will not affect or impair such terms or conditions in any way or the right of the Owner or the Engineer at any time to avail itself or himself of such remedies as it or her may have for any breach or breaches of such terms or conditions.

.2 No provision in the Contract which imposes or may be deemed to imposes extra or specific responsibilities or liabilities on the Contractor shall restrict the general or other responsibilities or liabilities of the Contractor in any way.
2.03 MATERIALS AND WORKMANSHIP

ARTICLE 23. MATERIALS BY CONTRACTOR

.1 The Contractor shall supply all materials unless it is expressly specified to the contrary. Materials used in the work shall meet the requirements of the specifications, or where not detailed in the specifications, shall be to the Engineer’s satisfaction. Unless otherwise specified, all materials shall be new.

.2 Unless otherwise specified, the Contractor shall provide all water, light, power, heating and equipment necessary for the execution of the work.

.3 Schedules of piping, fittings, reinforcing, or other materials indicating quantity and/or dimensions, which are shown on the drawings, or in the applicable sections of the specifications, are intended only to assist the Contractor in his quantity takeoff. Quantities and dimensions shown therein are not guaranteed to be accurate and the Contractor must satisfy himself as to the accuracy of the quantities and dimensions.

.4 No variations between the quantities shown on the schedules and those actually installed shall give rise to any claim by the Contractor or to any right for additional payment in a lump sum price contract or to a variation in unit price in a unit price contract.

.5 All materials provided by the Contractor shall remain in the custody and at the risk of the Contractor.

ARTICLE 24. MATERIALS BY OWNER

.1 The Owner will provide only such materials as are specifically listed as being supplied by the Owner.

.2 The Contractor shall be responsible for materials from the point of delivery to the jobsite. The Contractor shall verify the delivery dates of materials provided by the Owner and shall arrange work schedules to comply therein.

.3 The Owner shall not be liable in any way for a delay in such delivery arising out of any cause beyond the Owner’s reasonable control.

ARTICLE 25. MATERIALS STORAGE

.1 The Contractor, at his own cost, shall store all materials provided for the work either by himself or the Owner until they have been incorporated into the completed works. Materials shall be so stored as to ensure the preservation of their quality and fitness for the work, and shall be so protected from vandalism and theft. Stored materials shall be located so as to facilitate prompt inspection. Faulty materials shall not be stored on the site, and any material found to be faulty shall promptly be removed from the site by the Contractor.
ARTICLE 26. TESTING, REJECTED WORK AND MATERIALS

.1 If, in the opinion of the Engineer, testing is required, the Engineer will arrange for a testing firm to carry out tests to determine whether the applicable standards and specifications have been met. Where initial testing indicates inadequacies, additional testing may be required by the Engineer.

.2 The Contractor, as directed by the Engineer, shall supply specimens or samples for testing.

.3 All materials, which do not conform to the requirements of the Contract Documents, are not approved by the Engineer, or are in any way unsatisfactory or unsuited to the purpose for which they are intended, will be rejected. Any defective work, whatever the cause thereof, and without limiting the generality of the foregoing, whether the result of poor workmanship or use of defective materials, shall be removed within five (5) days after written notice is given by the Engineer, and the work shall be re-executed by the Contractor. The fact that the Engineer may have previously overlooked such defective work shall not constitute an acceptance. The removal of work and the re-execution thereof shall be at the expense of the Contractor, and he shall pay the cost of replacing the work which shall include materials of other contractors destroyed or damaged by the removal of the rejected work or materials and the subsequent replacement with acceptable work. The Contractor shall also reimburse the Owner for initial testing and any additional engineering, inspection, testing or other contractor's costs incurred in respect of rejected work or materials, whether such work or materials are replaced or not or are accepted at a lower price.

.4 If, in the opinion of the Engineer, it is not expedient to re-execute defective work the Owner may deduct from the Contract price, the difference in value between the work as done and that called for by the Contract, the amount of which shall be determined by the Engineer.

ARTICLE 27. OWNER'S RIGHT TO CORRECT DEFICIENCIES

.1 Upon failure of the Contractor to perform the work in accordance with the Contract Documents, and after five (5) days' written notice to the Contractor, or without notice if an emergency or danger to the work or public exists, the Owner may, without prejudice to any other remedy he may have, correct such deficiencies. The cost of work performed by the Owner in correcting deficiencies shall be paid by the Contractor.

ARTICLE 28. PERSONNEL AND RATES OF PAY

.1 All workers must have sufficient knowledge, skill, and experience to perform properly the work assigned to them. Any foreman or workers employed by the Contractor or subcontractor who, in the opinion of the Engineer, does not perform his work in a skillful manner, or appears to be incompetent or to act in a disorderly or intemperate manner shall, at the written request of the Engineer, be removed from the site of the work immediately and shall not be employed again in any portion of the work without the approval of the Engineer.

.2 In addition the minimum rate of pay to all workers for work performed under this Contract or under Sub-contract shall be as classified in the current Agreement between the City of Nanaimo and the Canadian Union of Public Employees, Local No. 401.
.3 Failure of the Contractor to pay the minimum rate of pay as described in Article 28.2, may result in the Owner:

(a) terminating the contract, in accordance with Article 17 - Owner’s Termination of the Contractor’s Rights
(b) suspending payments to the Contractor, in accordance with Article 44 - Payment Withheld, until the Owner is satisfied the Contractor is complying with Article 28.2.
(c) holding back sufficient funds to cover the difference between what the Contractor or Sub-Contractor is paying and what they should be paying under Article 28.2.

ARTICLE 29. GUARANTEE PERIOD

.1 Neither the Notice of Acceptance nor a Notice of Partial Acceptance nor any payment by the Owner shall relieve the Contractor of responsibility for faulty materials or defective workmanship. The Contractor guarantees to maintain the work against any defects arising from faulty installation, faulty materials, supplied under the Contract or faulty workmanship which may appear within one (1) year of the date of the Notice of Acceptance. If a Notice of Partial Acceptance has been issued, the guarantee period shall begin from the date of such Certificate except for the work still to be performed and the defects and deficiencies still to be corrected which are listed on such Certificate. Faulty materials shall be replaced and defects discovered and failures which occur during the guarantee period shall be rectified to the satisfaction of the Engineer and in accordance with the Contract Documents, including, if deemed necessary by the Engineer, replacement of all or a portion of the work. The same guarantee as is here in provided and for the same period shall attach to such replacement materials or rectified work and the period shall begin on the date the Engineer accepts such replacement materials or rectified work.

.2 If the Owner observes through use of the works, or if it is discovered by tests or inspection of the works prior to the end of the guarantee period, that a deficiency or defect exists in the materials or workmanship in respect to the works, the Owner shall immediately notify the Contractor, by whatever means are available, of the defect or deficiency and instruct him to rectify the fault. Such notification shall be confirmed by the Owner in writing to the Contractor. In the event that this work, in the opinion of the Owner, must be done immediately to prevent serious damage, injury or loss of life, the Owner may perform, or cause to be performed, the necessary work, and shall notify the Contractor accordingly. Work required under guarantee shall, except as otherwise provided herein for emergencies, be carried out by the Contractor or his representative within ten (10) days of the Owner’s written instruction to perform the work. In the event that this work is not done by the Contractor within the ten (10) day period, or such further period as may be approved by the Engineer, the Owner may take whatever action is necessary to have the work done.

.3 All costs relating from the necessity to do work under the guarantee requirement, whether it be done by the Contractor, his representative, or the Owner, as provided herein, shall be borne by the Contractor. The Contractor shall, in addition, be liable to the Owner for all expense, losses, or damages incurred by the Owner as a result of faulty materials and defective workmanship as are referred to in the first paragraph of Article 29, or as a result of the Contractor’s failure to meet the guarantee requirements as specified herein, including, but without limiting the generality hereof, all costs of engineering, inspection and testing. All costs will be deducted by the Owner from the guarantee amount described in Article 51 - Release of Guarantees.

.4 The issuance of a Certificate of Completion in relation to a subcontract shall not relieve the Contractor of his obligation under this Article 29 - Guarantee Period.
ARTICLE 30. DAMAGE TO WORK

.1 The Contractor shall be responsible for all loss and damage whatsoever which may occur on or to the works, completed or otherwise, until such time as the entire works have been completed and the Notice of Acceptance has been issued by the Owner. In the event of any loss or damage occurring, the Contractor shall, on notice from the Engineer, immediately put the works into the condition it was immediately prior to such loss or damage all at the Contractor's expense, except where such loss or damage was caused solely by an act of the Owner.

ARTICLE 31. INDEMNITY

.1 The Contractor shall indemnify and save harmless the Owner from and against all losses and all claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description brought or recovered against him, and/or the Owner, by reason of any act or omission or alleged act or omission of the Contractor, his agents, employees, or subcontractors in the execution of the work.

ARTICLE 32. BONDS

.1 To ensure the faithful execution and proper fulfillment of this Contract, the Contractor shall provide the Owner with the following bonds at the time of his execution of the Contract Agreement:

(a) a Performance Bond in the amount of fifty percent (50%) of the total contract amount covering the faithful performance of the Contract and maintenance of the Contract for one year after the Notice of Acceptance;
(b) a Labour and Material Payment bond in the amount of fifty percent (50%) of the total contract amount; and the above bonds must be issued by a Surety Company licensed to conduct business in the Province of British Columbia and shall be provided in quadruplicate on the forms contained within the Contract Documents.

.2 Notwithstanding anything contained elsewhere in the contract documents, the Owner shall not be required to make any payment whatever to the Contractor until the above bonds, duly executed, have been delivered to the Owner.

ARTICLE 33. PATENTS AND ROYALTIES

.1 The Contractor shall pay all royalties and license fees with respect to and shall assume the defense of and indemnify the Owner and the Engineer, their employees, officers and agents from all claims relating to inventions, copyrights, trademarks, or patents used in doing the work and in the subsequent use and operation of the work or any part thereof upon completion. The contractor shall not be liable hereunder with respect to any claims arising from a construction method, process or equipment specified by the Owner in the documents submitted to the Contractor before he submitted his tender.
ARTICLE 34. PERMITS AND REGULATIONS

.1 The Contractor shall, at his own expense, procure all permits, certificates and licensees required for the construction of the work and shall comply with all federal, provincial, and local laws, regulations and ordinances affecting the execution of the work, save insofar as the Contract Documents specifically provide otherwise.

.2 The Owner will obtain all necessary governmental approvals for the design of the completed work, and all permits and licenses required by law for the completed works.

ARTICLE 35. INJURY OR DAMAGE TO PERSONS OR PROPERTY

.1 The Contractor shall use due care and take all necessary precautions to ensure the protection of persons and property and shall comply with the provisions of the Workers' Compensation Act of the Province of British Columbia and any safe work procedures as listed in Section 3.10 – Workers' Compensation Board. The Contractor shall be liable for any and all injury or damage which may occur to persons or to property due to any act, omission, neglect or default of the Contractor, or of his employees, workmen or agents.

.2 The Contractor shall, without further order, provide and maintain at all times during the progress or suspension of the work, suitable barricades, fences, signs, signal lights and flagpersons as are necessary to ensure the safety of the public and those engaged in the work.

.3 Notwithstanding the provision of Article 9 – Engineer's Status, in an emergency affecting the safety of life, or of the works, or of adjoining property, the Contractor, without the necessity of authorization from the Engineer, shall act in a reasonable manner to prevent loss or injury.

.4 The work shall be carried out in a manner that will cause the least interruption to vehicular and pedestrian traffic. Where work is to be carried out on highways or properties other than those of the Owner, the Contractor shall familiarize himself with the requirements of the owner or controllers of those highways or properties which pertain to traffic control and safety or which place limitations on the work and shall comply with such requirements.
ARTICLE 36. NOTICE TO PROCEED

.1 Following the execution of the Contract Agreement by the Contractor and the provisions of the required bonds and insurance policies, written Notice to Proceed with the work will be given to the Contractor by the Owner. The Contractor shall begin work within fourteen (14) days following receipt of the Notice to Proceed and shall prosecute the work regularly and without interruption thereafter, unless otherwise directed in writing by the Engineer or Owner, in such a manner as to secure completion of the work within the time stated in the Contract Agreement. Time shall be of the essence of the Contract.

.2 If, however, when the Notice to Proceed is given, as strike or lockout affecting workers of a classification required to organize or begin performance of the work reasonably prevents the Contractor from beginning work promptly, the completion date stated in the Contract Agreement will be extended by the same number of days as the strike or lockout. If the strike or lockout affects workers of several classifications and such strike or lockout ends on different dates, the end of the strike or lockout will be deemed to occur when all workers of a classification required to organize or begin performance of the work are permitted to work for the Contractor. No extension of time herein provided, shall be grounds for any claim whatsoever by the Contractor for extra payment.

ARTICLE 37. FAILURE TO COMPLETE ON TIME

.1 If the work is not complete within the scheduled time, the Owner may extend the time of completion. If the time limit be so extended, the Owner shall have the right to charge to the Contractor and to deduct from the final payment for the work, the actual cost to the Owner of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the contract and which accrue during the period of such extension, except that the cost of final surveys and preparation of final estimates shall not be included in such charges.

ARTICLE 38. SCHEDULE OF COMPLETION

.1 The Contractor shall prepare a detailed work schedule and plan of operation approved by the Engineer. The schedule and plan of operation, unless otherwise approved by the Engineer, shall be submitted to the Engineer not later than fourteen (14) days after the date of the Notice of Award. The schedule and plan of operation shall describe the proposed labour force and equipment, sequence and methods of operation, and projected weekly progress to show completion of all work within the Contract time for completion. Upon receipt of such schedule and plan of operation by the Engineer, the schedule shall become the approved construction schedule. Neither the plan of operation nor the approved construction schedule shall be changed without the prior approval of the Engineer.

.2 Unless otherwise approved by the Engineer, work shall be scheduled between the normal working hours of 8:00 a.m. and 4:30 p.m., Monday through Friday, excluding Statutory Holidays. For work scheduled outside the normal working hours, the owner shall have the right to charge to the contractor and to deduct from the Contractor's payments, the actual cost to the Owner for engineering inspection, superintendence and other overhead expenses which are directly chargeable to the contract and which accrue outside the normal working hours.
.3 If the Engineer should be of the opinion, and so state in writing to the Contractor, that the rate of progress of the work is insufficient to enable the whole of the work or any part or parts thereof to be completed within the time or times specified for such completion in the approved construction schedule, the Contractor shall take whatever steps the Engineer may in his absolute discretion specify in writing to the Contractor to expedite the progress of the work. Such steps may include, but shall not be limited to adoption of shift work and/or the provision of additional men or equipment. The Contractor shall not be entitled to any extra payment by reason of such order of the Engineer.

ARTICLE 39. CHANGES IN THE WORK

.1 The Owner, without invalidating the Contract, may make changes by altering, adding to, or deducting from the work. The Contractor shall proceed with the work as changed and the work shall be executed under the provisions of the Contract. No change shall be undertaken by the Contractor, without written order of the Engineer, except in an emergency endangering life or property, and no claims for additional compensation shall be valid unless the change was so ordered. No payment for extra work or changes in any contract will be entertained by the Owner unless a "Change Order Form" is completed prior to the change or commencement of the extra work.

.2 If, in the opinion of the Engineer, such changes affect the time of Contract completion or the Contract amount, these will be adjusted at the time of ordering the changes. The value of the addition or deduction from the Contract amount, and the method of determining such value, shall be decided by the Engineer. The Engineer will use one (1) or more of the following methods in deciding such value:

(a) by unit prices or combinations of unit prices in the Contract Tender Form:
(b) by unit prices submitted by the Contractor and accepted by the Owner:
(c) by lump sum submitted by the Contractor and accepted by the Owner:
(d) on a force account basis as specified in the next succeeding Article.

.3 If the Contractor and the Owner cannot agree on the method of determining such value, the Engineer shall decide and certify the unit prices or lump sum to be used which are or is in his opinion fair and reasonable to both parties and his decision shall be final.

.4 The Contractor shall obey, perform and comply with the Engineer's orders or instructions with respect to the work or concerning the conduct thereof promptly, efficiently and to the satisfaction of the Engineer. However, if the Contractor is of the opinion that such orders or instructions are not authorized under the provisions of the Contract or involve a change for which a Change Order should be issued as described in Article 39.1, he shall so notify the Engineer in writing before proceeding to carry them out and, in any event, within ten (10) days of the receipt of such orders or instructions. If the Contractor does not so notify the Engineer within the time so limited, he shall not claim at any time thereafter that the orders or instructions were not authorized or should have been subject to a Change Order. Nevertheless, the giving of such notice to the Engineer shall not relieve the Contractor of his obligations to carry out and obey such orders and instructions.
ARTICLE 40.  FORCE ACCOUNT WORK

.1 Force account rates for personnel shall be based on the direct cost to the Contractor. A markup of 20% of the total direct costs will be paid to cover overhead and profit. The total direct costs shall be calculated based on:

(a) The rate of pay as outlined in Article 28, or the employee’s actual rate of pay, if higher.
(b) All applicable employee benefits.
(c) All small tools and equipment, signage and transportation required by the employee to perform the duties of the listed occupation.
(d) All applicable Federal, Provincial and Municipal taxes, duties and charges.

.2 Force account rates for equipment shall be determined by the Engineer based on the B.C. Government Blue Book Equipment Rate Guide as follows:

(a) For Contractor owned equipment, “all found” rates will be paid which include allowances for the equipment operator, small tools, overhead and profit.
(b) For Non-Contractor owned equipment, the lower of, Blue Book rates; or the actual rental costs, as evidenced by invoice, plus a 10% markup to cover overhead and profit.
(c) Attachments on equipment will only be paid when in use and not because the equipment has the attachment(s).

.3 Subcontractors will be paid the subcontractor’s proper bill for such work performed with a markup of 10% to cover overhead and profit.

.4 Materials will be paid based on the supplier’s invoice price with a markup of 10% to cover overhead and profit.

.5 The cost of the work done each day shall be submitted to the Engineer by the Contractor in a satisfactory form on each succeeding day after force account work is carried out and shall be approved or adjusted by the Engineer. No claim for compensation for extra work or materials shall be considered or allowed unless such report shall have been made, or the Engineer shall have extended the time for such reports or released the Contractor therefrom. The submission to, or acceptance or approval by, the Engineer of daily force account cost records shall not at any time be deemed to be an admission that the work is properly chargeable to force account.

.6 The Contractor will be required to demonstrate to the Engineer’s satisfaction the personnel force account rates are in fact the direct cost to the Contractor. The Contractor will also be required to provide any necessary information required by the Engineer to determine equipment rates.

ARTICLE 41.  DELAYS

.1 If the Contractor is delayed during the performance of the work, the time for completion of the work under the Contract may be extended by the owner in the event of one (1) or more of the following:

(a) Where extra work as herein provided is added to the work under this Contract.
(b) Where the work is suspended as provided for in Article 16 – Suspension of Work by Owner of the General Conditions.

(c) Where the work is delayed on account of conditions which could not have been foreseen or which were beyond the control of the Contractor and which were not the result of the fault or negligence of the Contractor, his agents, or employees, provided, however, rain, wind, flood, or other natural phenomena of normal intensity for the area shall not be construed as cause for an extension of time for completion of the work.

(d) Where work is delayed on account of conditions that are beyond the reasonable control of the Engineer or the Owner.

(e) Where delay occurs in the progress of the work as a result of the negligent act of the Owner or his employees, in the administration of this contract.

(f) Where delay occurs as a result of an act of a public authority.

(g) Where the Engineer causes delay in furnishing of drawings or necessary information.

(h) Where strikes, lockouts, or labour disputes prevent or substantially interfere with the progress of the work.

(i) Where, in the opinion of the Engineer, the Contractor is entitled to an extension of time.

.2 A claim for extension of Contract time shall only be considered when submitted by the Contractor to the Engineer in writing within seven (7) days of the occurrence of the delay on which the claim is based, provided, however, that in the case of a continuing cause of delay only one (1) claim shall be necessary. Within a reasonable period after the Contractor submits a request for an extension of time, the Engineer will present his written recommendation to the Owner stating his opinion on whether or not the delay justifies an extension of time; and, if so, the number of days extension due to the Contractor. The Owner will make the final decision on all requests for extension of time.

.3 Delays, pursuant to Article 41, shall not entitle the Contractor to reimbursement for any additional costs, except as outlined in .1 (b) or (e) above.

ARTICLE 42. USE OF COMPLETED PORTIONS

.1 The Owner will have the right to take possession of and use any completed or partially completed portions of the work, whether the time for completing the entire work or such portions has or has not expired, but such taking possession and use will not be deemed an acceptance of any work so taken possession of or used. If such prior use increases the cost of, or delays the completion of uncompleted work or causes refinishing of completed work, the Contractor shall be entitled to such extra compensation or extension of time, or both, as the Engineer may determine.

ARTICLE 43. PROGRESS PAYMENT CERTIFICATES

.1 At the end of each calendar month the Contractor will estimate project quantities for that month and provide to the Engineer for review and approval. Where unit prices apply, payment will be calculated on the basis of the tendered prices and the units of work completed as determined by the Engineer. Where a lump sum price applies, payment will be calculated on the basis of the Engineer's estimate of the percentage of work completed. The Engineer will prepare final payment certificate for payment by the Owner.

.2 The payment certificate shall show as of the end of the last day of each calendar month the value of all labour and materials incorporated into the works, including extras, and all
adjustments previously made whether additions or deductions. The certificate shall also show the aggregate of previous payments, the amounts withheld to comply with the Builders Lien Act, and the amount, if any, of the holdback released in respect of completed subcontracts. Except in respect of the final progress payment, the gross amount shown on such certificate, less the aggregate of all previous payments, previous sums withheld, and the amount then required to be withheld to comply with the Builders Lien Act as set out below, shall become due and be payable by the Owner to the Contractor on or before the last day of the next month. In those cases where the work is such that the Builders Lien Act does not apply or does not require the retention of a holdback, the Owner will nevertheless retain holdbacks to the same extent as if such legislation applied to the work.

.3 Ten percent (10%) of each progress payment shall be retained by the Owner to comply with the Builders Lien Act until payment is due in accordance with the provisions of Article 50 – Release of Holdback.

.4 The monthly estimates shall not bind the Owner or Engineer in any manner in the preparation of the final estimate of the work done, but shall be construed and held to be approximate only, and shall in no case be taken as an acceptance of the work or as a release of the Contractor from his responsibility therefor.

ARTICLE 44.  PAYMENT WITHHELD

.1 Upon receipt of a certificate in writing from the Engineer stating that, in his opinion, justification exists and stating the basis and the amount of such deduction, the Owner may withhold or nullify, on written notice to the Contractor specifying the ground or grounds relied on, the whole or part of any progress payment to the extent necessary to protect himself from loss on account of one (1) or more of the following:

(a) The Contractor is not making satisfactory progress in the opinion of the Engineer.

(b) That defective work is not being remedied at all or in a manner satisfactory to the Engineer.

(c) That there are claim of liens (or a lien) filed, against the holdback funds, lands and premises on which the work is done or is being done, or reasonable evidence of the probable filing of claim of lien or registration of liens (or a lien).

(d) That the Contractor is failing to make prompt payments as they become due to subcontractors or for material or labour.

(e) That there exist unsatisfied claims for damages caused by the Contractor to anyone employed on the site or in connection with the work.

(f) That the Contractor or any Sub-Contractor has failed, or is failing to pay the minimum rate of pay as outlined in Article 28.

.2 Where subcontractors or suppliers of materials are not receiving prompt payment, the Owner may make payment to such subcontractors or suppliers directly and deduct the amount of such payments from amounts otherwise due to the Contractor.

ARTICLE 45.  BUILDER'S LIENS

.1 The Contractor shall remove or cause to be removed all claim of lien or liens filed or registered against the holdback funds, lands and premises on which the work is being performed which claim of lien or liens arise out of anything done or to be done under the Contract. Such removal shall be effected by the Contractor forthwith upon demand by the Owner or the Engineer.
.2 Certificate of Completion shall have the interpretation assigned to it by the Builder’s Lien Act.

.3 Application for the Certificate of Completion shall be in accordance with the Builder’s Lien Act and shall include a written statement from the Contractor that all claims and demands of the Contractor for extra work or otherwise in connection with the Contract were presented in writing to the Engineer.

.4 The Owner shall release a holdback in respect of a completed subcontract if a Certificate of Completion has been issued in respect of that subcontract and the holdback period established under the Builder’s Lien Act has expired without any claims of lien being filed that arose under that subcontract.

.5 Notwithstanding anything elsewhere contained in the contract documents, the Contractor shall indemnify and hold harmless the Owner from all demands, damages, costs, losses and actions arising in any way out of claims or lien or liens which arise out of anything done or to be done under the Contract whether the lien period binding on the Contractor has expired or not.

.6 The obligations imposed on the Contractor by the provisions of this Article 45 shall not extend to claims of lien or liens properly filed by the Contractor himself.

ARTICLE 46. COMPLETION

.1 When the Contractor is of the opinion that he has completely performed the work, he shall inspect the work to ensure that all work has in fact been performed, that it is in a clean and tidy condition and that it is ready in all respects for acceptance by the Owner. He shall then submit a written request to the Engineer that he make a final inspection.

.2 The Engineer will make an inspection and notify the Contractor in writing of any defects or deficiencies, which require correction by the contractor. When the defects or deficiencies are corrected, and the Contractor has submitted to the Engineer the “as-constructed” drawings, digital survey file and a written statement that all claims and demands of the Contractor for extra work or otherwise in connection with the Contract were presented in writing to the Engineer, the Engineer will recommend to the Owner to issue a Notice of Acceptance to the Contractor. The Owner, subject to their acceptance of the Engineer’s recommendation, will issue the Notice of Acceptance.

ARTICLE 47. PARTIAL COMPLETION

.1 If the Contractor considers that, by reason of climatic or similar problems beyond his reasonable control, not all the work can be performed or defects or deficiencies corrected promptly, he may in writing request the Engineer for a Notice of Partial Acceptance. Such request shall be accompanied by a written statement that all claims and demands of the Contractor for extra work or otherwise in connection with the work to be accepted have been presented in writing. If the Engineer considers such request to be reasonable, he will carry out an inspection and will notify the Contractor in writing of any defects or deficiencies which require correction before he will recommend partial acceptance. He will prepare an additional list of defects and deficiencies which in his opinion do not impair the usefulness to the Owner of the whole work and the correction of which may reasonably be deferred. This list shall show the amount, which the Engineer considers to be 200% of the cost of completing such work and correcting such defects and deficiencies. When all work has been performed and defects and deficiencies corrected other than those on this list, he will...
recommend to the Owner that a Notice of Partial Acceptance be issued to the Contractor. If the owner accepts this recommendation, he will issue a Notice of Partial Acceptance which shall list the work to be performed and the defects and deficiencies to be corrected and 200% of the estimated cost thereof. The Notice of Partial Acceptance shall fix a date within which all such works shall be performed and the defects and deficiencies corrected.

.2 The Owner may make his acceptance conditional on the Contractor providing written consents of sureties under any Performance or Labour and Materials Payment Bonds or other evidence that no guarantor or surety will be relieved of his obligations.

.3 When all such work has been performed and the defects and deficiencies corrected, the Contractor shall call for final inspection in accordance with Article 46 - Completion.

.4 If all work is not performed and all defects and deficiencies are not corrected by the date set out in the Notice of Partial Acceptance, the Owner may have the work performed and the defects and deficiencies corrected by any means he thinks suitable, and may recover the costs thereof from any money withheld from the Contractor or from the Contractor if such money is insufficient.

ARTICLE 48.  FINAL PROGRESS PAYMENT

.1 The final progress payment certificate will be prepared following the issuance of the Notice of Acceptance. The Engineer will review with the Contractor all work quantities and all claims and demands of the Contractor for extra work in connection with the Contract. The final progress payment certificate will show the total amount of the payment due to the Contractor less the amount required to be retained under the Builder’s Lien Act whether a lien can be filed or not and less a 2% guarantee amount or five thousand ($5,000) dollars, guarantee amount, whichever is greater.

.2 The final progress payment shall be made by the Owner within thirty (30) days of the date of the final progress payment certificate provided the Contractor supplies the Owner with a full and final payment receipt in respect of the work in the Contract, covering and including acknowledgment of full payment for the cost of all extra work and material furnished by the Contractor in the fulfillment of the works and all incidentals thereto and releasing the Owner from all claims whatsoever out of the Contract.

ARTICLE 49.  PROGRESS PAYMENT AFTER PARTIAL COMPLETION

.1 If the Owner issues a Notice of Partial Acceptance, the Engineer will prepare a Progress Payment Certificate in the same detail as required for a Final Progress Payment Certificate. From the amount shown on such certificate to be due to the Contractor shall be deducted the amount required to be retained under the applicable lien legislation and twice the amount shown on the Notice of Partial Acceptance to be 200% of the estimated cost of performing the remaining work and correcting the defects and deficiencies. Payment of the net amount due to the Contractor shall be made by the Owner within thirty (30) days of the date of this progress payment certificate. If the amount to be withheld in respect of work still to be performed or defects and deficiencies still to be corrected exceeds the amount otherwise payable to the Contractor, the excess shall be withheld from the amount of the lien holdback to be paid under the provisions of Article 50 - Release of Holdback.
ARTICLE 50.  RELEASE OF HOLDBACK

.1 If applied for, the Certificate of Completion shall, in accordance with the Builder’s Lien Act, start the period within which liens must be filed. Otherwise, a Notice of Partial Acceptance or where none is issued, a Notice of Acceptance shall be conclusively deemed between the Owner and the Contractor to start the period within which liens must be filed by the Contractor in accordance with the Builder’s Lien Act.

.2 The Owner shall pay the holdback to the Contractor within fourteen (14) days of the expiry of the statutory time release of holdback, provided that:

(a) The Contractor has provided to the Owner a Certificate from the proper office to register liens to prove that, as of a date two days after the expiry of the statutory period, no notice of lien or liens has been filed or other matters recorded to make effective any lien.

(b) The Contractor has complied with any conditions imposed by the Owner in his acceptance of the recommendation of the Engineer to issue a Notice of Partial Acceptance.

(c) The Workers’ Compensation Board has, at the request of the Contractor, filed with the Owner a certificate that all assessments due to the Board by the Contractor have been paid; such certificate shall be dated after the expiry of the statutory period for filing liens.

(d) If in accordance with the Builder’s Lien Act, there is no person who can provide the certificate referred to in (a) above, the Contractor shall furnish to the Owner a Statutory Declaration, dated not earlier than seven (7) days after the expiry of the statutory lien period, stating that all materials, labour, work and services incurred directly or indirectly on account of the work have been paid for by the Contractor.

ARTICLE 51.  RELEASE OF GUARANTEES

.1 The Performance Bond and 2% of the final contract price, or five thousand dollars, ($5,000), whichever is greater, or a letter of credit in lieu of the 2% amount or five thousand dollars, ($5,000), whichever is greater, will be held by the Owner for one year from the date of Notice of Acceptance.

.2 The 2% guarantee amount, or five thousand dollars ($5,000), guarantee amount, held back during the one year guarantee period, or remaining portion thereof, will be released to the Contractor one year following Notice of Acceptance. No interest will be allowed.

.3 Prior to the expiration of the one year guarantee period and subsequent release of guarantees, the Owner, Engineer and Contractor shall conduct an inspection to determine that all deficiencies have been corrected and that no new defects or deficiencies exist in the materials or workmanship in respect to the works. Any faults corrected at this time will be covered as set out in Article 29 – Guarantee Period and sufficient guarantees retained for an additional one year period from acceptance of the replacement materials or rectified work.

.4 As an alternate to Clauses .1 and .2 above, a Contractor may deposit with the City an irrevocable letter of credit for $50,000 to cover the guarantee for all works undertaken for the City in any calendar year. This letter of credit would serve as an overall guarantee in place of individual guarantees for each project completed and would be renewed on its anniversary date each year. No interest will be allowed.
ARTICLE 52. INSURANCE

.1 The Contractor shall, at his own expense, provide the following insurance. Each policy shall contain a clause stating that: "This policy will not be cancelled or materially changed without the Insurer giving at least fifteen (15) days notice by registered mail to the Owner." Certified copies of these policies shall be filed by the Contractor with the Owner prior to commencement of the work. Wherever the word "Owner" or "Engineer" is to appear in these policies, the legal name shall be inserted.

.2 Builder's Risk Course of Construction Insurance:

(a) The Contractor shall at all times during construction and until all conditions of this Contract (except guarantee provisions) have been fully complied with, keep all buildings, structures, works, equipment (other than Contractor's mobile equipment), and supplies, including materials which will form part of such building, works, or structure, which is the subject matter of this contract, insured in the name of the Owner and the Contractor for any amount not less than the Contract price against the following perils: "All risks of direct physical loss or damage from any cause whatsoever, including flood and earthquake, and subject to a maximum deductible of three percent (3%) of the Contract price."

(b) Such insurance shall be with Insurers and on forms acceptable to the Owner and shall contain the following clause:

(c) "It is agreed that the right to subrogation against the Owner and the Engineer or any of their parent, subsidiary, or affiliated companies or corporations or any employee thereof is hereby waived."

(d) The following exclusions shall be deemed permissible (additional or modified exclusions subject to permission of the Owner).

   (i) Any loss or use of occupancy howsoever caused;
   (ii) Penalties for non-completion of or delay in completion of Contract or non-compliance with Contract conditions;
   (iii) Cost of making good faulty workmanship, construction, or design, but this exclusion shall not apply to damage resulting from such faulty workmanship, construction, or design;
   (iv) Wear, tear, normal upkeep, and normal making good;
   (v) Loss, damage, or liability occasioned by, happening through or in consequence of war, invasion, hostilities, acts of foreign enemies, civil war, rebellion, insurrection, military or usurped power or martial law or confiscation by order of any government or public authority;
   (vi) Any weapon or war employing atomic fission or radioactive force whether in time of peace or war;
   (vii) Claims or liability arising directly or indirectly from nuclear fission, nuclear fusion, or radioactive contamination;
   (viii) Loss or damage caused by frost or freezing unless resulting from damage occasioned by fire and/or lightning and/or windstorm and/or hail and/or riot attending a strike and/or civil commotion and/or vehicles and/or smoke;
   (ix) Loss due to disappearance or revealed by inventory shortage alone;
   (x) Mechanical breakdown, but this exclusion shall not be deemed to exclude loss or damage arising as a consequence of mechanical breakdown;
   (xi) Infidelity of the Assured's employees;
   (xii) Loss or damage to material and/or equipment while in the course of ocean marine shipment, but this exclusion shall not apply to shipments by regular coast-wise vessels, regular ferry lines, or railway car transfer barges;
(xiii) Automobiles or Contractor's equipment of every description.

.3 Liability Insurance:
(a) The Contractor shall buy and keep in force until twelve (12) months after the date of acceptance, Personal Injury and Property Damage Liability Insurance. Such insurance shall be in the name of the Contractor and the Owner, and shall include a Cross Liability or Severability of Interest Clause. Such insurance shall be on a form and with an Insurer acceptable to the Owner. Both Personal Injury and Property Damage sections are to provide coverage on an "occurrence basis".
(b) Exclusion pertaining to the following operations are to be deleted, if such operations are to be performed by the Contractor or anyone on his behalf:
(i) Blasting or use of explosives;
(ii) Pile driving;
(iii) Excavation;
(iv) Underpinning, shoring or removal or rebuilding of support;
(v) Demolition.
(c) Such insurance shall indemnify the Contractor for claims arising out of all premises, operations, subcontracted operations, elevators (if any), completed operations, products, and for all liability for personal injury or property damage assumed by the Contractor under any contract or agreement (including this Contract).
(d) Such insurance shall be for the following minimum limits:
(e) Bodily Injury and Property Damage - $2,000,000 Inclusive

.4 Automobile Insurance:
(a) The Contractor shall buy and keep in force until all conditions of the Contract have been fully complied with, a Standard Automobile Policy covering all licensed vehicles owned by him, registered in his name, or leased to him. Such insurance shall include Liability Insurance for the following minimum limits:
(b) Bodily Injury and Property Damage - $2,000,000 Inclusive. The Contractor shall furnish proofs of insurance to the satisfaction of the Engineer.

.5 Non-Owned Automobile Insurance:
(a) The Contractor shall buy and keep in force until all conditions of the Contract have been fully complied with, a Standard Non-Owned Automobile Policy. Such insurance shall be for the following limits:
(b) Bodily Injury and Property Damage $2,000,000 Inclusive. The Contractor shall furnish proofs of insurance to the satisfaction of the Engineer.

.6 Contractor's Equipment Insurance:
(a) Notwithstanding anything contained elsewhere herein, it is understood and agreed that the Owner and/or Engineer will not be liable for any loss or damage to Contractor's equipment including loss of use thereof. Each and every policy insuring Contractor's equipment to be used on this project shall contain the following clause:

"It is agreed that the right to subrogation against the Owner and the Engineer or any of their parent, subsidiary or affiliated companies or corporations or any employee thereof is hereby waived."
ARTICLE 53. ARBITRATION

.1 In the case of any dispute between the Owner or the Engineer on his behalf, and the Contractor, during the progress of the work or afterwards, or after the determination of breach of Contract, as to any matter arising thereunder, either party hereto shall be entitled to give to the other notice of such dispute and to demand arbitration thereof. Such notice shall be in writing and shall specify the matter to be submitted to arbitration, and in it said party shall name a person to act as arbitrator; thereupon within fifteen (15) days after receipt of such written notice the other party by written notice shall choose and name a second arbitrator; the two (2) arbitrators so chosen shall forthwith jointly select a third arbitrator, giving written notice to both parties of the choice so made, and fixing a place and time for meeting not later than thirty (30) days thereafter, at which both parties may appear and be heard, touching such controversy relating to the matters aforesaid. In case the two (2) arbitrators shall fail to agree upon a third arbitrator, or in case the party notified of the demand for arbitration shall fail to name the second arbitrator within the time stipulated, such third arbitrator (or such second arbitrator as the case may be) upon the application of either party, of which the other shall be given notice, shall be named by a Justice of a Superior Court of the Province of British Columbia. The parties may agree to submit the matter to one (1) arbitrator, whose award shall be as binding as that of three (3) arbitrators.

.2 The submission and the arbitration proceedings shall be under the provisions of the Arbitration Act of the Province of British Columbia provided nevertheless that any statutory limitation on the fees payable to the arbitrator or arbitrators shall be waived. The decision of the said arbitrator(s) shall be made in writing within thirty (30) days after the completion of hearings thereon, and when signed by a majority of them shall be final and conclusive upon the parties thereto.

.3 Arbitration proceedings shall not take place until after the completion or alleged completion of the work except; (a) on a question of certificate for payment; or (b) in a case where either party claims that the matter in dispute is of such a nature as to make immediate arbitration proceedings necessary while the evidence is available. The arbitrator(s) in their decision shall determine which party shall bear all or a portion of the costs and expenses of the arbitration including the fees of the arbitrator(s), and said arbitrator(s) may in any such decision allocate such costs and expenses between the parties in such amounts as they may deem fair and equitable by reason of such decision.
## SECTION 3 - GENERAL REQUIREMENTS

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3.01 SPECIFICATIONS, STANDARDS, OR METHODS

.1 When references to the following capitalized abbreviations are made, they refer to Specifications, Standards, or Methods of the respective Association. Abbreviations listed herein but not mentioned in the specifications shall be disregarded.

.2 The numbers and letters following the abbreviations denote the Association's serial designation for the Specification or Standard to which reference is made. All references to these Specifications, Standards or Methods shall, in each instance, be understood to refer to the latest adopted revision, including all amendments.

AASHO  American Association of State Highway Officials
ACI    American Concrete Institute
AGA    American Gas Association
AIEE   American Institute of Electrical Engineers
AISC   American Institute of Steel Construction
AI SI   American Iron and Steel Institute
ANSI   American National Standards Institute
ASA    American Standards Association
ASCE   American Society of Civil Engineers
ASME   American Society of Mechanical Engineers
ASTM   American Society for Testing and Materials
AWWA   American Water Works Association
AWPA   American Wood Preservers' Association
AWS    American Welding Society
BCNTA  British Columbia Nursery Trades Association
BCSLA  British Columbia Society of Landscape Architects
CEC    Canadian Electrical Code
CEMA   Canadian Electrical Manufacturers Association
CGA    Canadian Gas Association
CGSB   Canadian Government Specifications Board
CISC   Canadian Institute of Steel Construction
CMHC   Canada Mortgage and Housing Corporation
CPCI   Canadian Prestressed Concrete Institute
CRCA   Canadian Roofing Contractors Association
CSA    Canadian Standards Association
CUA    Canadian Underwriters' Association
CW B   Canadian Welding Bureau
CSPI   Corrugated Steel Pipe Institute
EEI    Edison Electric Institute
IEC    International Electrotechnical Commission
IEEE   Institute of Electrical Engineers
IEEE   Institute of Electrical and Electronics Engineers, I (formerly IRE and IEE)
IES    Illuminating Engineering Society
IPCEA  Insulated Power Cable Engineers Association
ISA    Instrument Society of America
IOS    International Organization for Standardization
LEMA   Lighting Equipment Manufacturers Association
MCA    Millwork Contractors Association
MSMRCA Master Sheet Metal and Roofing Contractors' Association of B. C.
NBC    National Building Code of Canada
.3 All static and dynamic units on drawings and specifications are S.I. units, conforming to Can-3-Z234.2-73, the International System of Units (S.I.) and Can/CSAZ234.1, Metric Practice Guide.

.4 The S.I. Units accepted for the purpose of these standards, together with conversion factors relating them to equivalent imperial units are tabulated as follows:

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<th>BASIC S.I. UNIT</th>
<th>(SIU) ABBREVIATION</th>
<th>EQUIVALENT IMPERIAL UNIT (EIU)</th>
<th>CONVERSION FACTOR (CF) (CF X EIU=SIU)</th>
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<tbody>
<tr>
<td>Length</td>
<td>metre</td>
<td>m</td>
<td>foot</td>
<td>0.3048</td>
</tr>
<tr>
<td>Length</td>
<td>millimetre</td>
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<td>inch</td>
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<tr>
<td>Volume</td>
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<td>m³</td>
<td>cubic foot</td>
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<tr>
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<td>cubic yard</td>
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<tr>
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<td>imperial gallon</td>
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</tr>
<tr>
<td>Mass</td>
<td>kilogram</td>
<td>kg</td>
<td>pound</td>
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<td>Mass</td>
<td>tonne</td>
<td>t</td>
<td>ton (short)</td>
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<tr>
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<td>degree Fahrenheit</td>
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EXISTING STRUCTURES AND UTILITY WORKS

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<th>BASIC S.I. ITEM</th>
<th>(SIU) UNIT</th>
<th>EQUIVALENT ABBREVIATION</th>
<th>CONVERSION IMPERIAL UNIT</th>
<th>FACTOR (CF) (CF X EIU=SIU)</th>
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<td>(concrete)</td>
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<td>l/s</td>
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</tr>
<tr>
<td>flow</td>
<td>per second</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Volume flow</td>
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<td>m3/s</td>
<td>cubic feet per second</td>
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<tr>
<td>flow</td>
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<td></td>
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<tr>
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<tr>
<td>flow</td>
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<td></td>
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<tr>
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* As used in these standards, pressure shall mean gauge pressure unless otherwise noted.
# Standard Sieve Sizes

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<th>EIU</th>
<th>SI</th>
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<td>4&quot;</td>
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<td>37.5 mm</td>
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<td>3&quot;</td>
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<td>25 mm</td>
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<td>3/4&quot;</td>
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# Standard Pipe Sizes

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# Concrete Strengths

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<tr>
<td>2500 psi</td>
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<td>4500 psi</td>
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<td>5000 psi</td>
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### Reinforcing Steel

Comparison of Imperial and Metric Sizes  
(Note: % difference based on area of bars in in$^2$)

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<tr>
<th>IMPERIAL BAR SIZE</th>
<th>AREA in$^2$</th>
<th>AREA mm$^2$</th>
<th>METRIC BAR SIZE</th>
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<th>AREA mm$^2$</th>
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<td>129</td>
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<td>.16</td>
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<td>.20</td>
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<td>15M</td>
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<td>200</td>
<td>55% L</td>
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<tr>
<td>#7</td>
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<td>25M</td>
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<td>500</td>
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<td>3.88</td>
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</table>

L = LARGER  
S = SMALLER

### 3.01A REFERENCE

.1 The Manual of Engineering Standards and Specifications contains references to standard specifications for testing, materials, manufacturing installation and design procedures. This section provides the full descriptive title of referenced specifications.

.2 All references listed shall be understood to refer to the latest adopted revision, including all amendments.

.3 All references listed and referred to by the Manual of Engineering Standards and Specifications shall be part of the Manual as far as they are applicable to and not in consistent with the Manual.
### SECTION 3 - GENERAL REQUIREMENTS
EXISTING STRUCTURES AND UTILITY WORKS

<table>
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<td>Cast Iron Pipe Flanges and Flanged Fittings</td>
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<td>Details and Detailing of Concrete Reinforcement</td>
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<td>Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners</td>
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<td>Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality</td>
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<td>Test Method for Specific Gravity and Absorption of Coarse Aggregate</td>
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<td>Method of Sieve Analysis of Fine and Coarse Aggregate</td>
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<td>Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN·m/m³))</td>
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<td>Kinematic Viscosity of Asphalts</td>
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<td>Standard Test Method for External Loading Properties of Plastic Pipe by Parallel Plate Loading</td>
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<td>Test Method for the Sand Equivalent Value of Soils and Fine Aggregate</td>
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<td>Standard test methods for density of soil and soil-aggregate in place by nuclear methods (shallow depth)</td>
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<td>Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water</td>
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<td>Ductile Iron and Grey Iron Fittings, 3 Inch Through 48 Inch, for Water and Other Liquids</td>
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<td>Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings</td>
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<td>Thickness Design of Ductile Iron Pipe</td>
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<td>Polyvinyl Chloride (PVC) Water Transmission Pipe Nominal Diameters, 14 Inch Through 36 Inch</td>
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<td>Plastic Drain and Sewer Pipe and Pipe Fittings</td>
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<td>Large Diameter Ribbed PVC Sewer Pipe and Fittings</td>
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SECTION 3 - GENERAL REQUIREMENTS
EXISTING STRUCTURES AND UTILITY WORKS

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<td>CSA G 30.18</td>
<td>Billet-Steel Bars for Concrete Reinforcement</td>
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<td>Cold Drawn Steel Wire for Concrete Reinforcement</td>
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<td>Welded Steel Wire Fabric for Concrete Reinforcement</td>
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<td>Hot Dip Galvanizing of Irregularly Shaped Objects</td>
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<td>Steel for Prestressed Concrete Tendons</td>
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<td>Strength Design in Aluminum</td>
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<td>Welded Steel Construction (Metal Arch Welding)</td>
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<tr>
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<td>Welding of Reinforcing Bars in Reinforced Concrete Construction</td>
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3.02 CONSTRUCTION PROGRAM

.1 Prior to commencement of work specified herein, the Contractor shall submit to the Engineer for approval, a written construction program summarizing his proposed construction methods and sequences.

.2 This program shall contain sufficient information on the following points for the Engineer to assess the practicability of the proposed methods:

(a) Sources of aggregate  
(b) Stripping methods  
(c) Excavation and hauling methods  
(d) Compaction equipment and methods for each type of fill and aggregate  
(e) Watering and dewatering methods  
(f) Waste material disposal locations  
(g) Traffic control, if required  
(h) Provision for access to adjacent properties, if required  
(i) Hours of work

3.03 TEMPORARY CONSTRUCTION FACILITIES

.1 Access Road:

(a) Temporary roads shall be constructed as required for access to the working areas. Access to temporary roads from public roads shall require prior written approval from the City of Nanaimo. Adequate drainage facilities in the form of ditches, culverts, or other conduits shall be installed as found necessary to maintain these roads. In the construction of access roads, existing drainage facilities, natural or otherwise, shall not be disturbed to the detriment of properties outside the working area and such facilities shall, unless otherwise provided elsewhere in the specifications, be restored to their original condition as far as is practical to do so on completion of the work.
.2 Sanitary Facilities:

(a) Clean, sanitary, latrine accommodations shall be provided by the Contractor, and shall be located and maintained such that they are not offensive to any property owner or member of the public. The use of these facilities by persons engaged in the work shall be strictly enforced.

(b) These facilities shall be removed by the Contractor at the conclusion of the work or when instructed to do so by the Owner.

3.04 SPECIAL TOOLS, OPERATING MANUALS, AND SHOP DRAWINGS

.1 For installations which include mechanical and electrical equipment or machinery having wearing parts and requiring periodical repair and adjustment, all special tools, wrenches, and accessories required for removing worn parts, making adjustments, and carrying out maintenance shall be supplied. All gauges, indicators, and lubricating devices necessary for the proper operation of the equipment shall be furnished.

.2 With each piece of equipment, 4 sets of operating manuals and as-constructed shop drawings shall be supplied. The manuals should give the manufacturer's recommended maintenance schedules with the grades of lubricants required and instructions as to how the equipment may be taken apart for periodic inspection and replacement.

.3 The Contractor shall furnish all lubricating oils, greases, fuels, water, and power necessary to operate all equipment furnished under this Contract for a period of time sufficient to indicate its full acceptance to the Engineer.

3.05 EXPLOSIVES

.1 The General method of storage, handling, use and character of all explosives shall be subject to the Accident Prevention Regulations covering explosives, pursuant to the Workers’ Compensation Act of British Columbia and must conform to local police requirements.

.2 Explosives in excess of sixty-eight (68) kg shall be kept only in registered premises, which have been licensed under the Explosives Act (Canada).

3.06 BLASTING

.1 Blasting will be permitted only after securing the approval of the Owner. Damage caused by blasting shall be repaired by the Contractor at his expense. The method and procedure employed for blasting shall be in accordance with Provincial and Municipal ordinances. The Contractor shall not do any blasting without first verifying that his insurance covers any loss of life or damage that may result from this work and includes a waiver of subrogation in favour of the Owner. The Owner, in granting approval for blasting, does not in any way assume responsibility for injury, loss of life, or damage that may result therefrom, and such approval shall not be construed as approval of the methods employed by the Contractor in blasting, the sole responsibility therefore being that of the Contractor.
3.07 SITE MAINTENANCE AND CLEANUP

.1 The working areas shall be maintained in an orderly manner and shall not be encumbered with equipment, materials, or debris.

.2 Cleanup shall be a continuing process from the start of the work to final acceptance of the project. The Contractor shall at all times, and without further order, keep property on which work is in progress free from accumulations of waste materials or rubbish caused by employees or by the work. Accumulations of waste materials which might constitute a fire hazard will not be permitted. Spillage from the Contractor's hauling vehicles on travelled public or private roads shall be promptly cleaned up. On completion of construction, the Contractor shall remove all temporary structures, rubbish, and waste materials resulting from his operations.

3.08 TIMING OF INSTALLATION

.1 The Contractor shall schedule the work in a manner such that disruption of normal traffic and inconvenience to residents in the working area is kept to a minimum. Resurfacing of roads, testing of pipe, and cleanup of the site shall be completed no later than 30 days following commencement of construction on any street block.

.2 Departure from scheduling as specified above will be permitted only with the written consent of the Owner to a request made by the Contractor.

3.09 WORK WITHIN ROAD RIGHTS-OF-WAY

.1 All work within road rights-of-way shall be in strict conformance with, but shall not be limited to, the following requirements:

(a) Where one-way traffic cannot be avoided, adequate traffic control in the form of signs, lights, barricades and/or flagmen or pilot cars must be provided.
(b) Where detours are available, they must be adequately designated with proper signs.
(c) Traffic must be restored to as near normal as possible when work is not in progress.
(d) Surface runoff is to be prevented from seeping into trenches.
(e) Excavation across entrances, whether private or commercial, shall be backfilled and thoroughly compacted, within two hours unless otherwise approved in writing by the tenant or property owner.
(f) Open cut excavation shall not be left open overnight or on weekends unless there are workmen on duty and there is authorization by letter from the City of Nanaimo.
(g) Adequate signs, barriers, flares, etc., to ensure the safety of the public and traffic are to be provided at all times. Lights and flares are to be in good working order at all times and are to be checked daily. Lights that are not operational shall be removed from the worksite.
(h) Existing drainage courses and culverts are to be preserved and maintained as required.
(i) If the City of Nanaimo, at any time, deems it necessary, a workman from the Operations Division, City of Nanaimo, will be stationed at the work site to ensure that no damage is done to existing services.
.2 The Contractor shall make allowance in his tendered prices for all additional costs likely to be incurred in conforming with the Ministry of Transportation regulations when working on or near a highway or right-of-way under the jurisdiction of the Ministry of Transportation.

3.10 WorkSafeBC (Revised March 2010)

.1 The Contractor shall comply, at all times, with the current Workers Compensation Act and the WorkSafeBC Occupational Health and Safety Regulation.

.2 The Contractor shall have a current Occupational, Health & Safety Program and provide a copy of this program to the Owner.

.3 Prior to commencing work, the Contractor shall forward a copy of their WorkSafeBC Notice of Project and Clearance Letter.

.4 If the Contractor is designated as the Prime Contractor, they shall:
(a) Comply with the WorkSafeBC Occupational Health and Safety Regulations, Notice of projects, section 20.2, and Coordination of multiple employer workplaces, section 20.3, and in the Workers Compensation Act, Coordination at multiple-employer workplaces, sections 118, subsections (1) and (2).
(b) Coordinate the occupational health and safety activities for the project.
(c) Complete hazard assessments, communicate known hazards to any persons who may be affected, and ensure appropriate measures are taken to effectively control or eliminate the hazards.
(d) Ensure all workers are suitably trained and qualified to perform the duties for which they have been assigned.
(e) Ensure or coordinate first aid equipment and services as required by WorkSafeBC OH&S Regulation.
(f) Assume responsibility for the health and safety of all workers and ensure compliance by all workers with the Workers Compensation Act and WorkSafeBC OH&S Regulation.
(g) Maintain at the workplace and make available upon request from the City and/or WorkSafeBC Prevention officers, the following documents.
- All notices which the Prime Contractor is required to provide to WorkSafeBC as per WorkSafeBC OH&S Regulation.
- Any written summaries of remedial action taken to reduce occupational health and safety hazards within the area of responsibility.
- All directives and inspection reports issued by WorkSafeBC.
- Records of any incidents and accidents occurring within the Prime Contractor’s area of responsibility.
- Completed accident investigations for any incidents and accidents occurring within the Prime Contractor’s area of responsibility.
- Records of all orientation and regular safety meetings held between contractors and their workers, including topics discussed, worker names and companies in attendance.
- Written evidence of regular inspections within the workplace.
- Occupational first aid records.
- Worker training records.
SECTION 3 - GENERAL REQUIREMENTS
EXISTING STRUCTURES AND UTILITY WORKS

- Current list of the name of a qualified person designated to be responsible for each subcontractor (employer's) site health and safety activities.
- Diagram of the emergency route to the hospital.

.5 The workplace may have the following known operations and/or site conditions that could present a potential hazard to workers and other persons at the workplace. Other hazards may exist:

  e.g. - Asbestos Pipe - Energized Equipment
       - Confined Space - Traffic > 30 km/h
       - Underground Utilities - Tree Removal
       - Excavations - Hazardous Materials
       - Overhead Power Lines - Mobile Equipment

.6 The City of Nanaimo has developed Safework Procedures for the guidance of Municipal Employees in addressing the aforementioned potential hazards. These procedures can be made available to the Contractor as reference in developing their own site specific safework procedures that will be utilized to protect the health and safety of all workers and persons on this project.

.7 Any WorkSafeBC violation by the Prime Contractor may be considered a breach of contract resulting in possible termination or suspension of the contract and/or any other actions deemed appropriate at the discretion of the City.

3.20 SCOPE

.1 This specification refers to the location, protection, removal, and replacement of existing structures and utility works.

.2 Existing structures shall mean all existing pipes, ducts, ditches, or other works forming a part of sewerage, drainage, water, telephone, electrical, gas or other utility systems as well as sidewalks, curbs, poles, fences, buildings, and other man-made things that may be encountered during construction.

3.21 SUPPLY OF MATERIALS

.1 The Contractor shall supply all materials required for the specified location, protection, removal, and replacement of existing structures.

.2 Unless specified otherwise, materials supplied for replacement of existing structures shall be at least equal to those being replaced.

3.22 LOCATION OF STRUCTURES

.1 Prior to commencing any excavation the Contractor shall be responsible for locating existing surface and underground structures that may affect the work or may be damaged during construction.
.2 Drawings or descriptions, verbal or otherwise, of existing structures or their location that are given to the Contractor are intended only as an aid to his location of these structures. Measurements and location of the existing underground structures shown on the drawings are not guaranteed to be accurate, and must be verified by the Contractor prior to proceeding with construction.

.3 On request from the Engineer, the Contractor shall excavate and uncover underground structures for the purpose of establishing line or grade for proposed installation of piping or other works.

3.23 PROTECTION, ADJUSTMENT, AND SALVAGE OF STRUCTURES

.1 Unless authorization from the Engineer is received for their removal, underground and surface structures encountered during construction shall be protected from damage. In the event of damage resulting from the construction operation, they shall be repaired or replaced at the contractor's sole expense to a condition which is at least the equivalent of that which existed prior to construction. On instructions from the Engineer certain works shall be salvaged and delivered to the City of Nanaimo Works Yard on Labieux Road.

3.24 EMERGENCY SITUATIONS

.1 In emergency situations resulting from the construction operation, where life or property are endangered, the Contractor shall immediately take whatever action is required to eliminate the danger and shall also notify the appropriate authorities of the situation.

.2 In the specific case of a water or sewer break, the contractor shall immediately notify the Public Works Department at 250-758-5222.

.3 During periods when the Contractor's personnel are not on the job (after hours and weekends) at least one of the three Contractor's representatives in Nanaimo shall be available by phone contact. The names, addresses and phone numbers of the three Contractor's representatives shall be filed with the Engineer prior to commencement of construction and this list shall be updated by the Contractor as is necessary.

.4 If the Contractor cannot be contacted to remedy the situation the Owner will take whatever action deemed necessary to eliminate the danger and all costs incurred shall be borne by the Contractor.

3.25 ACCESS MAINTAINED

.1 Existing hydrants, valve or manhole covers, valve boxes, curb stop boxes, fire or police call boxes, and all other utility controls, warning systems, and appurtenances thereof shall not be obstructed or made inaccessible at any time by the construction work. Bridges, walks, or other temporary facilities shall be provided as may be necessary to ensure that these controls or warning systems are free for use in their normal manner at all times during construction.

3.26 CURTAILMENT OF UTILITY SERVICE

.1 Where existing utilities such as water, sanitary sewer, storm sewer, electricity, telephone, and gas are serving the public, work shall be planned and executed such that there is no curtailment of service provided by these utilities without prior receipt of approval of the
authorities responsible for provision and maintenance of these utilities. The Contractor shall obtain the above approvals from the recognized authorities controlling these utilities. If approval for such disruption of utility service is not granted, the Contractor may be able to establish temporary facilities to provide continuous utility service during the course of construction. Such temporary facilities shall only be implemented after receiving the approval of the utility authority and all costs relating to the establishment of temporary services shall be borne by the Contractor.

.2 If the Contractor, after receiving approval of the responsible authorities, is to temporarily close off an existing utility, he shall, unless otherwise authorized by the Engineer, notify individual users of the utility at least twenty-four (24) hours prior to the time of shut-off.

3.27 SUPPORT OF STRUCTURES

.1 Existing structures other than pipes shall be protected against damage from settlement by means of support or compaction of backfill as required. Support shall remain in place following backfill of excavations.

.2 Backfill which is placed under or adjacent to existing structures which have been undermined during excavation shall be compacted in a manner which will prevent damage of the structure from settlement. Such backfill shall be of approved granular material suitable for compaction.

.3 For support of existing piping, other than asbestos cement or cast iron piping, refer to Standard Drawing T-11 in Section 4 – Trench Excavation, Bedding and Backfill.

.4 Where excavations for works cross underneath existing asbestos cement or cast iron piping the existing pipe shall be replaced by the Contractor with PVC pipe approved by the Engineer or supported with a concrete grade beam refer to Standard Drawing No. T-11, Section 4 – Trench Excavation, Bedding and Backfill as determined by the Engineer.

3.28 DRAINAGE FACILITIES

.1 Existing culverts, enclosed drains, flumes and ditches, and other drainage structures affected by the work but left in place, shall be kept clear of excavated material at all times during construction. When it is necessary to temporarily remove an existing drainage structure, the Contractor shall provide suitable temporary ditches or other approved means of handling the drainage during construction.

.2 Culverts and drain pipes shall be replaced on line and grade at the time of trench backfilling, in accordance with City of Nanaimo Standards and Specifications.

.3 No chlorinated water shall be discharged into storm drainage facilities without prior approval from the City Engineer.

.4 Prior to, and during construction, the Contractor shall take full responsibility for controlling erosion and sediment transfer by utilizing the guidelines contained in the handbook entitled, “Land Development Guidelines for the Protection of Aquatic Habitat”, by the Department of Fisheries and Oceans and the Ministry of Environment, to prevent discharge of sediment into City storm sewer systems and environmentally sensitive areas. It is incumbent for the contractor to acquire and be familiar with these guidelines.
3.29 WORK WITHIN RAIL RIGHTS-OF-WAY

.1 Where construction occurs within Railway rights-of-way the Owner will obtain the necessary permit for installation. The Contractor shall provide written notice to the local Superintendent of the Railway company at least 48 hours prior to commencement of work, with copies to the Engineer.

.2 The Contractor shall coordinate timing of installation, rail removal and replacement with the Railway District Superintendent.

3.30 HIGHWAY CROSSING

.1 Where construction occurs on Provincial Highway rights-of-way the Owner will obtain the permit for Permission to Construct Works within Crown Lands. The Contractor shall be responsible for obtaining any other necessary construction permits and shall determine the complete requirements of the Ministry of Transportation (MOT). Installation within the right-of-way shall be strictly in conformance with MOT requirements and regulations. If there is any conflict between MOT requirements and these specifications, the MOT requirements shall govern within the highway rights-of-way. The Contractor shall provide written notice to the MOT at least 7 days prior to commencement of work with copies to the Engineer.
3.31 **ELECTRICAL POWER, TELEPHONE, TELEVISION, CITY AND PRIVATE OWNED FIBRE OPTICS, CABLES AND CONDUITS**

.1 Electrical power, telephone, television, city and private owned fibre optics, cables and conduits may exist throughout the work area. B. C. Utility Companies shall be notified by the Contractor prior to excavation in the vicinity of any buried cables or ducts.

3.32 **GAS PIPELINES**

.1 High pressure gas pipelines may exist throughout the area. The Contractor shall familiarize himself with the requirements and regulations of the Standard Practice Instruction of the Gas Utility Company, the Gas Act, and the Pipe-Line Act of the Province of British Columbia with regard to work carried out in the vicinity of these pipelines, and shall comply with such requirements and regulations.

.2 The local gas company shall be notified prior to excavation in the vicinity of buried gas mains.

3.33 **POWER LINE CROSSING**

.1 Where construction crosses British Columbia Hydro and Power Authority (BCH&PA) rights-of-way, the Owner will obtain necessary permission beforehand. Construction within the right-of-way shall be strictly in conformance with BCH&PA requirements and regulations.

3.34 **WORK IN VICINITY OF OVERHEAD POWER LINES**

.1 Equipment shall not be operated where it is possible to bring such equipment or any part of the equipment within 3 metres of any energized electrical conductor unless the following safety precautions are taken by the Contractor:

(a) The utility company is notified, the line de-energized, or effectively guarded against contact, or displaced or re-routed from the work area.

(b) The Workers’ Compensation Board prior to commencement of construction is notified in accordance with their required procedure.

(c) For high-voltage transmission lines, a greater clearance is provided, as determined by the utility company.

3.35 **RELOCATION OF EXISTING PIPING**

.1 Where existing underground piping parallels the centreline of the trench, or crosses the trench centreline and intersects the pipe to be installed and must, in either case, be relocated, the Contractor shall make arrangements for the relocation of existing piping or shall, having received the approval of the authority responsible for maintenance of the existing pipe, remove and relocate existing piping with his own forces. Where existing pipes cross the centreline of the trench but do not intersect the pipe to be installed, the Contractor will not disturb the existing pipes.
3.36 WATERCOURSE CROSSING

.1 Where a watercourse crossing is required as part of the construction, the crossing construction shall be in accordance with the Ministry of Environment, Provincial Fish and Wildlife regulations and Federal Fisheries regulations where applicable.

.2 The Owner will obtain the necessary initial permission from the authority having jurisdiction to construct works where a water course crossing is required. The Contractor shall provide written notice to the authority having jurisdiction at least seven (7) days prior to commencement of work, with copies to the Engineer.

3.37 DETOURS

.1 All road closures and detours require approval from the City of Nanaimo. Applications for detours shall be made by the Contractor to the City of Nanaimo in writing at least seven (7) days in advance of the detour going into effect. Where detours are permitted the City of Nanaimo will notify the fire, police and ambulance departments as well as the bus service prior to the detour going into effect.

.2 The Contractor shall notify the City of Nanaimo immediately following the resumption of normal traffic flow.
3.50 SCOPE

.1 This specification refers to clearing and grubbing of the site for construction in the areas delineated on the drawings or described in the specifications.

3.51 SUPPLY OF MATERIALS

.1 The Contractor shall supply all materials required for clearing and grubbing.

3.52 CLEARING AND GRUBBING

.1 The area shall be cleared and grubbed within the limits designated by the Engineer on the site.

.2 All trees and brush except those selected for preservation shall be cut, and along with all stumps, logs, roots, rotten wood, and other organic materials shall be removed from the site.

.3 The above material shall be removed from the ground surface and to a minimum depth of 0.30 metres below.

.4 All other rubbish and debris existing on the site shall be removed and disposed of. No burning will be allowed.

.5 Where selective clearing is required, trees or groups of trees as designated on the drawings or marked by the Engineer in the field shall be preserved.

.6 Trees shall be felled within the designated clearing area and those falling outside this area shall be cut up and returned to the clearing area for disposal.

.7 Individual leaning or dangerous trees or snags adjacent to, but outside the designated clearing area, shall be cut and disposed of. Written permission shall be obtained from the Owner by the City of Nanaimo for this work.

.8 Excavations resulting from removal of tree trunks, roots, or other material shall be filled and leveled by the Contractor as a part of the clearing and grubbing operation.

3.53 BURNING

.1 No burning of wood waste, rubbish or debris is in the City of Nanaimo.

3.54 MERCHANTABLE TIMBER

.1 Merchantable timber cut during the clearing operation shall be trimmed of all branches and stockpiled on the site at a location designated by the Engineer. Such timber will remain the property of the Owner unless otherwise noted in the contract documents.

.2 Removal of timber from dedicated road rights-of-way will be subject to permission from the Provincial Forestry Branch.
3.60 **SCOPE**

.1 This specification refers to the control of public traffic in construction areas.

3.61 **CONTROL OF PUBLIC TRAFFIC - GENERAL**

.1 The following general principles shall be maintained when performing construction or maintenance work upon Municipal streets and thereby affecting traffic through movement, access to properties and/or parking.

.2 All control of public traffic will be carried out in accordance with the Province of British Columbia Ministry of Transportation and Highways Traffic Control Manual for Work on Roadways and WorkSafe BC regulations.

.3 Work on streets shall be completed as quickly as possible so as to only disrupt normal street operation for the shortest possible time.

.4 Proposed projects shall be planned in such a way as to keep work areas and interference with traffic to a minimum.

.5 Initial inspection of the site shall include observations of traffic intensity, property use and extent of no parking.

.6 All job equipment not in use shall be sorted in such a manner as not to create view obstructions or unnecessary obstructions to vehicular or pedestrian traffic.

.7 In certain instances, it may be required to perform construction jobs between traffic peaks, which will be noted as a condition on the permit to construct works on the Public Road Allowance, i.e. 9:00 a.m. to 4:00 p.m.

.8 Emergency works shall have priority over traffic inconvenience insofar as is necessary to correct the problem. Nevertheless, every effort must be made to provide protection for the public and workers.

.9 Partial or complete closure of major and collector roads requiring traffic detouring in at least one direction must be approved by the City of Nanaimo at least seven days prior to the start of construction.

.10 No loose material like dirt, mud and debris should be allowed to accumulate or remain upon any sidewalk, street or driveway.

.11 At any time, a Police Officer can override these provisions.
3.62 USE OF FLAGPERSONS

.1 Although the need for flag persons will be determined by the Engineer, it is generally expected that they will be required in the following situations:

(a) When public traffic is required to pass working vehicles or equipment which may block all or part of the travelled roadway.
(b) When it is necessary to institute a one-way traffic system through a construction area or other blockage where traffic volumes are heavy, approach speeds are high, and a traffic signal system is not in use.
(c) Where workers and/or equipment are employed on the travelled way over the brow of a hill, around a sharp curve or at any other location where oncoming traffic would not otherwise have adequate warning of their presence.
(d) In high speed, high volume areas where temporary protection is required while other traffic control devices (barricades, cones, signs, etc.) are being erected or taken down.
(e) For emergency protection when other traffic control devices are not readily available.
(f) In all situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
(g) At the entrance to road closures and along detour routes where required.

.2 Courtesy is of prime importance as many motorists tend to become irritable when held up by road work for any length of time. Each flagperson shall be fully conversant with all aspects of the situation requiring the delay and shall be ready to explain the hold-up, and its approximate duration, if required.

.3 All flag persons must be trained and certified in a Traffic Control course acceptable to WorkSafe BC.

.4 Flag persons and their equipment shall conform to WorkSafe BC regulations.

3.63 USE OF TRAFFIC CONTROL DEVICES

.1 Traffic control devices shall be placed immediately before the work commences, except "parking restriction" signs which will be installed a minimum of 12 hours in advance.

.2 Traffic control devices shall remain in place only as long as they are needed, and shall be removed immediately thereafter.

.3 Any traffic control device not required at any time during the work shall be removed from view.

.4 Traffic control devices used outside work hours (overnight, holidays and weekends) shall be maintained to produce a safe effect and be minimal obstructions to traffic, parking or access. Flashing beacons will be used to completely and properly identify all sites at night.

.5 Traffic control devices shall at all times be in good repair.

.6 Misapplication and excessive use of traffic control devices shall be avoided. This may cause confusion and result in disrespect for the instruction.
.7 Detoured traffic shall be afforded maximum practical protection, convenience and guidance by the proper use of traffic control devices.

.8 Signs shall be mounted on weighted bases or folding frames, ensuring that they are held rigidly and maintained in a proper position.
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3.70 **EXISTING STRUCTURES AND UTILITY WORKS**

Extra payment will not be made to the Contractor for expense incurred as a result of the presence of existing structures except as follows:

(a) **Location of Existing Structures:** Section 3.22.3

Where he is specifically instructed by the Engineer to locate, by excavating, underground structures for the purpose of establishing line or grade, the Contractor will be paid on the basis of the payment items shown on the Tender Form.

(b) **Relocation of Existing Piping:** Section 3.35

Where an existing pipe parallels the centreline of the trench and lies within the allowable trench width as shown on standard drawing T-1 or T-2, or crosses the trench and intersects the pipe to be installed and must, in either case, be relocated, the Contractor will, unless otherwise specified elsewhere herein, be paid on the basis of the payment items shown in the Tender Form. No payment will be made for delays, standby, or any claims of the Contractor other than for the actual cost of relocating the existing pipe, and no payment will be made for tunnelling under or protecting the existing pipe.

(c) **Support of Existing Asbestos Cement or Cast Iron Piping** Section 3.27

Standard Drawing T-11

Payment for work to support or replace existing asbestos cement or cast iron piping under which excavation for works crosses shall be made at the price quoted in the Tender Form. This price shall include supply of materials, excavation, backfilling and all work incidental thereto.

3.71 **CLEARING AND GRUBBING** Section 3.52

Payment for clearing and grubbing will be made at the lump sum price shown in the Tender Form. This price shall include materials, and all work incidental thereto.

3.72 **SALVAGED MATERIALS** Section 3.23

This item covers the cost of salvage and delivery of salvaged items to the City of Nanaimo Works Yard on Labieux Road. This work shall be paid for on a per unit basis as shown in the Tender Form. No payment will be made for items damaged due to the act of removal or delivery.
3.73 **CONTROL OF PUBLIC TRAFFIC** Section 3.60, 3.61 and 3.62

Payment will be made as a lump sum as shown in the Tender Form.

3.74 **REMOVAL OF EXISTING CULVERTS**

Payment for culvert removal will be made at the unit price per linear metre shown in the Tender Form for the various sizes of culverts. Measurement will be made horizontally along the centre line of the existing culverts.

This item covers the removal and disposal of all existing culverts and headwalls designated on the drawings for removal including backfill of the trench with suitable native material. Where imported granular fill is required, it shall be paid for at the unit price quoted in the tender form.

3.75 **REMOVAL OF EXISTING STRUCTURES** Section 3.23

Payment for the removal and disposal of structures, as designated on the drawings, will be made at the unit price shown in the Tender Form.

a) **Valve Boxes** – This price shall include the removal and disposal of the valve box, filling the valve stand pipe with pea gravel or non-shrink grout, abandoning valves in place unless otherwise shown on the drawings, and all work incidental thereto.

b) **Air Valve** – This price shall include the removal and disposal of the air valve, air valve chamber, casting and lid, all associated piping and fittings, backfill and compaction with suitable native material, and all work incidental thereto.

For these pay items, import granular backfill where required, and surface restoration will be paid separately under the applicable unit rate in the Tender Form.
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## SECTION 4 - TRENCH EXCAVATION, BEDDING AND BACKFILL

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*(REVISED NOVEMBER 2009)*
4.01 SCOPE

.1 This specification refers to trench excavation, bedding, backfill and all work pertaining thereto.

.2 Trenches shall be excavated only as far in advance of the pipe laying operation as safety, traffic, and weather conditions permit. Caution shall be exercised with respect to structures, piping, or other man-made obstacles that may exist within the working area and due consideration given to the protection and support of such properties and structures.

4.02 TESTING

.1 The Engineer will arrange for a testing firm to carry out tests to determine whether the applicable standards and specifications have been met. Where initial testing indicates non-compliance with the specifications, additional testing shall be required at the Contractors expense.

.2 The Contractor as directed by the Engineer shall supply specimens or samples for testing.

.3 The types of tests listed below are the minimum testing requirements. The Engineer shall determine if additional testing is required.

(a) Regular sieve analysis of aggregate gradation on materials to be incorporated in the works.
(b) Determination of optimum moisture content and Modified Proctor Density (ASTM D1557) on all materials to be used for import bedding and backfill.
(c) Field density tests taken on the compacted backfill.
(d) Other tests as may be required.

4.03 TRENCH EXCAVATION

.1 Trench excavation shall be classified as common or rock excavation.

.2 Common excavation is defined as the excavation and removal of all material encountered which is not classified as rock excavation.

.3 Rock excavation is:

(a) The removal of detached masses of rock including single boulders, and pieces of concrete or masonry having individual volumes in excess of 1 cubic metre, or solid-rock which requires drilling and blasting or breaking with a power-operated tool for its removal.
(b) Removal of soft or disintegrated rock which can be removed with a hand pick or power-operated excavator or shovel, or previously blasted or broken stone in rock fills or elsewhere with individual volumes less than one cubic metre, or boulders or pieces of fractured rock which do not occur naturally within the excavated volume but fall into the excavation from the adjacent area, shall not be classified as rock excavation. Hardpan (glacial till) shall not be classified as rock excavation.
(c) Overbreak, is that portion of solid rock which is excavated, displaced or loosened outside the limits used to calculate the volume of rock excavation and will be classified as unauthorized overexcavation.

(d) Authorized overexcavation is that excavation required by the Engineer as a result of unsuitable foundation conditions not resulting from the contractor's operation.

(e) Unauthorized overexcavation is that excavation required as a result of the contractor's operation as determined by the Engineer.

4.04 PRECUTTING PAVED SURFACES

.1 When trenching along or across a paved surface, pavement shall first be sawn or cut by methods approved by the Engineer in straight lines parallel to the trench centreline. The total cut width of pavement shall not be greater than the specified maximum trench width at the ground surface shown on the drawings. Concrete curbs and sidewalks shall be sawn at existing joints.

.2 Where, in the opinion of the Engineer, existing pavement is in poor condition, pavement may be cut by hand, mechanical means, or trenching equipment.

.3 Pavement that has been cut and removed to permit trenching shall be disposed of as waste material and shall not be placed in the trench backfill. Pavement that has been removed by grinding may be re-used as backfill if approved by the Engineer.

4.05 SITE PREPARATION

.1 Remove all brush, weeds, grasses and accumulated debris from the trench width and working area.

.2 Where directed by the Engineer for trenchwork in existing lawns, carefully cut and remove sod prior to excavation. Store sod for replacement after backfilling is completed.

.3 For trenchwork in landscaped statutory rights-of-way, carefully remove fences, shrubs, small trees and other items for replacement after backfilling is completed. If, in the opinion of the Engineer, removed trees are too large to be replaced, the contractor shall not be responsible for their replacement unless otherwise noted on the construction drawings.

.4 For trenchwork in landscaped boulevards, the contractor shall provide 14 days notice to all property owners for the removal of all fences, shrubs, small trees or other structures or plantings within the road rights-of-way that the property owner wishes to retain. Plantings and structures listed above and not removed by the property owner upon expiration of the 14 day notice shall be removed and disposed of by the Contractor.

.5 Remove all top soil within the trench width and where required in the working area, and stockpile for replacement at locations approved by the Engineer. Stumps, boulders and other deleterious material shall be removed from the top soil and disposed of as specified in Section 4.11 – Disposal of Excavated Material. Do not handle top soil while it is wet or frozen.
.6 Cut pavement, sidewalks and curbs in accordance with Section 4.04 – Precutting Paved Surfaces.

.7 Provide temporary drainage control to protect construction area and adjacent properties. Provide siltation controls to protect natural watercourse or existing storm drainage systems.

4.06 TRENCH ALIGNMENT AND DEPTH

.1 The trench shall be excavated so that pipe can be laid to the established alignment and depth with allowance made for specified trench wall clearances and bedding as required.

.2 Prior to or at the commencement of construction, the contractor shall check existing mains for line and elevation at the point of connection. If they are different than what is shown on the construction drawings, the contractor shall immediately report the difference to the Engineer and cease construction pending direction from the Engineer.

4.07 TRENCH EXCAVATION

.1 Trenches shall be excavated to the section and dimensions as shown on the drawings. Trench stability and safety procedures shall conform to WorkSafe BC Regulations.

.2 Ledge rock, boulders, and large stones shall be removed to provide a clearance of at least 150 mm around all sides of pipe, fittings and appurtenances.

.3 In road rights-of-way, the trench width shall be kept to a minimum and the trench width be such that at least one-way traffic can be maintained at all times unless otherwise approved by the City Engineer.

.4 To prevent damage to existing utilities, excavate the last 300 mm above the utility by hand.

.5 If, in the opinion of the Engineer, trench width exceeds the maximum allowable for pipe support, the contractor may be required to provide a higher class of bedding, a pipe with a higher strength class or concrete encasement at no extra cost to the owner.

.6 Excavation for manholes shall be to dimensions which will permit assembly of the sections in accordance with these specifications, except that concrete for manhole bases may be cast against the walls of the excavation, if the soil conditions are suitable.

.7 Excavate trenches only as far in advance of pipe laying operation as safety, traffic and weather conditions permit. In no case shall open trenches exceed 30 metres.

.8 All excavations left unattended shall be adequately protected with approved fencing and barricades and with flashing lights where required.
4.08 ROCK EXCAVATION

.1 Where rock is encountered in the trench or pit, the method of removal shall be agreed with the Engineer before its removal.

.2 Should blasting be required during excavation, the Contractor shall exercise extreme care and shall limit the use of explosives to such charges that shall not cause damage to existing pipelines, other utilities or private property. Blasting shall be done by experienced persons, qualified for the work. The compliance with regulations regarding the use and storage of explosives shall be the responsibility of the Contractor and he shall be responsible for any accidents or injury, loss and/or damage which might occur as a result of his blasting.

.3 Overbreak shall be removed as directed by the Engineer and replaced with imported granular fill, placed and compacted as specified herein at no additional cost to the owner.

4.09 HAND EXCAVATION

.1 Mechanical trenching and backfilling equipment shall be used except where by so doing, damage to trees, buildings, sidewalks, curbs, piping, or other existing structures or man-made obstacles above or below ground cannot be avoided. Trenches shall be hand excavated and backfilled where such obstacles prevent the use of mechanical equipment.

.2 Authorized hand excavation shall be restricted to trench excavation in statutory rights-of-way and only in those locations which, in the opinion of the Engineer, necessitate hand excavation methods.

.3 The following and similar circumstances shall not be considered as authorized hand excavation:

(a) Crossing of existing structures and utility works;
(b) Where lighter or smaller mechanical equipment could be used;
(c) Where, by the use of close sheeting, timber support, equipment pads, or other facilities, mechanical equipment could be used; or
(d) Where the presence of timbering, sheeting, well pointing equipment, or other Contractor placed obstacles restrict the use of mechanical equipment.

4.10 PILING OF EXCAVATED TRENCH MATERIAL

.1 Common excavation approved by the Engineer as approved native backfill, may be piled along the trench in accordance with WorkSafe BC regulations and provided the working space is adequate for this purpose and provided that by so doing the backfill material does not spill onto private properties adjacent to the line of the trench thereby disturbing fences, buildings, shrubs, lawns, or other items of value.

.2 Piling of excavated material along the trench shall not unduly restrict cross traffic at road intersections. Material shall be cleared from road intersections and provision made for use of the cross road by traffic as soon as possible after excavation has taken place. Pedestrian traffic to individual properties shall be maintained at all times and timber bridges shall be provided where it is necessary to cross open trenches. Roadways,
driveways, and drainage facilities shall not be blocked unnecessarily. The spoil pile shall be located such that hindrance to local traffic is minimal.

.3 In order that excavated material may be piled along the trench, roads may be temporarily closed to traffic with the permission of the City of Nanaimo and providing that adequate detour traffic routes can be established to move traffic around the construction area, and providing also that street entrances to driveways are not blocked from vehicular traffic for periods in excess of one day. One lane shall be kept open at all times for emergency vehicles unless otherwise approved by the City Engineer.

.4 Where excavated material cannot be piled along the trench in compliance with the above restrictions, it shall be trucked to locations where backfilling is taking place or trucked to stockpile for return to the trench at the time of backfilling. Alternatively, subject to approval of the Engineer, excavated material may be wasted and replaced with approved material at the time of backfilling.

.5 The contractor shall retain sufficient approved native backfill material for the backfilling of the trench. Surplus approved native backfill material shall be taken to and used at other locations within the project site suitable for material placement.

.6 The contractor shall take all measures required to protect approved native backfill from contamination, segregation and weather.

4.11 DISPOSAL OF EXCAVATED MATERIAL

.1 Surplus or waste excavated material shall be removed from the trench area during the excavation or backfilling operations and shall not be left along the trench following the completion of backfilling the trench.

.2 Surplus excavated material which is not required for the works, as shown on the drawings or specified elsewhere herein, shall be disposed of at sites obtained by the Contractor. Waste material shall not be dumped on private property without the written permission of the owner of the property and a fill permit obtained from the City of Nanaimo.

.3 The Contractor shall exercise particular care to avoid spillage on paved roadways over which excavated material is hauled, and any such spillage shall be cleaned up promptly by sweeping.

.4 Failure to immediately begin cleanup of spillage from roadways when required by the City of Nanaimo will result in the Contractor being charged all costs accrued by the City of Nanaimo to do the cleanup work.

.5 Care shall also be exercised to avoid spreading the excavated material over a wide area and rutting or otherwise damaging unnecessarily adjacent property when side casting of excavated material is permitted.
4.12 BRACING AND SHEETING

.1 Trenches shall be excavated, sheeted and braced in accordance with WorkSafe BC regulations or as may be necessary to protect life, property, and structures adjacent to the work, the work itself, or to maintain trench widths within the specified limits. Trench sheeting and bracing shall be located no closer than 150 mm to the widest section of any installed pipe.

.2 Whenever possible, vertical trench timber or sheeting shall be placed so that it does not extend below the springline of the pipe being installed. When it is necessary to place sheeting or timber below the pipe springline, as in the case of overexcavation for trench bottom stabilization, sheeting shall be raised in 600 mm lifts and all backfill placed below the level of the pipe springline shall be thoroughly compacted on each lift to fill the void left by the raised sheeting.

.3 Trench sheeting and bracing shall be removed, except in situations where the removal of trench sheeting and bracing will result in damage to adjacent structures. When sheeting and bracing is left in place, it shall be cut off above springline.

.4 Where sheeting or timber is removed from a trench in which backfill is to be compacted, it shall be removed in a manner which permits compaction of the backfill in the manner specified.

.5 Workers' Compensation Board approved cages may also be used in place of sheeting.

4.13 DEWATERING

.1 During construction, ground and surface water shall be controlled to the extent that excavation and pipe installation can proceed in the specified manner and such that the trench bottom is not disturbed to the detriment of the pipe installation. Trench water shall not be permitted to enter the pipe being installed unless approval is received from the Engineer.

.2 Pumps, well points, or other equipment shall be employed to keep excavations free of water. Caution shall be exercised to make sure that foundation problems with existing structures and works under construction do not result from the selected method of dewatering excavations.

.3 Discharge from pumps, well points, or other dewatering equipment shall be located and controlled such that loss, damage, nuisance, or injury does not result.

.4 The contractor shall be responsible for any claims or actions resulting from the dewatering operation.
SECTION 4 - TRENCH EXCAVATION, BEDDING AND BACKFILL
SPECIFICATIONS AND INSTALLATION

4.14 TRENCH BOTTOM CONDITIONS

.1 Trenches shall be maintained such that pipe can be installed without allowing water, muck, silt, gravel, or other foreign material into the pipe. Material remaining in the trench bottom on completion of machine excavating which has been disturbed or softened by workmen or trench water shall be removed before bedding material is placed. The trench bottom shall be firm and capable of supporting the pipe to be installed.

.2 When, in the opinion of the Engineer, the material in the trench bottom is found to be unstable or otherwise unsuitable for pipe support or the support of appurtenant structures, the Engineer shall direct the contractor to utilize the most suitable of the following stabilization methods:

(a) Overexcavate to suitable subgrade and backfill with base gravel and compact to 95% Modified Proctor Density (ASTM D1557). Use of import granular fill, subbase gravel, drainrock or bedding material shall be at the discretion of the Engineer.

(b) Use of concrete bedding as directed by the Engineer.

(c) Other methods as proposed by the Engineer and approved by the City Engineer.

4.15 AUGURING

.1 Auguring shall be performed with hand- or power-operating equipment, subject to the approval of the Engineer.

.2 Auger holes shall terminate in open trench.

.3 Auguring shall be performed such that undermining or displacement of the roadway structure does not result and the completed auger hole is not more than 50 mm larger in diameter than the maximum outside diameter of the casing pipe or pipe to be installed.

.4 The augured hole shall be to the correct line and grade. If an obstruction is encountered that will cause deviation from the correct line and grade, a new hole shall be augured.

4.16 CASING PIPES

.1 Casing pipes shall be as shown in the construction drawings and shall be laid to the grade and alignment shown.

.2 The same bedding and backfill criteria shall be used for casing pipe as required for main piping.

.3 All pipe joints within the pipe casing shall be fully restrained with approved mechanical restrainers.
SECTION 4 - TRENCH EXCAVATION, BEDDING AND BACKFILL
SPECIFICATIONS AND INSTALLATION

4.17 BEDDING WITHIN PIPE ZONE

.1 Bedding materials shall be granular in nature, free of organic material, silt or clay, and shall conform to the following gradation limits when tested in accordance with ASTM C136:

<table>
<thead>
<tr>
<th>Gradation Limits (Percent by Weight Passing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sieve Designation</td>
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<tr>
<td>-------------------</td>
</tr>
<tr>
<td>19.0 mm</td>
</tr>
<tr>
<td>12.5 mm</td>
</tr>
<tr>
<td>9.5 mm</td>
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<td>4.750 mm</td>
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<tr>
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<tr>
<td>0.180 mm</td>
</tr>
<tr>
<td>0.15 mm</td>
</tr>
<tr>
<td>0.075 mm</td>
</tr>
</tbody>
</table>

.2 Type 1 is the standard acceptable bedding material. Type 2 shall be used where specified by the Engineer.

.3 Other acceptable bedding materials, for use only where shown on the construction drawings or as approved by the Engineer, are drainrock or native material.

.4 The bedding material shall cover the full width of the trench bottom and have a minimum depth of 100 mm on completion of compaction. In rock excavation the minimum depth of bedding below the pipe shall be 150 mm after completion of compaction.

.5 Bedding material shall be compacted in maximum 150 mm lifts to 95% of Modified Proctor Density (ASTM D1557).

.6 Bedding material shall be placed in such a manner that the pipe is evenly supported throughout its length by the pipe bedding material.

.7 Placement and compaction of the bedding material shall not damage or displace the pipe.

.8 Bedding material shall be leveled across the full width of the trench to an elevation of 300 mm above the crown of the pipe.
4.18 TRENCH DAMS

.1 Trench dams shall be constructed on all utility main lines where grades exceed ten percent (10%) or where indicated on the construction drawings.

.2 All trench dams on utility mains shall be constructed in accordance with Standard Drawing No. T-8. Trench dams on storm sewer gravity mains as per Standard Drawing No. T-8A requires approval by the City Engineer. *(REVISED NOVEMBER 2009)*

.3 All trench dam drain pipes shall be capped at the highest end of the run. *(REVISED NOVEMBER 2009)*

.4 Trench dam spacing shall be as follows:

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>MAX. SPACING</th>
<th>SLOPE</th>
<th>MAX. SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% - 15%</td>
<td>30 m</td>
<td>10% - Over</td>
<td>10 m</td>
</tr>
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<td>15% - 20%</td>
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</tr>
<tr>
<td>20% - 35%</td>
<td>20 m</td>
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</tr>
<tr>
<td>35% - 50%</td>
<td>15 m</td>
<td></td>
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</tr>
<tr>
<td>50% - Over</td>
<td>10 m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

.5 If approved by the Engineer concrete trench dams may be constructed of wetted sandbag sacks filled with wet pre-mixed concrete for areas inaccessible by construction equipment. Sacked concrete shall be laid in courses such that joints in succeeding courses are staggered. Courses shall be a minimum of nine (9) per vertical metre and shall be placed around the pipe and keyed into the trench walls to form a water tight dam.

.6 If approved by the Engineer clay trench dams shall be installed in 150 mm lifts, compacted to 95% Modified Proctor Density and at the locations shown on the drawings or as directed by the Engineer.

.7 Relief drains shall be installed on all trench dams to an acceptable watercourse or storm sewer system.
4.19 BACKFILL AND COMPACTION

.1 Backfill material shall be:

(a) Approved native material (Section 4.23 – Approved Native Backfill)
(b) Imported granular fill (Section 4.20 – Imported Granular Fill)
(c) Controlled density fill (Section 4.24 – Controlled Density Fill)

.2 General:

(a) Placement and compaction of backfill material shall not damage or displace the pipe.
(b) Remove shoring or cages in such a manner as to allow proper compaction and to prevent trench walls from collapsing.
(c) Place backfill in lifts suitable to the soil type and compaction equipment being used as determined by the Engineer.
(d) Import granular fill shall be used for backfill where specified on the construction drawings or contract documents, where native soils are unsuitable or where there is insufficient approved native backfill available.
(e) Deficiencies in the quantities of approved native backfill material which are the result of the contractor's operation, shall be replaced with imported granular fill at no additional cost to the Owner.
(f) Trenches shall be backfilled to a depth to allow for surface restoration in accordance with Section 4.27 – Surface Restoration.

.3 Traveled Surfaces:

(a) Traveled surfaces are roadways, lanes, driveways, road shoulders, sidewalks, walkways or other surfaces on which vehicular or pedestrian traffic normally travels.
(b) Under no circumstances shall a trench in a traveled area be left in a hazardous condition.
(c) Trenches in traveled surfaces shall be backfilled with approved native backfill except where directed by the Engineer, trenches located in existing arterial, collector or commercial/industrial roads shall be backfilled with controlled density backfill in accordance with Section 4.24.
(d) Approved native backfill shall be compacted to 95% Modified Proctor Density (ASTM D1557).

.4 Untraveled Surfaces:

(a) Untraveled surfaces are all other surfaces not classified as traveled surfaces.
(b) Untraveled surfaces shall be backfilled with approved native backfill and compacted to 90% Modified Proctor Density (ASTM D1577).
4.20 IMPORTED GRANULAR FILL

.1 If the material excavated from the trench is unsuitable for backfill, the Contractor shall import granular fill.

.2 Imported granular fill shall consist of well graded granular material, with not more than 8% passing the 0.075 mm sieve, which contains no stones larger than 150 mm in diameter and contains no stumps, roots, organic or other deleterious material.

.3 All imported granular fill shall require approval by the Engineer prior to placement.

(a) A wet sieve analysis (ASTM C117) may be required by the Engineer to confirm the fines content of the imported granular fill material.

.4 The use of quarried or blast rock as import granular fill requires specific approval by the City Engineer unless listed in the City of Nanaimo Approved Product List. Quarried or blast rock shall be hard and durable, well graded, with not more than 8% passing the 0.075 mm sieve, which contains no stones larger than 150 mm in diameter and no stumps, roots, organic or other deleterious material.

4.21 CONCRETE

.1 Concrete for pipe base, encasement or backfill shall have a minimum compressive strength of 20 MPa at twenty-eight (28) days and be in accordance with Section 11 - Plain and Reinforced Concrete Works.

.2 Backfill material shall not be placed over the concrete until the concrete has obtained its initial set but in no case shall be less than one hour.

4.22 ROAD GRAVEL

.1 Sub-Base Gravel:

The sub-base gravel shall be in accordance with Section 9.29 - Sub-base.

.2 Base Gravel:

The base gravel shall be in accordance with Section 9.30 - Base Course.

4.23 APPROVED NATIVE BACKFILL

.1 Approved native backfill shall be soils native to the excavation and suitable for backfilling to the required compaction densities as determined by the Engineer.

.2 The maximum size rock in approved native backfill shall be 200 mm in any dimension.

.3 Approved native backfill material placed within 600 mm of the finished surface shall have a maximum rock size of 75 mm measured in any dimension.
.4 Unsuitable native materials, i.e. rock, clay or silt may be mixed with granular material for use as approved native backfill if approved by the Engineer. In no case shall the silt and clay content exceed 30% by volume.

4.24 CONTROLLED DENSITY FILL

.1 All materials and methods shall conform to CAN/CSA A23.1 and A23.2.

.2 Materials:

(a) Portland cement: Type 10 to CAN/CSA A5, for winter conditions Type 30 may be used.
(b) Fly Ash: Type F to CAN/CSA A23.5.
(c) Water: To CAN/CSA A23.1.
(d) Aggregate: To CAN/CSA A23.1.
(e) Air entraining admixture: To CAN/CSA A266.2.
(f) Chemical admixtures: To CAN/CSA 266.2. Use of admixtures to accelerate or retard curing as directed by the Engineer.

.3 Mix Design:

(a) Compressive strength: 0.5 MPa at twenty-eight (28) days.
(b) Cement content: 25 kg per m³.
(c) Slump: 150 - 200 mm
(d) Air entrainment: 4 - 6%

.4 Formwork:

(a) Formwork, if required, shall conform to CSA S269.3.

.5 Placement:

(a) Provide the Engineer with twenty-four (24) hours notice prior to placing controlled density backfill.
(b) Segregation of the material during placement shall not be permitted. Pumping of controlled density fill is permitted if approved by the Engineer.
(c) Internal vibrators or other methods of consolidation may be used to ensure undercut areas of pavement are fully supported.
(d) When using controlled density fill to bed and surround the pipe, material shall be placed so as not to damage or displace the pipe.
(e) Begin placement of controlled density fill at the high end of sloping trenches.
(f) Do not place load on the controlled density backfill until authorized by the Engineer.
(g) Steel road plates or other approved means of supporting traffic shall be used until surface restoration can proceed.
SECTION 4 - TRENCH EXCAVATION, BEDDING AND BACKFILL
SPECIFICATIONS AND INSTALLATION

4.25 VARIATION IN SPECIFICATION REQUIREMENTS FOR TRAVELED SURFACES

.1 Requirements under Section 4.19 - Backfill and Compaction, Section 4.27 - Surface Restoration and Section 4.28 - Pavement Restoration may be modified or deleted as determined and authorized by the Engineer depending on soil conditions, the condition of the existing pavement and road structure, traffic control, future planned construction or other reasons, that affect work outlined under the aforementioned specification sections.

4.26 FISH HABITAT GRAVEL

.1 Gravel shall be composed of inert, non-fractured smooth washed aggregate.

.2 Gradation:

<table>
<thead>
<tr>
<th>US STANDARD SIEVE SIZE</th>
<th>GRADATION LIMITS (PERCENT BY WEIGHT PASSING)</th>
<th>PERCENT BY VOLUME</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mm</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>75 mm</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>50 mm</td>
<td>80</td>
<td>15</td>
</tr>
<tr>
<td>37.5 mm</td>
<td>60</td>
<td>20</td>
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<tr>
<td>19 mm</td>
<td>25-30</td>
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<td>9.5 mm</td>
<td>10-15</td>
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<td>6.3 mm</td>
<td>0 - 15</td>
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<td>4.75 mm</td>
<td>0 - 5</td>
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</table>
4.27 **SURFACE RESTORATION**

.1 **General:**

(a) Surface restoration shall be completed immediately following the backfilling operation.

(b) Restore all disturbed surfaces to a condition equal to or better than the condition that existed prior to construction to the satisfaction of the Engineer unless otherwise specified.

(c) Repair any damage to adjacent lands or improvements.

(d) Damage to paved surfaces shall be seal coated, patched or replaced in an approved manner to the satisfaction of the Engineer.

(d) Damage to graveled surfaces shall be restored by scarifying, regrading and compacting the surface, or if required, regravelling the surface with base gravel or approved equivalent to the satisfaction of the Engineer.

.2 **Traveled Surfaces:**

(a) Restoration of traveled surfaces shall conform to the following minimum requirements, or to the existing road structure, whichever is greater, unless otherwise noted on the construction drawings.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>SUB-BASE</th>
<th>BASE</th>
<th>SURFACE TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel Roads</td>
<td>300 mm</td>
<td>50 mm</td>
<td>-</td>
</tr>
<tr>
<td>Gravel Shoulders</td>
<td>300 mm</td>
<td>50 mm</td>
<td>-</td>
</tr>
<tr>
<td>Asphalt Roads (Existing)</td>
<td>250 mm</td>
<td>100 mm</td>
<td>50 mm Asphalt</td>
</tr>
<tr>
<td>Asphalt Roads (With CDF)</td>
<td>CDF</td>
<td>100 mm</td>
<td>50 mm Asphalt</td>
</tr>
<tr>
<td>Gravel Driveways</td>
<td>-</td>
<td>100 mm</td>
<td>-</td>
</tr>
<tr>
<td>Asphalt Driveways</td>
<td>-</td>
<td>100 mm</td>
<td>50 mm Asphalt</td>
</tr>
<tr>
<td>Concrete Driveways*</td>
<td>-</td>
<td>100 mm</td>
<td>100 mm Concrete</td>
</tr>
<tr>
<td>Asphalt Sidewalks</td>
<td>250 mm</td>
<td>100 mm</td>
<td>50 mm Asphalt</td>
</tr>
<tr>
<td>Concrete Sidewalks</td>
<td>250 mm</td>
<td>100 mm</td>
<td>100 mm Concrete</td>
</tr>
<tr>
<td>Asphalt Walkways</td>
<td>150 mm</td>
<td>50 mm</td>
<td>50 mm Asphalt</td>
</tr>
</tbody>
</table>

* Concrete driveways within the road rights-of-way shall be restored in accordance with the asphalt driveway requirements where the abutting street is not constructed with concrete curb and gutter or where future road widening will be required.

(b) Place and compact sub-base, and base to 95% Modified proctor Density (ASTM D1557).

(c) Restore asphalt road surfaces in accordance with Section 4.28 – Pavement Restoration.

(d) If approved by the Engineer, excavated road gravel may be reused for the sub-base course.

(e) Concrete shall be in accordance with Section 8 - Curbs and Sidewalks.
.3 Ditches:

(a) Reshape ditches to the original lines, grades and sections as existed prior to construction unless otherwise shown on the construction drawings.
(b) Restore ditch with a minimum of 300 mm of import granular fill, or other material specified by the Engineer where stability of ditch slopes and bottom cannot be maintained.
(c) Compact to 95% Modified Proctor Density (ASTM D1557).

.4 Boulevards, Statutory Rights-of-way and Private Property:

(a) Surface restoration in untravelled boulevard areas shall be limited to the replacement of topsoil, grass, gravel, rock chips or bark mulch (subject to drainage conditions) unless otherwise stated in the construction drawings or contract documents.
(b) Surface restoration shall be a minimum depth of 100 mm, or to meet pre-construction conditions, whichever is greater, unless otherwise noted on the construction drawings.
(c) Restore unimproved areas with materials equivalent to the surface conditions prior to construction.
(d) Restore gardens with materials approved by the Engineer including top soil, bark mulch, rock chips or other materials required to match pre-construction conditions.
(e) Restore lawns with sod removed prior to construction, otherwise restore lawn with top soil approved by the Engineer and seed or sod to match existing lawn.
(f) Restore gravel surfaces with equivalent granular materials.
(g) Restore driveways in accordance with Section 4.27.2.
(h) Restore landscaped areas in accordance with Section 4.27.5.
(i) Surface restoration in statutory rights-of-way shall also be in accordance with the rights-of-way condition sheet.
(j) Prior to acceptance of the work, the contractor shall obtain and submit, in duplicate to the Engineer, a written release from each owner of property, where works were constructed or damaged, certifying that the owner is satisfied with the completed works.

.5 Landscaped Areas:

(a) Top soil, shrubs, small trees, fences and other items removed prior to, or during construction shall be replaced to the satisfaction of the property owner.
(b) Replacement shrubs, trees and plants shall be planted at a suitable time of the year in accordance with good horticultural practice to provide a maximum assurance of survival.
(c) During the maintenance period, any trees, shrubs or plants which show signs of dying as a result of the contractor's operation shall be replaced with new plantings of a similar variety, age and size at no extra cost to the owner.

4.28 PAVEMENT RESTORATION

.1 All pavement restorations shall be constructed in accordance with Standard Drawing No. T-4 or Standard Drawing No. T-4A or as directed by the Engineer.

(REvised November 2009)
.2 All excavations in traveled paved areas shall be patched on the same day as the excavation with a temporary or permanent patch, or with approved steel plates, unless otherwise directed by the Engineer.

.3 Temporary Pavement Patching: *(REVISED NOVEMBER 2009)*

(a) All temporary patching and steel road plates shall be installed and maintained to ensure safe and smooth conditions.

(b) Temporary patching shall consist of cold or hot mix asphaltic concrete as approved by the Engineer and placed to a minimum compacted thickness of 50 mm.

(c) Use of steel road plates shall require approval from the Engineer and shall only be used where the specifications or drawings require the trench to be left open. (i.e. to allow curing of concrete or controlled density fill.) Steel plates shall be rated to meet traffic loading requirements.

.4 Permanent Asphaltic Concrete Pavement Patching:

(a) Install permanent pavement patch within 15 days of the excavation unless otherwise approved by the Engineer.

(b) Remove and dispose of all broken, cracked, damaged or temporary pavement as well as paved areas showing settlement.

(c) All pavement outside the allowable trench width, as shown on Standard Drawing No. T-1, that is damaged as a result of the contractor's operation shall be removed; all backfill beneath the damaged pavement recompacted; and the pavement reinstated in accordance with these specifications at no additional cost to the owner.

(d) If required, re-cut existing pavement so that the location and alignment of the patch is in accordance with Section 4.29 – Final Cutting Paved Surfaces, and so that the pavement edge is a minimum of 300 mm from the trench wall.

(e) Excavate patch, as required, to ensure placement of the specified thickness of road base. Road base material and placement shall be in accordance with Section 9 - Streets.

(f) Pavement edges shall be thoroughly cleaned. Tack coat, in accordance with Section 12.27, shall be applied to completely cover all pavement edges.

(g) Minimum compacted pavement thickness shall be equal to the existing pavement thickness or 50 mm, whichever is greater.

(h) Material and placement of pavement shall be in accordance with Section 12 - Asphaltic Concrete Paving.

(i) Finished permanent pavement patch shall be smooth and match adjacent pavement grades and be free of humps, depressions or ridges and within 6 mm of the existing pavement grades when measured with a 3.0 m straight edge, but not uniformly high or low.

(j) The contractor shall maintain all pavement patches in complete repair during the warranty period. Should a dangerous situation arise, the pavement patch shall be repaired immediately upon notification by the Engineer, unless otherwise directed by the Engineer.
4.29 FINAL CUTTING PAVED SURFACES

.1 All final pavement cuts shall be sawn by methods approved by the Engineer.

.2 All final cuts shall be a minimum of 300 mm from the trench wall.

.3 All longitudinal pavement cuts in streets shall lie outside a vehicle wheel path, unless otherwise directed by the Engineer.

4.30 TRENCH SETTLEMENT DURING GUARANTEE PERIOD

.1 The Contractor shall replace materials and rectify all failures that occur as a result of settlement of trench backfill or collapse of trench walls during the guarantee period as specified in Section 2.03 – Materials and Workmanship, Article 29.

.2 Trenches in which backfill settles shall be refilled with the specified backfill material, and paved surfaces that are adjacent to trenches or on trench backfill, which fail during this period, shall be replaced or repaired in an approved manner.

4.31 PRIVATE UTILITIES IN CITY RIGHTS-OF-WAY

.1 Private utilities within City of Nanaimo road rights-of-way generally shall follow the alignments shown on Standard Drawing No. T-9, Standard Drawing No. T-10.

.2 All private utilities shall be traceable electronically.

.3 Installation of private utilities shall require prior approval by the City Engineer.
# SECTION 4 - TRENCH EXCAVATION, BEDDING AND BACKFILL

## MEASUREMENT AND PAYMENT

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4.70 **AUTHORIZED HAND EXCAVATION** Section 4.09

Payment for authorized hand excavation will be made at the unit price per linear metre if shown in the Tender Form and will be based on the trench depth. This price shall include supply of materials, hand excavation, hand backfilling, and all work incidental thereto.

4.71 **TRENCH ROCK EXCAVATION** Section 4.03.3

Payment for trench rock excavation will be made as shown in the Tender Form:

(a) **By Volume Measurement:**

Payment will be made for excavation of single boulders, pieces of concrete, or masonry having individual volumes exceeding one cubic metre in volume.

Measurement for trench rock excavation will be calculated based on:

1. The depth from the top of the rock surface to 150 mm below the bottom of the pipe barrel.
2. The maximum allowable trench dimensions as per T-1, or for common trenches, as per T-2.
3. The length measured horizontally along the centre line of the trench.
4. Cross sectional measurements will be made at 3 m intervals or as required.
5. In the event that the average rock width is less than 600 mm in any 3 m interval, payment will be based on a 600 mm minimum rock width.

This price shall include excavation, disposal of rock, and all work incidental thereto.

(b) **By Linear Metre:**

The City will provide a rock profile along the trench centreline showing rock elevations at 10 m intervals.

Payment will be made per linear metre of trench where rock is excavated irrespective of depth. This price shall include excavation, disposal of rock, and all work incidental thereto.

(c) **By hourly rates:**

Rates for personnel and equipment shall be in accordance to Section 2 – Article 40 Force Account Work. The contractor shall schedule his workforce in such a manner that the Trench Rock Excavation will not interfere substantially with progress of other work. Only personnel and equipment required for the excavation and disposal of the rock will be paid under force account rates. No payment will be made for delays or standby time.
SECTION 4 - TRENCH EXCAVATION, BEDDING AND BACKFILL

MEASUREMENT AND PAYMENT

4.72  OVEREXCAVATION AND PLACEMENT OF BASE GRAVEL MATERIAL  Section 4.03.3 (d) (e) and 4.14

Payment for authorized overexcavation and placement of base gravel material or other material specified will be made at the unit price per tonne of material placed as shown in the Tender Form. This price shall include supply of materials, overexcavation and disposal of the unsuitable material, placement and compaction of the specified base gravel material, special bracing and sheeting as may be required, and all work incidental thereto. Payment for this work will only be made when, in the opinion of the Engineer, it is necessitated by the natural existence of unsatisfactory soil conditions. No payment will be made for unauthorized over excavation which has resulted from acts, neglects, or delays of the Contractor.

4.73  IMPORTED GRANULAR FILL  Section 4.20

Payment for imported granular fill will be made at the price per cubic metre or tonne as shown in the tender form (conversion of tonnes to cubic metres compacted will be 2.43 tonnes/cubic meter). This price shall include supplying, loading, hauling, placing, compacting imported granular material, disposal of excavated material and all work incidental thereto. Payment by weight will be based on weigh certificates for material actually incorporated into the work unless otherwise approved by the Engineer.

Tender quantities are based on the allowable trench width limits as shown on Standard Drawings T-1 or T-2, with allowances for site soil conditions. Placement of import granular fill beyond these limits will be at the Contractor's expense where the Contractor employs methods that excavate beyond these limits without prior authorization from the Engineer.

4.74  CONCRETE AND CONTROLLED DENSITY FILL

(a) Concrete Fill Section 4.21 - Standard Drawing T-5 and T-6
(b) Controlled Density Fill - Section 4.24 - Standard Drawing T-3

Payment for concrete or controlled density fill for pipe base, encasement, or backfill in the trench will be made at the unit price per cubic metre shown in the Tender Form. Measurement will be based on the design dimensions of the concrete placed. This price shall include supply of materials, concrete work, form work, curing and protection and all work incidental thereto.

4.75  TRENCH DAMS  Section 4.18  Standard Drawing T-8

Payment for trench dams will be made at the unit price per trench dam shown in the Tender Form. This price shall include supply of materials, installation and all work incidental thereto.
4.76 **SURFACE RESTORATION** Section 4.27, 4.28 & 4.29

Payment for surface restoration will be made at the price per square metre as shown on the Tender Form for the various types of surface restoration.

a) For surface restoration of untraveled areas, (boulevards, rights-of-way and private property), price shall include all labour, equipment and materials necessary to restore untraveled areas, to a condition equal to or better than existed prior to construction and in accordance with the specifications and drawings.

b) For surface restoration of traveled areas, (roads, shoulders, driveways, sidewalks, curbs and walkways), price shall include all labour, equipment and materials necessary to restore the traveled areas, to a condition equal to or better than existed prior to construction and in accordance with the specifications and drawings. **This price shall include surface cutting and removal, supply and installation of gravel materials, and restoration of the travelled surface.**

c) For temporary surface restoration of traveled areas, (roads, driveways, sidewalks, curbs and walkways), price shall include all labour, equipment and materials necessary to restore and maintain the traveled surface, as directed by the Engineer, using the materials as shown on the Tender Form.

Tender quantities are based on the allowable trench width limits as shown on Standard Drawings T-1 or T-2. Surface restoration beyond these limits will be at the Contractor’s expense where the Contractor employs methods that damage areas beyond these limits without prior authorization from the Engineer.

4.77 **ASBESTOS CEMENT PIPE REMOVAL**

Payment for the handling, cutting and removal of asbestos cement pipe will be made at the unit price per linear metre of pipe removed as shown in the Tender Form. This price shall include all labour, equipment and materials required for the proper removal and disposal of asbestos cement pipe as required by the WorkSafeBC Regulations.
NOTES:
1. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.
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*(REVISED NOVEMBER 2009)*

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(REVISED NOVEMBER 2009)
6.20 **SCOPE**

.1 This specification refers to gravity sewer pipe and appurtenant fittings for sanitary sewers. Only those products approved by the City Engineer and listed in the City of Nanaimo Approved Products List will be accepted for installation.

.2 Refer to Section 4 - Trench Excavation, Bedding and Backfill for related specifications.

6.21 **MATERIALS TESTING**

.1 If, in the opinion of the Engineer, testing is required, the Engineer will arrange for a testing firm to carry out tests to determine whether the applicable standards and specifications have been met. Where initial testing indicates inadequacies additional testing may be required by the Engineer.

.2 The Contractor as directed by the Engineer shall supply specimens or samples for testing.

.3 The types of tests listed below may be required by the Engineer unless in the opinion of the Engineer other testing is required.

.4 Joints for sanitary sewer main pipe and fittings and service connection pipe and fittings shall be capable of meeting the following exfiltration tests. The Engineer may require that these tests be carried out by the Contractor or his supplier prior to acceptance of pipe on the project.

(a) **Pipes in Proper Alignment:**

Not fewer than 3, or more than 5, pipes selected from stock by the Engineer shall be assembled according to standard installation instructions issued by the manufacturer. With ends bulkheaded and restrained against internal pressure, the section shall be subjected to 70 kPa hydrostatic pressure. Pressure shall be maintained for a period of 24 hours. There shall be no leakage at the joints.

(b) **Pipes in Maximum Deflected Position:**

At least 2 of the joints of the assembly shall be deflected to the maximum amount recommended by the manufacturer. 35 kPa internal hydrostatic pressure shall then be applied to the test section and maintained for a period of 24 hours. Joints shall show no leakage.

(c) **Pipes in Maximum Lateral Misalignment:**

The test section shall be supported on blocks or otherwise so that one of the pipes is suspended freely between adjacent pipes and bears only on the jointing material. The suspended pipe shall then be loaded on the bell or coupling by a load equal to one-third of the ultimate 3-edge bearing strength required by the applicable ASTM specification, except that pipe having a laying length of more than 1.2 m shall be loaded no more than the amount computed for a 1.2 m length. While under this load, stressed joints shall show no leakage under 35 kPa internal hydrostatic pressure.
6.22 PIPING, FITTINGS AND SERVICES

.1 The sizes and types of pipe to be used are shown on the drawings.

.2 Concrete Pipe:

(a) Non-reinforced concrete pipe and fittings shall conform to ASTM C14M, Class 3, to a maximum diameter of 600 mm and shall be designed with flexible rubber gasket joints conforming to ASTM C443M.
(b) Reinforced circular concrete pipe and fittings shall conform to ASTM C76M, Class III or higher, for all pipe greater than 600 mm diameter and shall be designed with flexible rubber gasket joints conforming to ASTM C443M.
(c) Pipe with chips, cracks, porous concrete or any other defects which impair joint sealing or durability will not be accepted.

.3 Polyvinyl Chloride (PVC) Pipe (Smooth Profile):

(a) Pipe and fittings up to 675 mm diameter shall be DR35. Pipe and fittings shall have a minimum pipe stiffness of 320 kPa at 5.0% deflection when tested in accordance with ASTM D2412.
(b) Pipe and fittings shall be manufactured to the following specifications:
   
   100 mm - 375 mm dia. to ASTM D3034 and CSA B182.2
   450 mm - 675 mm dia. to ASTM F679 and CSA B182.2

c) Pipe and fittings shall include integral bell and spigot ends with stiffened wall section and a formed groove for a rubber gasket conforming to ASTM F477.
(d) All P.V.C sanitary gravity main pipes shall be green in colour. (REVISED NOVEMBER 2009)

.4 Ductile Iron Pipe:

(a) Pipe and fittings shall conform to ASTM A746 or as approved by the City Engineer.

.5 Polyvinyl Chloride (PVC) Service Pipe:

(a) All sanitary service inspection assemblies shall be white in colour. (REVISED NOVEMBER 2009)
(b) Sanitary service connections of 100 mm diameter shall be DR28 and conform to CSA B182.1. Pipe and fittings shall have elastomeric seal joints, locked in gasket and integral bell joint features.
(c) Sanitary service connections greater than 100 mm diameter shall be as specified for PVC (smooth profile) mainline pipe.

.6 High Density Polyethylene (HDPE) Pipe (Smooth Profile):

(a) Pipe shall conform to CGSB 41-GP-25M. Pipe material shall conform to ASTM D1248 Type III, Class C, Category 5, Grade PE35-10.
(b) Minimum acceptable pipe class shall be DR26 with a hydrostatic design stress of 10MPa.
(c) All pipe shall bear the pipe series designation and manufacturers name.
(d) Fittings for polyethylene pipe, if required, shall be detailed and manufactured by the pipe manufacturer. Miter bends shall be fiberglass reinforced. Pipe deflected up to manufacturer's recommended minimum radius may be used in place of fabricated miter bends and to form the required vertical and horizontal curves. Polyethylene fittings shall have a pressure rating at least equal to that of the pipe being joined.

(e) All P.V.C. sanitary force main pipe shall be white in colour. (REVISED NOVEMBER 2009)

6.22A FORC MAINS

.1 The sizes and types of pipes to be used are shown on the drawings.

.2 Ductile Iron Pipe:

(a) Pipe shall conform to AWWA C150 and C151 and shall be cement mortar lined in accordance with AWWA C104.

(b) Joints shall be a mechanical type conforming to AWWA C111 or shall be rubber gasket, bell and spigot tyton joint.

.3 Polyvinyl Chloride (PVC) Pressure Pipe:

(a) Pipe shall be ULC approved and have cast iron pipe equivalent outside diameter.

(b) Pipe shall be manufactured to the following specifications:

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 mm - 300 mm</td>
<td>AWWA C900 and CSA B137.3</td>
</tr>
<tr>
<td>350 mm - 900 mm</td>
<td>AWWA C905 and CSA B137.3</td>
</tr>
</tbody>
</table>

(c) Pipe shall be compatible with mechanical and push-on joint fittings and valves without the use of special adapters.

(d) Pipe shall include push-on integrally thickened bell and spigot type joints conforming to ASTM D313.9 with single elastomeric gasket conforming to ASTM F477.

.4 High Density Polyethylene (HDPE) - Smooth Profile:

(a) High Density Polyethylene (HDPE) pipe shall conform to Section 6.22.6, except that the minimum acceptable pipe class shall be DR21.

6.23 JOINTS

.1 Sanitary sewer main pipe and fittings and service connections pipe and fittings shall be jointed with a rubber gasket or other preformed, factory-manufactured gasket or approved material designed for use with the specified pipe. Solvent connected joints and fittings will not be permitted.

.2 High Density Polyethylene (HDPE) Pipe (Smooth Profile) Joints:

(a) Joints shall be by thermal butt-fusion and constructed in accordance with the manufacturers specifications.

(b) Flange joints shall be used to join long sections of butt-jointed pipe or as shown on the construction drawings.
(c) Flanges for polyethylene pipe shall be slip-on type installed in conjunction with stub ends supplied by the pipe manufacturer. The flanges shall be Class 150 meeting ANSI B16.5 drilling dimensions. Flanges shall be carbon steel.

(d) All flanged joints shall be separated by a neoprene gasket bonded to one of the flange faces. Neoprene for flange gaskets shall be 3 mm thick with holes drilled for flange bolts and size equal to flange diameter.

(e) Bolts and nuts for flanges shall be hot dip galvanized.

6.24 SERVICE JUNCTIONS

.1 Concrete Pipe (non-reinforced and reinforced):

(a) Service connections shall be manufactured using a sanded PVC male and stub pipe with integral bell.

(b) Stub shall be grouted into a neatly chipped hole in the pipe wall with a Portland cement based grout with a smooth interior and exterior finish by the pipe manufacturer, or an alternate method is to utilize epoxy resin to cement the stub into a neatly cored hole in the pipe wall by the pipe manufacturer.

(c) Stub orientation shall be at 45° to the centreline of the mainline pipe for pipe diameters less than 1050 mm.

(d) Stub orientation may be at 90° to the centreline of the mainline pipe for pipe diameters of 1050 mm or larger.

(e) No section of the service stub shall protrude past the inside of the concrete pipe wall.

(f) Field break-in and mortar patch joints shall not be used unless approved by the City Engineer. Refer to Section 6.48 for field joint specifications.

.2 PVC Pipe (Smooth Profile):

(a) Service connections to PVC mainline pipe shall be made with extrusion molded PVC or fabricated PVC fittings manufactured to ASTM D3034, CSA B182.1 and CSA B182.2.

(b) The use of saddles instead of manufactured wye fittings shall require approval by the City Engineer. Saddles shall be cast iron with alignment rings complete with stainless steel bands.

.3 PVC Pipe (Ribbed Profile):

(a) Service connections to PVC mainline pipe shall be made with extrusion molded or fabricated PVC fittings manufactured to ASTM D3034, CSA B182.1 and CSA B182.2.

(b) For connections more than two pipe sizes smaller than the mainline, prefabricated service saddle connections may be approved.

.4 High Density Polyethylene (HDPE) Pipe (Smooth Profile):

(a) Service connections to HDPE mainline pipe shall be made with manufactured fittings, electro-fused, or heat welded to the main. Mechanical connections, if used, shall be water-tight.

(b) Connection of HDPE service junctions to non-pressurized PVC service pipe shall be with flexible couplings. Flexible couplings shall be manufactured from elastomeric PVC, and be held in place with series 300 stainless steel worm gear clamps.
.5 High Density Polyethylene (HDPE) Pipe (Open Profile):

(a) Service connections to HDPE mainline pipe shall be made with extrusion molded or fabricated fittings manufactured to CSA B182.1, B182.2 and B182.4.

(b) For service connections more than two pipe sizes smaller than the mainline, prefabricated service saddle connections may be approved.

6.25 PRECAST MANHOLE SECTIONS

.1 Unless otherwise approved, all manhole sections shall be precast reinforced concrete in accordance with ASTM C478.

.2 All precast sections shall be complete with ladder rungs.

.3 O-ring rubber gaskets shall conform to ASTM C443.

6.25A PRECAST MANHOLE BASES

.1 Use of factory precast manhole bases requires approval by the City Engineer. Precast manhole bases shall be reinforced concrete in accordance with ASTM C-76 Class III or better.

.2 All dimensions and specifications shall conform to the requirements for cast-in-place manhole bases in accordance with Section 6.50 – Manhole Channeling and the standard drawings. *(REVISED NOVEMBER 2009)*

.3 Plastic and concrete pipes installed in the precast manhole base shall utilize rubber manhole adapter rings to seal the connection. *(REVISED NOVEMBER 2009)*

.4 Pipe alignment, grade and invert elevations in the precast manhole bases shall conform to the construction drawings.

6.26 MANHOLE TOPS

.1 Manhole tops shall be flat slab, precast concrete. Tops shall be reinforced to meet CS600 loading conditions. Precast tops shall conform to ASTM C478 with approved offset opening for frame and cover.

6.27 MANHOLE COVERS AND FRAMES

.1 Covers and frames shall be cast iron and certified to meet CS600 loading requirements with the bearing faces of the cover to be frame machined for a non-rocking fit. *(REVISED NOVEMBER 2009)*

.2 Patterns, dimensions and weights shall be in accordance with the Standard Drawings. Covers shall have "CITY OF NANAIMO SANITARY SEWER" permanently embossed on the cover.

.3 Standard manhole frame and cover shall conform to Standard Drawing No. S-9 - Heavy Sanitary Duty Manhole Frame and Cover. *(REVISED NOVEMBER 2009)*
.4 Utility chamber manhole frame and cover shall conform to Standard Drawing No. S-10. *(REVISED NOVEMBER 2009)*

.5 A watertight manhole frame and cover, if required shall conform to Standard Drawing No. S-15 - Watertight Manhole Frame and Cover.

.6 Covers located in statutory rights-of-way shall be permanently embossed with the additional wording "DO NOT COVER".

.7 The inside surface of the manhole frame shall be painted yellow with an enamel rust paint in accordance with the manufacturer's specifications.

6.28 MANHOLE STEPS

.1 Steps shall conform to ASTM C478 for manhole steps and ladders and shall be either:

(a) Hot-dip galvanized, 19 mm diameter cold-rolled steel to CSA G164.

(b) A 19 mm diameter aluminum alloy conforming to CSA S157.

.2 All steps shall be complete with approved polyethylene anchor insulating sleeves and installed in 25 mm to 26 mm diameter precast or drilled holes in a manhole section.

.3 Distance from the top of the manhole cover to the top rung shall conform to WorkSafe BC requirements.

6.29 MANHOLE PLATFORMS

.1 Manhole platforms shall meet the specifications as detailed on the standard drawings.

6.30 CONCRETE

.1 The compressive strength of concrete for manhole bases shall be not less than 20 MPa at 28 days.

.2 All concrete work shall conform to Section 11 - Reinforced and Plain Concrete Works.

6.31 PRECAST CONCRETE GRADE RING *(REVISED NOVEMBER 2009)*

.1 A precast concrete grade ring conforming to ASTM C478 shall be used. *(REVISED NOVEMBER 2009)*

.2 Brick may be used instead of precast concrete grade rings at the discretion of the Engineer for filler ring below cast frame. Shall be concrete brick conforming to ASTM C55, Type 1, Grade U-1. *(REVISED NOVEMBER 2009)*

6.32 CLEANOUT FRAMES AND COVERS

.1 Cleanout frames and covers shall be as specified for heavy duty manhole frames and covers except without the 19mm centering rim on the underside of the frame.
SECTION 6 - SANITARY SEWER SYSTEM
SPECIFICATIONS

6.33 PIPE AND FITTINGS FOR DROP MANHOLES AND CLEANOUTS

.1 Pipe and fittings for drop manholes and cleanout structures shall be as specified under Section 6.22 – Piping, Fittings and Services and Section 6.23 - Joints.

6.34 - NOT USED -

6.35 MANHOLE AND CLEANOUT LID MARKERS

.1 Markers are required, where manhole and cleanout lids are not located within developed road rights-of-way or residential properties, to indicate the location of the manholes and cleanouts. These markers shall be constructed of 50 mm steel pipe painted with a minimum of two coats of yellow exterior duty paint applied in accordance with the manufacturer's recommendations and set in a concrete base. The markers shall extend one (1) metre above the ground surface. The markers shall be located on site at a location determined by the Engineer opposite the manhole or cleanout lid and the distance to the lid is to be marked in black figures on a flattened upper portion of the marker. See Standard Drawing No. S-14. (REVISED NOVEMBER 2009)

6.36 SERVICE BOXES

.1 Service boxes for single sanitary sewer services shall be 300 x 500 mm concrete boxes complete with cast iron traffic cover marked "Sewer" and concrete extension sections as required. See Standard Drawing No. S-20.

.2 Service boxes for twin sanitary sewer services shall be 425 x 750 mm concrete boxes complete with steel traffic cover marked "Sewer" and concrete extension sections as required. See Standard Drawing No. S-19.

6.37 PUMPING STATIONS

.1 Mechanical ventilation of wet well chamber shall use PVC SDR35 for supply piping and steel SCH.40 pipe for discharge piping. Discharge piping shall incorporate a bird screen.

.2 Chemical injection line into wet well shall be 8 mm O.D. clear PVC in 50 mm PVC conduit.

.3 Pump discharge piping shall be steel SCH.40, epoxy coated inside and outside. Piping shall be terminated with a flanged end 0.5 metres outside wet well.

.4 All piping penetrations into wet well shall be located outside of barrel joints and complete with rubber manhole adapter ring.

.5 Ball valves shall be stainless steel, full bore.

.6 All concrete work shall conform to Section 11 - Reinforced and Plain Concrete Works.

.7 Precast manhole barrel sections shall conform to Section 6.25 – Precast Manhole Sections.

.8 Precast manhole tops shall conform to Section 6.26 – Manhole Tops.

.9 Manhole frame and covers shall conform to Section 6.27 – Manhole Covers and Frames.
.10 Manhole steps shall conform to Section 6.28 – Manhole Steps.

.11 Brick shall conform to Section 6.31 - Brick.

.12 Hot dip galvanized steel products will only be accepted when a comparable aluminum or stainless steel product is not available.

.13 Materials for water service connections shall be in accordance with Section 5 - Water Distribution System.

.14 Materials for pavement structure shall be in accordance with Section 9 - Streets and Section 12 - Asphaltic Concrete Paving.

.15 Materials for storm drainage shall be in accordance with Section 7 - Storm Sewer System.

.16 Materials for pump station lighting shall be in accordance with Section 10 - Roadway Lighting and Traffic Controls.

.17 Equipment and materials not listed in the City of Nanaimo Approved Products List requires approval by the City Engineer. For all unlisted equipment and materials, proposed for the pump station, the design engineer shall provide the necessary product data and specifications. If approved, the design engineer shall provide supplementary specifications on the construction drawings.
6.40 TRENCH EXCAVATION, BEDDING AND BACKFILL

.1 Refer to Section 4 - Trench Excavation, Bedding and Backfill for installation requirements.

6.40A PIPE ALIGNMENT AND GRADE

.1 The pipe shall be laid on the alignment and grade in accordance with the construction drawings. Methods to maintain pipe alignment and grade must be approved by the Engineer. Each pipe shall be checked for line and grade as it is installed.

.2 Unless otherwise directed by the Engineer, tolerances for pipe alignment and grade shall be:

\[
\begin{align*}
\text{Alignment} &= \pm 50 \text{ mm} \\
\text{Grade} &= \pm 10 \text{ mm}
\end{align*}
\]

6.41 PIPE CUTTING

.1 Pipe cutting shall be done in the manner recommended by the pipe manufacturer employing tools designed for this purpose.

6.42 PIPE INSTALLATION

.1 Pipe shall be installed in strict accordance with the manufacturer's recommended practice.

.2 Pipe shall be checked before being lowered into the trench to ensure that no foreign material, manufacturer's defects, or cracks exist that might prevent the proper jointing of the pipe or its operation.

.3 The open end of the pipe in the trench shall be suitably covered to prevent entrance of trench water and other material during periods when pipe is not being installed.

.4 Precautions shall be taken to ensure that displacement of the pipe in the trench does not occur through soil displacement or floatation due to the presence of trench water. Pipe that has been displaced shall be removed from the trench and re-laid.

.5 Lifting holes in concrete pipe shall be plugged with prefabricated plugs in non-shrink grout, or other plugs recommended by the pipe manufacturer.

.6 The contractor shall use methods for installing pipe in an auger hole or casing pipe as described on the construction drawings.

6.42A FORCE MAIN INSTALLATION

.1 Force mains shall be installed according to installation requirements in Section 6.42 – Pipe Installation.

.2 Thrust blocking to be installed in accordance with Section 5.47 - Thrust Blocking.
6.43 **JOINTS AT RIGID STRUCTURES**

.1 A flexible joint shall be provided at locations where the pipe is held in fixed position by a rigid support or structure. The distance from the support or structure shall depend on the diameter and type of pipe being installed and shall be in accordance with the pipe manufacturer's recommended practice. The purpose of the flexible joint is to prevent pipe failure due to uneven support under the pipe. Approved flexible joints include rubber gasket bell and spigot connections and dresser couplings.

6.44 **HORIZONTAL AND VERTICAL CURVES**

.1 Pipe on horizontal and vertical curves shall be laid true to the curve of the radius shown on the drawings. Variations in vertical curves and grades within the allowable pipe deflection may be allowed where approved by the Engineer.

6.45 **DEFLECTION**

.1 The amount of pipe deflection at joints and couplings shall be the limit as specified by the manufacturer. P.V.C. pipe shall not be deflected at joints or couplings.

6.46 **FITTINGS AND JOINTS**

.1 Fittings shall be installed at the locations shown on the construction drawings or as directed by the Engineer. Fittings shall be installed in accordance with the manufacturer's specifications.

.2 **High Density Polyethylene (HDPE) Pipe (Smooth Profile):**

(a) Pipe shall be joined by the thermal butt fusion method. The contractor shall make arrangements to have the pipe jointing carried out by the pipe manufacturer or certified personnel, familiar with the jointing technique, using equipment, and techniques specifically designed for the pipe diameter and material being jointed. Where required flanged joints shall be used for connecting long pipe sections. The joint shall consist of a polyethylene stub end butt fused to the end of pipe and a steel slip-on flange.

(b) Flanged joints and flange bolts shall be protected against corrosion with a liquid epoxy coating to AWWA C210.

.3 **Sewage Force Mains:**

(a) Install thrust blocking in accordance with Section 5.47 – Pipe Restraint.

6.47 **CONNECTIONS TO EXISTING PIPING AND APPURTENCES**

.1 All connections to existing piping, services, and appurtenances shall be made by City of Nanaimo forces unless otherwise authorized by the City Engineer.

.2 All connections to existing piping and services shall utilize a manufactured rubber gasket bell and spigot joint or dresser coupling designed for the types of pipes to be connected.

.3 The use of field joints or rubber repair couplings shall require the approval of the Engineer.
.4 Rubber repair couplings must have 4 stainless steel clamps complete with stainless steel anti shear band. Only those products approved by the City Engineer will be accepted for installation. *(REVISED NOVEMBER 2009)*

.5 Slip couplers shall be used on PVC pipes. Rubber repair couplings are not to be used on PVC pipes. *(REVISED NOVEMBER 2009)*

**6.48 SERVICE CONNECTION JUNCTIONS**

.1 Locations of service connection junctions to the sewer shall be installed as shown on the construction drawings or as directed by the Engineer during construction.

.2 Where service connections are not constructed in conjunction with the mains, fittings shall be provided with approved caps or plugs and markers as specified in Section 6.59 – service Connection Installation, clause 6.59.3(i). Caps or plugs for sanitary sewers shall be watertight and suitably blocked to withstand test pressures.

.3 **Concrete Pipe (Reinforced and Non-reinforced):**

   (a) Field break-in and mortar patch joints shall not be used unless approved by the City Engineer. If approved, the following shall apply:

   (i) Break into the pipe by coring to within 40 mm of the outside diameter of the service stub. All exposed reinforcing steel shall be removed.

   (ii) Trim the stub to conform to the shape of the pipe interior when installed. PVC stubs shall be coated with PVC pipe glue and fine dry sand prior to insertion.

   (iii) Insert the stub into the core ensuring that no portion of the stub protrudes past the inside of the pipe, and the stub protrudes a minimum of 200 mm from the outside of the pipe.

   (iv) Prepare non-shrink, fast setting cementitious grout with a 3 to 1 sand/cement mix to a "dry pack" consistency. Pack grout tightly into the void between the stub and the pipe and mound around the stub for lateral support.

   (v) Hand finish interior and exterior grout surfaces to a smooth finish.

   (vi) In order to prevent damage to the field joint, allow sufficient time for grout to develop strength prior to installation of connecting pipe or backfilling.

   (vii) Installation shall be inspected by the Engineer prior to backfilling.

.4 **PVC Pipe (smooth profile):**

   (a) Service saddle connections shall not be used unless approved by the City Engineer.

   (b) If approved, installation of service saddle connections shall conform to the following:

   (i) Drill hole into mainline pipe to the exact dimension of the new connection.

   (ii) Attach service saddle in accordance with the manufacturers specifications.

.5 **PVC Pipe (ribbed profile):**

   (a) Installation of service saddle connections shall conform to Section 6.48.4
.6 High Density Polyethylene (HDPE) Pipe (Open Profile):

(a) Installation of service saddle connections shall conform to Section 6.48.4.

.7 High Density Polyethylene (HDPE) Pipe (Smooth Profile):

(a) Service connections to mainline pipe using manufactured fittings shall be in strict accordance with manufacturer's instructions.

(b) Connection between HDPE service tees and PVC service pipe shall be by flexible coupling, conforming to Section 6.24.4 – High Density Polyethylene (HDPE) Pipe (Smooth Profile).

6.49 MANHOLE CONCRETE BASES

.1 All water shall be removed from the excavation prior to placing base concrete. The base shall be constructed such that the first section of a precast section can be set plumb with uniform bearing throughout its full circumference.

.2 If material in the bottom of the trench is unsuitable for support, the bottom shall be over excavated to firm base as determined by the Engineer and backfilled to the required grade with thoroughly compacted base gravel as specified for trench bottom stabilization under the applicable item included in Section 4 - Trench Excavation Backfill and Bedding.

.3 Where over excavation and backfill with base gravel is not practical, special structural support shall be provided as specified for trench bottom stabilization under the applicable item included in Section 4 - Trench Excavation Backfill and Bedding.

.4 Concrete manhole bases shall be constructed as shown on the drawings. Pipes and fittings through the manhole shall be supported on concrete blocks and the concrete base poured around the pipe to a depth of at least 150 mm below the bottom of the pipe and up to the springline of the pipe. Install rubber manhole adapter rings on all plastic pipe installed in the manhole base.

.5 Invert elevations of pipes at the manhole shall be checked by the Contractor prior to and following placement of base concrete around the pipe to ensure that all pipes are installed at the design elevation. *(REVISED NOVEMBER 2009)*

.6 Variations in manhole inverts from established grade or elevation shall be corrected.

6.49A PRECAST MANHOLE BASES

.1 Installation of precast manhole bases shall conform to Section 6.49 – Manhole Concrete Bases.

.2 Precast manhole bases shall be placed on 150 mm thick base of 40 mm drainrock.

6.50 MANHOLE CHANNELING

.1 Manhole channeling shall be constructed as shown on Standard Drawing S-1 or as shown on the construction drawings.
.2 The channels in the base of manholes shall be shaped and finished to provide smooth passage for the sewage in order to minimize head losses and deposits at bends and at junctions of channels.

.3 Channels shall be accurately formed. The practice of forming channels roughly to shape and finishing with cement mortar will not be permitted. The channels shall be steel trowel finished.

.4 Benching in manholes shall be sloped to drain. While green, the concrete benching shall be given a broom finish to produce a non-skid surface.

6.51 PRECAST MANHOLE SECTIONS

.1 Precast manhole barrel sections shall be placed plumb.

.2 Joints between pre-cast manhole barrels not utilizing O-ring gaskets and between the top riser and the cover slab shall be made watertight with cement mortar. Prior to placing sections, the mating faces shall be thoroughly soaked with water and a layer of cement mortar shall be spread on the lower face. After sections are placed, excess mortar which has been squeezed out shall be removed and the joint made flush inside and out.

.3 Joints between precast manhole barrels utilizing O-ring gaskets shall conform to the manufacturers specifications. The inside surface of the precast barrel at the O-ring joints shall be filled with cement grout to a smooth finish.

.4 Damaged O-ring manhole joints require removal and replacement of damaged manhole section. Mortar patching of damaged area if approved by the Engineer, shall require the removal of the O-ring gasket and installation as per Section 6.51.2.

6.52 CONCRETE

.1 Concrete work shall be as specified under the Section 11 - Reinforced and Plain Concrete Works”.

6.53 FRAMES AND COVERS

.1 Frames shall be set on precast concrete grade rings to bring the cast iron manhole frame up to grade as shown on the Standard Drawings. Contractor to install a minimum of two (2) 62.5 mm thick concrete grade rings to a maximum of four (4) 62.5 mm thick grade rings. The concrete grade rings shall be laid in common bond with raked mortar joints and shall be mortared inside and outside of the manhole. (REVISED NOVEMBER 2009)

(a) Fine grade elevation adjustments of frames shall be done with a minimum of 3, steel only, shims equally spaced.

.2 Manhole covers shall be installed:

(a) for unpaved areas, covers shall have a 1.5 m x 1.5 m, 50 mm thick asphalt apron. Covers shall be set flush with the asphalt surround.

(b) for paved areas, covers shall be recessed 0 - 6 mm below finished pavement grade. Covers shall not protrude above the finished pavement.
.3 Steel manhole riser rings may be used in special circumstances at the discretion of the City Engineer in low traffic areas to bring cast iron manhole frames up to grade when pavement overlays over existing pavement require manhole cover grade adjustment. Low traffic areas are described as daily two-way traffic volume not exceeding 3000 vpd (vehicles per day) with no significant bus and/or truck activity. *(REVISED NOVEMBER 2009)*

6.54 MANHOLE STEPS

.1 Manhole steps shall be installed in manhole sections by the manufacturer unless circumstance dictates otherwise in which case approval must be received from the Engineer.

.2 The distance from the top of the casting and lid, to the first manhole step shall conform to WorkSafe BC requirements.

6.55 DROP STRUCTURES

.1 Manhole drop structures shall be constructed as shown on Standard Drawing No. S-3.

6.56 STUBS

.1 Blind stub sections for connection of future sewers and service connections to the manholes shall be installed where shown on the construction drawings and as directed by the Engineer. Stubs shall be as long as the vertical depth from finish grade to the invert of each stub. Each stub shall be plugged with a removable, watertight plug as shown on the construction drawings. Where stubs are installed, the bottom of the manhole shall be channeled to the stub entrance.

6.57 CLEANOUTS

.1 Cleanouts shall be constructed as shown on the standard drawings.

6.58 MANHOLE PLATFORMS

.1 Manhole platforms shall be constructed as shown on the standard drawings.

6.58A PUMPING STATIONS

.1 Pump stations shall be constructed in accordance with the approved construction drawings and the supplemental specifications.

.2 Connection to the City of Nanaimo’s telemetry system shall be done by the City forces unless otherwise authorized by the City Engineer.

.3 Level regulator holder in wet well shall be mounted off the hatch centre bar.
6.59 SERVICE CONNECTION INSTALLATION

.1 Location of Service Connections:

(a) Service connections are to be installed at the locations and depths as specified by the Engineer. For new connections, where the depth of the service connection exceeds two meters, the service shall be extended into the property the same distance as the depth of the service, up to a maximum distance of four meters. This shall be done during the installation of the service connection from the main to the property.

(b) At no time shall two or more sanitary services be coupled into one lead crossing the street or right-of-way. Each service shall have its own independent connection into the main sewer.

.2 Grade and Alignment of Service Connections:

(a) Trenches shall be excavated so that pipe can be installed in a direct line from the service connection fitting at the sewer or from a manhole to the terminus of the service. Service connections shall be installed at a grade of not less than two percent (2%) unless otherwise directed by the Engineer. Service pipe shall be installed at a uniform grade between the terminus at the property line and the junction fitting (or upper end of a service drop) at the sewer.

.3 Sanitary Sewer Service Connection Installation:

(a) Pipe shall be installed in strict accordance with the manufacturer's recommended practice.

(b) Pipe shall be checked before being lowered into the trench to ensure that no foreign material, manufacturer's defects, or cracks exist that might prevent the proper jointing of the pipe or its operation.

(c) The Contractor shall use methods for installing pipe in an auger hole or casing pipe as described in Section 4 - Trench Excavation, Bedding and Backfill.

(d) The trench shall be excavated to provide a minimum cover of 0.75 metre over the service connection pipe at property line.

(e) In rock, the trench is to be extended three (3) metres into the property to facilitate future extension of the service connection.

(f) The trench bottom shall be graded to form a continuous support along the service pipe. All rocks or projections which might prove detrimental to the pipe shall be removed.

(g) Joints shall be made using the specified couplings. Glued joints shall not be made.

(h) Approved watertight caps suitably supported by sandbags to prevent leakage shall be installed on sewer services at the terminus of each service.

(i) A 50 mm x 100 mm wood marker stake shall be placed at the service terminus as shown on the drawings to facilitate future location of the service pipe. This stake shall extend from a point approximately 300 mm above ground to the invert of the service pipe except in locations where the extension of the stake above ground surface would prove hazardous, in which case the stake shall be cut off flush with the ground surface. The stake shall be marked in an approved manner to show the depth of the service pipe invert below the top of the stake. The stake shall be painted yellow for sanitary sewer service connections. The Engineer will record the
invert elevation of the service connection assembly prior to placement of the cap by the Contractor.

(j) Inspection assemblies shall be installed as shown on the standard drawings.

(k) The service box shall be installed plumb with the lid 25mm above finished grade in unpaved areas, and 0 - 6mm below finished grade in paved areas.

.4 Riser Service Connections:

(a) Riser service connections shall be installed as shown on Standard Drawing No.’s S-6 or S-7 in locations shown on the construction drawings.

6.60 CLEANING AND FLUSHING

.1 On completion of the sewer pipe installation, the pipes shall be cleaned to the satisfaction of the Engineer and the City of Nanaimo Public Works Inspector by power flushing with water to remove all foreign matter.

.2 Ensure that snow chains are installed at the downstream manhole so that no foreign material passes beyond downstream manhole. Flow through the system shall remain unimpeded at all times while snow chains are installed. (REVISED NOVEMBER 2009)

.3 Begin cleaning from the upstream pipe in the system and proceed downstream. Under no circumstances is the pipe cleaning process to proceed downstream until all contributing upstream pipes have been successfully cleaned and approved by the Engineer, the City of Nanaimo Public Works Inspector or by the City of Nanaimo CCTV contract administrator. (REVISED NOVEMBER 2009)

.4 Manholes shall be cleaned after the upstream section of pipe has been successfully cleaned and approved by the Engineer, the City of Nanaimo Public Works Inspector or by the City of Nanaimo CCTV contract administrator. (REVISED NOVEMBER 2009)

.5 Pipes shall be cleaned in the direction of flow and shall not be flushed in a backflush direction unless approved by the City Engineer, by the City of Nanaimo Public Works Inspector or by the City of Nanaimo CCTV contract administrator. (REVISED NOVEMBER 2009)

.6 Under no circumstances shall debris pass beyond the downstream manhole. Active vactoring shall remove all debris at the snow chains installed at the downstream manhole (REVISED NOVEMBER 2009)

.7 Dispose of debris at approved dump site such as the Regional District of Nanaimo’s landfill or by the CCTV contract administrator’s approved alternative. (REVISED NOVEMBER 2009)

.8 Decanting of liquid waste accumulated during debris removal is permitted at a controlled release rate, to a maximum of 8 litres per second, at a location approved by the City of Nanaimo CCTV contract administrator. (REVISED NOVEMBER 2009)

6.61 NOTIFICATION TO CITY OF NANAIMO

.1 The City Inspector shall be given 48 hours notice of all tests.
6.62 LEAKAGE TESTING OF GRAVITY SEWERS

.1 Leakage tests shall be performed by the Contractor on all sanitary sewers and sewer service connections, manholes and appurtenances.

.2 Type of Test:

(a) Tests on gravity sewers and manholes shall be either exfiltration or infiltration water tests as directed by the Engineer. Manholes shall be tested separately from gravity sewers.

(b) In lieu of leakage testing with water, the Engineer may permit testing with low pressure compressed air.

(c) Testing shall only be carried out after all underground work is complete.

(d) Copies of all test results must be forwarded to the "City Inspector".

.3 Testing Equipment:

(a) The Contractor shall furnish all the necessary testing equipment, including suitable removable watertight plugs and test balls and shall perform the tests in a manner satisfactory to the Engineer. Testing equipment must provide readily observable and reasonably accurate measurements of leakage under the specified conditions. The Contractor must comply with all WorkSafe BC regulations covering the use of air testing, and ensure that safe working practices are used in the application of the test.

.4 Water Exfiltration Test:

(a) On an exfiltration test, the test section shall be sealed at its lower extremity by means of a watertight plug. The test section shall be filled with water such that a minimum hydrostatic head of 600 mm is placed on the pipe at its upper extremity. The head of water on the pipe shall be taken as the distance from the top of the pipe being tested to water surface at the point of measurement. The test pressure shall be maintained above the 600 mm minimum head for a period of not less than one hour, and unless excess exfiltration requires further testing, not greater than 8 hours. Pressures in excess of 3 metres water head are not recommended. Damage resulting to pipe as a result of testing shall be repaired by the Contractor at no cost to the owner.

(b) Manholes shall be tested independent of the sewer pipe for leakage by filling the chamber to the underside of the roof slab with water. The test duration shall be a minimum of three hours. No leakage shall be permitted in manholes.

(c) In areas where the groundwater table is above the sewer invert level, the test shall be increased by a height equal to the distance from the sewer invert level to the water table elevations.

(d) Exfiltration test sections shall normally have a manhole at both extremities. If, however, sewer grades are such that a test section cannot be terminated at a manhole without placing excess pressure on the pipe or joints, apparatus shall be provided to enable testing without having manholes at the upper and lower ends of a test section.
(e) Gravity sewers, service connections and appurtenant structures thereon shall be constructed such that leakage, as evidenced by exfiltration tests, is less than that calculated using the following formula:

\[
\text{Allowable leakage in litres} = \frac{\text{HDL}}{5200}
\]

where \( H \) = duration of test in hours,
\( D \) = inside diameter of the pipe in millimetres, and
\( L \) = length of pipe in the test section in metres

(f) The above leakage limit will constitute the total maximum allowable leakage of any test section of gravity sewer. Where service connections exist along the test section, the allowable leakage from service pipe calculated by the use of the formula in Section 6.62.4 (e) will be added to that of the main sewer to arrive at the total allowable leakage unless the elevation of the service connection pipe is greater than the maximum water elevation. No additional leakage allowance will be made for manholes existing along the test section.

(g) The maximum allowable leakage for an exfiltration test will be that calculated by the formula in Section 6.62.4 (e) regardless of the test head of water employed. Where a section of sewer is found to have leakage exceeding the allowable limit, replacement or repairs shall be made to reduce the amount of leakage to or below the allowable limit. Repaired sections shall be retested until they meet the allowable limit.

(h) All point sources of leakage exceeding 1.2 litres per minute (from poor joints, improper connections, etc.) shall be made watertight by the Contractor to the satisfaction of the Engineer.

(i) The Contractor shall dispose of the water used for testing in a manner approved by the Engineer.

.5 Water Infiltration Tests:

In areas of high groundwater table, the Contractor shall, if instructed by the Engineer, measure the amount of infiltration into the sewer over a period of 8 hours. The infiltration rate shall not exceed the leakage as calculated for exfiltration testing.

.6 Air Test:

(a) Air test shall not be used with concrete sewers.

(b) On an air test, the section to be tested shall be plugged at each end and all service laterals, stubs and fittings properly capped or plugged.

(c) Air shall be supplied to the test section slowly, filling the line to a constant pressure of 24.0 kilopascal (kPa). The air pressure inside the pipe shall not exceed 28 kPa except in the case where the groundwater level is above the sewer line being tested. In the event of the groundwater level being above the invert, the air test pressure must be increased by 1.0 kPa for each 100 mm of groundwater above the invert.

(d) The air supply is throttled to maintain the internal pressure above 20 kPa for a minimum of 5 minutes to stabilize the temperature in the pipe. After stabilization, the air pressure is adjusted to 24.0 kPa and the air supply shut off or disconnected. Timing commences and the time required for the line pressure to drop to 20.5 kPa is noted.
(e) If the time required to drop from 24.0 to 20.5 kPa is greater than allowable, the test section shall have passed.

(f) For the air test the minimum time allowable is calculated from the following tables:

<table>
<thead>
<tr>
<th>(Millimetres)</th>
<th>Min</th>
<th>Sec.</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>150</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>250</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>300</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>375</td>
<td>9</td>
<td>35</td>
</tr>
<tr>
<td>450</td>
<td>11</td>
<td>34</td>
</tr>
<tr>
<td>525</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>600</td>
<td>15</td>
<td>24</td>
</tr>
</tbody>
</table>

(g) Where multi pipe sizes are to undergo the air test, the average size shall be used.

6.63 TESTING OF FORCE MAINS

.1 Sewage force mains shall be tested in accordance with Section 5.61 – Pressure and Leakage Testing.

6.64 VIDEO INSPECTING MAINS

.1 All pipe video inspection including methods of cleaning, equipment and rates of camera travel, shall be in accordance with the UK Water Research Centres (WRc), Sewage Rehabilitation Manual, most current Edition. *(REVISED NOVEMBER 2009)*

.2 For gravity sewers, other than service connections, the contractor shall arrange for video inspection to check alignment, grade, and condition of the main sewer pipe including catch basin leads.

(a) Illumination depth of field shall be no less than 3 joints for standard joint and spigot pipe types to allow for pipe deflection assessments (9m). No dark/opaque circle shall be visible in the middle of this depth of field viewing area. *(REVISED NOVEMBER 2009)*

(b) Eliminate steaming and fogging encountered during the inspection survey by introducing forced air flow by means of fan. *(REVISED NOVEMBER 2009)*

(c) Camera lens to remain free of grease or other deleterious matter to ensure optimal clarity. *(REVISED NOVEMBER 2009)*

(d) Plan each service connection (junction) such that the camera looks down the centreline of the service, pause for a minimum of five (5) seconds and note condition of the joint and/or pipe/service interface. *(REVISED NOVEMBER 2009)*

(e) Camera guides (Skids) shall not be visible at either side of the pipe during normal camera travel or during Pan & Tilt operation. Configuration of camera/guides shall be altered to alleviate this problem. *(REVISED NOVEMBER 2009)*
SECTION 6 - SANITARY SEWER SYSTEM
INSTALLATION

(f) Position camera lens centrally in the pipeline with a positioning tolerance of ±10% off the vertical centerline axis of the pipeline. For elliptical pipe, the camera to be positioned 2/3 the height of the pipe measured from the invert. *(REVISED NOVEMBER 2009)*

(g) Position camera lens looking along the longitudinal axis of pipeline except when viewing service connections or panning defects. *(REVISED NOVEMBER 2009)*

(h) Travelling speed of the camera in the pipeline to be as follows: *(REVISED NOVEMBER 2009)*
   i) 0.1 m/s for pipeline of diameter less than 200 mm.
   ii) 0.15 m/s for diameters 200 mm and larger but not exceeding 310 mm: and
   iii) 0.20 m/s for diameters exceeding 310 mm.

.3 The inspection shall include the preparation of:
   • a 4.7GB DVD MPEG2 Video Data Disk. Picture Size: NTSC 720x480 pixels, 29.97 frames per second @ 5 megabits per second capture rate. Individual MPEG2 video files shall not exceed 1.7GB in size. DVD Data Disk shall be finalized after burn. *(REVISED NOVEMBER 2009)*
   • a Microsoft Access database CD of the WRc Header and Observation codes *(REVISED NOVEMBER 2009)*
   • a pipe condition report.

All submitted to the Engineer.

.4 The Engineer shall review the, DVD and CD and pipe condition report and provide certification that the condition of the installed pipe is accurately recorded and the pipe installation meets the City of Nanaimo Standards and Specifications. *(REVISED NOVEMBER 2009)*

.5 The DVD and CD, pipe condition report and certification shall become the property of the City of Nanaimo. *(REVISED NOVEMBER 2009)*

.6 Variations in line or grade of pipe, from that established by the Engineer prior to installation, and any jointing, pipe cleaning, or other deficiencies discovered during the inspection, shall be rectified. Reinspection of the pipe may be required by the Engineer.

.7 During this test, manhole construction and invert elevations shall be checked and any variations from the established grade, drawings, or specifications, shall be rectified.

.8 If directed by the Engineer, the contractor shall arrange for a reinspection of the pipe at the contractors cost, for the warranty inspection one month prior to the end of the maintenance period.

.9 Video inspection and pipe condition coding shall be undertaken only by personnel with current Canadian certification by a City approved agency. *(REVISED NOVEMBER 2009)*
SECTION 6 - SANITARY SEWER SYSTEM
INSTALLATION

6.65 SMOKE TESTING

.1 The Engineer shall arrange for smoke testing of all installed gravity sanitary mains in the presence of the City of Nanaimo Works Inspector.

.2 The Engineer shall provide as-built service location information to the City of Nanaimo Works Inspector prior to smoke testing.

.3 Cross-connections noted during the smoke testing shall be corrected and the as-built service location information revised.

6.66 TESTING OF PUMPING STATIONS

.1 Wet well chambers shall be tested for exfiltration by filling the chamber to the underside of the roof slab with water. The test duration shall be a minimum of three hours. No leakage shall be permitted.

.2 In areas of high groundwater tables, the engineer may require an infiltration test. No leakage shall be permitted.

.3 Pumping stations shall be tested using water. Station shall be tested through its operating range to confirm float operation, pumps, controls, alarms, backup power, manual operation and operation with the City of Nanaimo’s portable power unit.

.4 A noise level test shall be required to confirm pumping station and standby power are within specified acceptable limits.

6.67 PIPE VIDEO AND MANHOLE CONDITION REPORT FORMAT

.1 Reference plans shall accompany reports with manholes labeled and inspected sections highlighted. Manhole and pipe numbering shall conform with the construction drawings, or if available, City of Nanaimo pipe and manhole numbers. Reports shall be submitted in both digital and hardcopy formats.

.2 All sewer defects shall be photographed and included with the report and referenced by numbers accordingly.

.3 The video pipe condition rating report format shall be in accordance with the UK Water Research Centres (WRc), Sewerage Rehabilitation Manual, most current edition.  
(REVISED NOVEMBER 2009)
Structural defects shall be properly weighted with the appropriate scores assigned to them as shown in the following table:

**WRc GRADING SYSTEM**

<table>
<thead>
<tr>
<th>DEFECT CODE NO.</th>
<th>TYPE OF DEFECTS</th>
<th>POINT SCORES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Open Joints</td>
<td>1 to 2</td>
</tr>
<tr>
<td>2</td>
<td>Displaced Joints</td>
<td>1 to 2</td>
</tr>
<tr>
<td>3</td>
<td>Cracks</td>
<td>10 to 40</td>
</tr>
<tr>
<td>4</td>
<td>Fracture</td>
<td>40 to 80</td>
</tr>
<tr>
<td>5</td>
<td>Broken</td>
<td>80</td>
</tr>
<tr>
<td>6</td>
<td>Hole</td>
<td>80 to 165</td>
</tr>
<tr>
<td>7</td>
<td>Collapsed</td>
<td>165</td>
</tr>
<tr>
<td>8</td>
<td>Spalling</td>
<td>5 to 120</td>
</tr>
<tr>
<td>9</td>
<td>Wear</td>
<td>5 to 120</td>
</tr>
<tr>
<td>10</td>
<td>Deformation</td>
<td>20 to 165</td>
</tr>
</tbody>
</table>
Every video inspected sewer will be assigned a composite score when it scores under each defect category which are added as per the following table: *(REVISED NOVEMBER 2009)*

**WRc - SEWER RATING COMPOSITE SCORES**

<table>
<thead>
<tr>
<th>COMPUTER COMPOSITE GRADE</th>
<th>PEAK SCORE RANGE (SUM OF THE SCORES FROM THE ABOVE TABLE)</th>
<th>TYPICAL DEFECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (least defective)</td>
<td>1 to 9</td>
<td>No observable structural defects</td>
</tr>
<tr>
<td>2</td>
<td>10 to 39</td>
<td>Circumferential crack. Moderate joint defects, i.e. open joint (medium) or joint displaced (medium), spalling slight and wear slight.</td>
</tr>
<tr>
<td>3</td>
<td>40 to 79</td>
<td>Fracture with deformation &lt;5%. Longitudinal cracking or multiple cracking. Minor loss of level. More severe joint defects, i.e. open joint (large) or joint displaced (large). Spalling medium. Wear medium.</td>
</tr>
<tr>
<td>4</td>
<td>80 to 164</td>
<td>Broken, deformation up to 10% and broken fracture with deformation 5 - 10%. Multiple fractures. Serious loss of level. Spalling large. Wear large.</td>
</tr>
<tr>
<td>5 (most defective)</td>
<td>165+</td>
<td>Already collapsed. Deformation &gt;10% and broken. Extensive areas of fabric missing. Fracture with deformation &gt;10%.</td>
</tr>
</tbody>
</table>

The following additional information shall be included for each sewer section.

(a) Date of survey.
(b) Report number and tape, CD or DVD number.
(c) Direction of Camera Travel.
(d) Street names, addresses and blocks.
(e) Distance from the manhole rim to pipe invert.
(f) Current weather information.

.4 All pipe video inspection operators shall be thoroughly trained with current Canadian certification by a City approved agency. *(REVISED NOVEMBER 2009)*

.5 Manhole video inspection is not required. Manholes shall be rated as per the following table and form part of the video inspection report.
## MANHOLE RATING SYSTEM

<table>
<thead>
<tr>
<th>INTERNAL CONDITION GRADE</th>
<th>TYPICAL DEFECT DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (least defective)</td>
<td>- no observable structural defects</td>
</tr>
<tr>
<td></td>
<td>- no observable signs of infiltration</td>
</tr>
<tr>
<td>2</td>
<td>- minor cracks, chips, spalling.</td>
</tr>
<tr>
<td></td>
<td>- signs of minor staining, but no infiltration</td>
</tr>
<tr>
<td>3</td>
<td>- fractures, medium spalling, defective pipe/MH joints</td>
</tr>
<tr>
<td></td>
<td>- some staining, mineral build-up and seeding infiltration. Possible infiltration through manhole cover</td>
</tr>
<tr>
<td>4</td>
<td>- broken manhole wall, channel or riser assembly, multiple fractures, medium wear</td>
</tr>
<tr>
<td></td>
<td>- moderate staining, mineral build-up and running infiltration</td>
</tr>
<tr>
<td></td>
<td>- infiltration through manhole cover</td>
</tr>
<tr>
<td></td>
<td>- manhole frame and cover cracks or broken</td>
</tr>
<tr>
<td>5 (most defective)</td>
<td>- failure in manhole wall, channel or riser assembly, multiple fractures with deformation, large wear</td>
</tr>
<tr>
<td></td>
<td>- heavy staining, mineral build-up and gushing infiltration</td>
</tr>
<tr>
<td></td>
<td>- surface ponding and infiltration through manhole cover</td>
</tr>
<tr>
<td></td>
<td>- manhole frame and cover cracks or broken</td>
</tr>
</tbody>
</table>
### SECTION 6 - SANITARY SEWER SYSTEM

#### MEASUREMENT AND PAYMENT

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piping and Fittings</td>
<td>6.70</td>
</tr>
<tr>
<td>Service Junctions</td>
<td>6.71</td>
</tr>
<tr>
<td>Connections to Existing Piping</td>
<td>6.72</td>
</tr>
<tr>
<td>Precast Manhole Sections</td>
<td>6.73</td>
</tr>
<tr>
<td>Concrete Bases, Frames and Covers</td>
<td>6.74</td>
</tr>
<tr>
<td>Drop Structures</td>
<td>6.75</td>
</tr>
<tr>
<td>Stubs</td>
<td>6.76</td>
</tr>
<tr>
<td>Cleanouts</td>
<td>6.77</td>
</tr>
<tr>
<td>Additional Excavation and Backfill</td>
<td>6.78</td>
</tr>
<tr>
<td>Sewer Service Connection Piping</td>
<td>6.79</td>
</tr>
<tr>
<td>Service Connection Inspection Assembly</td>
<td>6.80</td>
</tr>
<tr>
<td>Manhole and Cleanout Lid Markers</td>
<td>6.81</td>
</tr>
</tbody>
</table>
The contractor will note that the tendered price for all items specified in this section will include but not be limited to the following: Please refer to Section 4 - Trench Excavation, Bedding and Backfill for further clarification of these items.

(a) materials  
(b) excavation  
(c) dewatering  
(d) bracing & sheeting  
(e) bedding  
(f) pipe installation  
(g) backfill with native material  
(h) video inspection  
(i) maintenance  
(j) preparing disturbed areas for surface restoration by the City  
(k) bypass pumping

The Contractor will note that payment for surface restoration and asphalt removal is paid in accordance with Section 4.76.

6.70 PIPING AND FITTINGS  Section 6.42 - 6.46

Payment for piping and fittings will be made at the unit price per linear metre shown in the Tender Form for the various sizes and class of pipe. Measurement will be made horizontally along the centreline of the installed pipe, including fittings, from centre-to-centre of manholes or to the end of the pipe, whichever is applicable. This price shall include materials, excavation, dewatering, bracing & sheeting, bedding, pipe installation, backfill with native material, video inspection and maintenance, testing as specified, and all work incidental thereto except those items for which payment is specified additional to that for gravity sewer pipe.

6.71 SERVICE JUNCTIONS  Section 6.48

Payment for service junctions installed in the gravity sewers will be made at the unit price shown in the Tender Form. This price shall include materials, and placement of the wye and plug or cap as required.

6.72 CONNECTIONS TO EXISTING PIPING  Section 6.47

(a) Payment for connections to existing main piping will be made at the unit price per proposed pipe size per connection shown in the Tender Form. This price shall include materials, and all work incidental thereto.

(b) Payment for connections to existing service connections will be made at the unit price per pipe size per connection shown in the Tender Form. This price shall include materials, and all work incidental thereto.
SECTION 6 - SANITARY SEWER SYSTEM

MEASUREMENT AND PAYMENT

6.73 PRECAST MANHOLE SECTIONS Section 6.51 -6.54

Payment for manholes will be made at the unit price per vertical metre per diameter of manhole barrel shown in the Tender Form. Measurement will be made from the lowest channel invert in the manhole to the bottom of the manhole cover slab. This price shall include materials, installation, grouting, and all work incidental thereto except those items for which payment is specified additional to that for manholes.

6.74 CONCRETE BASES, FRAMES AND COVERS Sections 6.49, 6.49A, 6.50, 6.52, 6.53

Payment for concrete bases or tee manholes, cover slabs, and frames and covers will be made at the unit price per manhole shown in the Tender Form. This price shall include materials, installation, brickwork, concrete, channeling, grouting, adjustment to grade, asphalt apron and all work incidental thereto. Payment will be in addition to that of 6.73 above.

6.75 DROP STRUCTURES Section 6.55

Payment for drop structures on manholes will be made at the unit price per vertical metre of drop shown in the Tender Form. Measurement will be made between pipe inverts at the top and bottom of the drop section. This price shall include materials, installation, concrete, asphalt apron and all work incidental thereto.

6.76 STUBS Section 6.56

Payment for stubs in manholes will be made at the unit price per linear metre for the various sizes of pipe shown in the Tender Form. This price shall include materials, grouting, installation, cap, and all work incidental thereto. Payment will be in addition to that of 6.73 above.

6.77 CLEANOUTS Section 6.57 Standard Drawing S12-S13

Payment for cleanouts will be made at the unit price shown in the Tender Form for the specified type of cleanout. This price shall include excavation, materials, installation, concrete base, concrete barrel, grouting, brickwork, frame and cover, pipe, fittings, adjustment to grade and all work incidental thereto.

6.78 ADDITIONAL EXCAVATION AND BACKFILL

Payment will not be made as a separate item for excavation, backfill and work applicable thereto required at any structure specified in this section. The cost of such work shall be included in the applicable prices for the various structures shown in the Tender Form.
SECTION 6 - SANITARY SEWER SYSTEM

MEASUREMENT AND PAYMENT

6.79 **SEWER SERVICE CONNECTION PIPING**  Section 6.59

Payment for sewer service connection pipe will be made at the unit price per linear metre shown in the Tender Form for the various sizes of pipe. Measurement will be made horizontally along the centreline of the installed pipe from the centre of the gravity sewer to the terminus of the service pipe or from the bend fitting in the case of riser service connections. This price shall include materials, excavation, dewatering, bracing & sheeting, bedding, pipe installation, backfill with native material, and maintenance, testing as specified, bends, caps, and other fittings, and all work incidental thereto except those items for which payment is specified additional to that for sewer service connection pipe.

6.80 **SERVICE CONNECTION INSPECTION ASSEMBLY**  Section 6.59.3 (j)  Standard Drawing S5

Payment for service connection inspection assemblies will be made at the unit price shown in the Tender Form. This price shall include installation of pipe, fittings, marker posts, concrete service box, other materials and all work incidental thereto.

6.81 **MANHOLE AND CLEANOUT LID MARKERS**  Section 6.35  Standard Drawing S14

Payment for manhole and cleanout lid markers will be made at the unit price shown in the Tender Form. This price shall include supply of materials, excavation, fabrication, painting, installation, backfilling and all work incidental thereto. Payment will be in addition to that of 6.73 and 6.77.

6.82 **POINT REPAIR AT 133 CILAIRE**

Payment for the point repair at 133 Cilaire Drive will be made at the lump sum price shown in the Tender Form. This price shall include all materials, equipment and labour required to complete the repair as noted in the drawings.
1. RIGHT ANGLE BEND
2. TEE CONNECTION
3. THREE WAY JUNCTION
4. FOUR WAY JUNCTION
5. STRAIGHT THROUGH
6. DEAD END
7. WYE CONNECTION
8. 45' BEND

NOTES

1. ALL CHANNELS SHALL BE FINISHED WITH A STEEL TROWEL. BENCHING (SHADED AREAS) SHALL BE BROOM FINISHED.
2. MANHOLE COVER OPENINGS AND RUNG LOCATIONS SHALL BE AS SHOWN UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS.
HEAVY DUTY MANHOLE FRAME AND COVER (STD. DWG. S-9)

ASPHALT APRON C/W 100mm BASE (OFF ROADWAY AREAS)

CONCRETE

500 (MAX.)

175

PRECAST CONCRETE GRADE RINGS
MORTAR INSIDE AND OUT
BUILD TO SUIT GRADE
TWO GRADE RINGS (125 MIN.)
FOUR GRADE RINGS (250 MAX.)

CONCRETE COVER SLAB TO CS600 LOADING

1-300 SECTION REQUIRED

JOINTS TO BE WATERTIGHT, MORTAR OR O-RING JOINTS

19# RUNGS AT 300 o/c CAST IN WALL OF BARREL INSTALLED IN CONFORMANCE WITH WCB REQUIREMENTS

RUBBER MANHOLE ADAPTOR RING (PLASTIC PIPE ONLY)

WHERE MANHOLE BASE EXCAVATION EXTENDS BEYOND BASE DIMENSION, THE OVEREXCAVATION SHALL BE FILLED WITH CONCRETE TO 100 BELOW THE BOTTOM OF THE PIPE AND FOR THE WIDTH OF THE TRENCH

NOTES:
1. FOR MANHOLE BENCHING DETAILS SEE DWG. S-1
2. ONLY PRODUCTS APPROVED BY THE CITY ENGINEER AND LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION
3. ALL DIMENSIONS IN MILLIMETERS UNLESS SHOWN OTHERWISE
4. MANHOLES LOCATED ON GRAVEL ROADS OR SHOULDERS REQUIRE A 1.5 m X 1.5 m HOT MIX ASPHALT APRON, 50 mm THICK.

GALVANIZED OR ALUMINUM LADDER RUNG

PRECAST REINFORCED CONCRETE BARREL CONFORMING TO ASTM C478

WHERE POSSIBLE USE HALF SECTIONS, OR BREAK OUT TOP HALF OF PIPE
PLASTIC PIPE TO TERMINATE IN MANHOLE WALL WITH RUBBER MANHOLE ADAPTOR RING

400# - 1050#
150# - 375#
PIPES

PIPES

100 (MIN.)

75 (MIN.)

150 (MIN.)

200 (MIN.)

CITY OF NANAIMO
THE HARBOUR CITY

TYPICAL SANITARY MANHOLE DETAILS FOR LATERALS TO 375mm - STANDARD PRECAST TYPE

Engineering Standards & Specifications
November 2009 Edition

Scale N.T.S.
Drawn G.C.
Rev. Date: NOV 2009
Dwg. No. S-2
NOTE: RISER PIPE, CAP AND PROPERTY SIDE STUB TO BE WHITE

FOR TRENCH DETAILS REFER TO SECTION 4

GROUND SURFACE

INSPECTION ASSEMBLY AND CONCRETE SERVICE BOX, SEE STD. DWG. S-8 FOR DETAILS.

DITCH

PIECE @ 2.0% GRADE (MIN.)

45° LONG RADIUS BEND

ELEVATION

WOODEN MARKER POST 50x100. SANITARY SEWER PAINTED YELLOW WITH DEPTH FROM TOP OF STAKE TO INVERT OF SERVICE PAINTED TO NEAREST 0.07M, LOCATE STAKE 2.0M FROM PROPERTY OR EASEMENT LINE.

WHITE CAP OR PLUG

COMPACTED BEDDING MATERIAL MIN. DEPTH 100 BELOW PIPE.

CAP & STAKE AT PROPERTY LINE FOR DEVELOPED LOTS

NOTES:
1. MINIMUM SERVICE CONNECTION DIAMETER TO BE 100.
2. EXTEND TRENCH 3.0M PAST MARKER INTO PROPERTY WHEN IN ROCK.
3. WHERE DEPTH OF SERVICE AT PROPERTY LINE IS GREATER THAN 2.0M, EXTEND SERVICE SO THAT EXTENDED LENGTH IS EQUAL TO DEPTH.
4. SANITARY SEWER INSPECTION ASSEMBLY, INCLUDING PROPERTY SIDE STUB, TO BE WHITE IN COLOUR.
5. MINIMUM 0.75M COVER @ PROPERTY LINE. PROVIDE SUFFICIENT DEPTH TO SERVICE THE BASEMENT PLUMBING BY GRAVITY IN ACCORDANCE WITH THE B.C. PLUMBING CODE.
6. ONLY PRODUCTS APPROVED BY THE CITY WILL BE ACCEPTED FOR INSTALLATION.
7. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN.
NOTES:
1. See standard drawings S-19 and S-20 for service box specifications.
2. Plastic service boxes shall be used in existing landscaped areas and require's approval by the city engineer.
3. Only products approved by the city engineer and listed in the city of Nanaimo approved products list will be accepted for installation.
4. All dimensions in millimeters unless otherwise shown.
REFERRING TO "CITY OF NANAIMO SANITARY," LETTERING SHALL BE 25 FLATTENED FACE, GOTHIC WITH FACE OF LETTERS RAISED TO THE SAME LEVELS AS THE TOP OF THE RIBS (IN STATUTORY RIGHTS-OF-WAY INCLUDE THE WORDING "DO NOT COVER" ON THE MANHOLE LID).

MANUFACTURES SYMBOL 90 MAXIMUM DIMENSION, CIRCLE OR SQUARE

2 1/8 HOLE FOR CARRIAGE BOLT, TWO REQUIRED AS ShOWN

1 1/2 x 6 1/2 MILD STEEL CARRIAGE BOLT
LAST THREAD BURIED

CARRIAGE BOLT DETAIL

NOTES:
1. ALL CASTINGS SHALL BE CERTIFIED TO MEET CS600 REQUIREMENTS

2. ALL METAL BEARING SURFACES BETWEEN FRAME, COVER AND RISER RINGS MACHINED FOR NON ROCKING FIT IN ALL POSITIONS, ALLOW 1 1/2 RAISED FACE IN CASTING FOR MACHINING

3. PAINT THE INSIDE SURFACE OF THE MANHOLE FRAME, IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS WITH AN ENAMEL RUST PAINT TO THE FOLLOWING COLOUR:
   - SANITARY INSTALLATIONS: YELLOW

4. ONLY PRODUCTS APPROVED BY THE CITY ENGINEER AND LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION

5. ALL DIMENSIONS IN MILLIMETERS UNLESS OTHERWISE SHOWN

FRAMES INSTALLED ON 600# BARRELS SHALL NOT HAVE RIB

CITY OF NANAIMO
THE HARBOUR CITY

HEAVY DUTY SANITARY MANHOLE COVER AND FRAME

Engineering Standards & Specifications
November 2009 Edition

Scale
N.T.S.
Drawn
G.C.
Rev. Date: NOV 2009
Dwg. No. S-9
CLEANOUT CAP
(RUBBER GASKET REMOVED)

ASPHALT APRON
C/W 100mm BASE
(OFF ROADWAY AREAS)

CONCRETE SURROUND
FRAME TO 50mm
BELOW BARREL (MIN.)

2 - 45° LONG RADIUS BENDS

STANDARD MANHOLE COVER AND
FRAME. PROJECT FRAME 25 IN
UNPAVED AREAS AND 0 IN
PAVED AREAS

PRECAST CONCRETE GRADE RINGS. MORTAR
INSIDE AND OUT. BUILD BRICK TO SUIT GRADE.
TWO GRADE RING LAYERS (125 min.).
FOUR GRADE RING LAYERS (250 max.)

600ø C76 CL III CONCRETE BARREL

COMPACTED SELECT
BACKFILL

SEWER PIPE, REDUCE TO 150ø WHERE
MAIN IS GREATER THAN 150ø

NOTES:
1. USE WHERE NO SERVICE EXTENSION IS REQUIRED.
2. FRAME AND COVER TO STANDARD DRAWING S-9 (HEAVY
DUTY COVER) OR STANDARD DRAWING S-15 (WATERTIGHT
COVER)
3. CLEAN OUT STRUCTURES LOCATED ON GRAVEL ROADS
OR SHOULDERS REQUIRE A 1.5 m X 1.5 m HOT MIX
ASPHALT APRON, 50 mm THICK.
4. ONLY PRODUCTS APPROVED BY THE CITY ENGINEER
AND LISTED IN THE CITY OF NANAIMO
APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR
INSTALLATION
5. ALL DIMENSIONS IN MILLIMETERS UNLESS SHOWN OTHERWISE

SANITARY CLEANOUT
STRUCTURE – TYPE 1

Engineering Standards & Specifications
November 2009 Edition
CLEANOUT CAP
ASPHALT APRON C/W 100mm BASE (OFF ROADWAY AREAS)
STANDARD MANHOLE COVER AND FRAME. PROJECT FRAME 25 IN UNPAVED AREAS AND 0 IN PAVED AREAS
CONCRETE SURROUND FRAME TO 50mm BELOW BARREL (MIN.)
PRECAST CONCRETE GRADE BRICK FILLER RING, MORTAR INSIDE AND OUT. BUILD BRICK TO SUIT GRADE. TWO GRADE RING LAYERS (125 min.) FOUR GRADE RING LAYERS (250 max.)
600# C76 CL II CONCRETE BARREL
COMPACTED SELECT BACKFILL
JUTE WRAPPED
45° LONG RADIUS BEND
45° WYE
150# x 100# REDUCER
100# STUB – 1.5m LONG (MIN.)
SEWER PIPE, REDUCE TO 150# WHERE MAIN IS GREATER THAN 150#

NOTES:
1. USE WHERE NO SERVICE EXTENSION IS REQUIRED.
2. FRAME AND COVER TO STANDARD DRAWING S-9 (HEAVY DUTY COVER) OR STANDARD DRAWING S-15 (WATERTIGHT COVER)
3. CLEAN OUT STRUCTURES LOCATED ON GRAVEL ROADS OR SHOULDERS REQUIRE A 1.5 m X 1.5m HOT MIX ASPHALT APRON, 50 mm THICK.
4. ONLY PRODUCTS APPROVED BY THE CITY ENGINEER AND LISTED IN THE CITY OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION
5. ALL DIMENSIONS IN MILLIMETERS UNLESS SHOWN OTHERWISE
CAST IRON TRAFFIC COVER
LID TO READ 'SEWER'

EXTENSION

TOP

BOTTOM

NOTES
1. MARK LID "SEWER" FOR SANITARY SERVICE.
2. ONLY PRODUCTS APPROVED BY THE CITY ENGINEER AND LISTED IN THE CITY
   OF NANAIMO APPROVED PRODUCTS LIST WILL BE ACCEPTED FOR INSTALLATION.
3. ALL DIMENSIONS IN MILLIMETERS UNLESS SHOWN OTHERWISE

CITY OF NANAIMO
THE HARBOUR CITY

STANDARD CONCRETE
SANITARY SERVICE BOX
(FOR SINGLE SERVICE)

Engineering Standards & Specifications
November 2009 Edition
1. DESCRIPTION

1.1 General

.1 This specification covers the supply and installation of full segment replacement using Cured-In-Place Pipe (CIPP).

.2 Cured-In-Place-Pipe (CIPP) means trenchless sewer rehabilitation by installing a resin-felt composite structure which when cured will form a continuous-close fit liner within an existing sewer.

.3 Full segment CIPP means CIPP extending from manhole to manhole and there are no mid-run splices.

.4 Minimum material requirements for CIPP shall conform to ASTM D5813 “Standard Specification for Cured-In-Place Thermosetting Resin Sewer Pipe” and the supplemental requirements noted herein.

.5 Refer to the Manual of Engineering Standards and Specifications 2009 (MOESS) Section 4 – Trench Excavation, Bedding, and Backfill, and Section 6 – Sanitary Sewer System for related specifications.

.6 The completed liner shall contain materials capable of withstanding the effects of conventional sanitary sewage, the gases produced therefrom, grits and other materials normally transported in sanitary sewage pipelines.

2. CIPP MATERIALS

2.1 CIPP Material Requirements

.1 The materials of the Liner System, Tube and Resin, shall comply with the requirements of ASTM D5813 Sections 5, 6, 7, and 8, unless noted otherwise.

.2 The Tube shall consist of one or more layers of fabric that are compatible with the Resin used and are capable of supporting and carrying Resin. The Tube should be capable of withstanding installation procedures and curing temperatures.

.3 The Resin shall be a thermosetting polyester or vinyl ester.

.4 The tube shall be homogeneous across the entire wall thickness.

.5 The outside layer of the tube (before wetout and inversion) shall consist of an impermeable, flexible membrane.

.6 The wall colour of the CIPP after installation shall be a light, reflective cover to facilitate CCTV inspection.

.7 Seams in the tube shall be stronger than unseamed felt. Overlapped layers that cause lumps in the final product shall not be allowed.

.8 If a calibration hose is used for inflation of the Liner System, it shall comply with the requirements of ASTM F1743 or ASTM F2019.
.9 Prior to construction, the Resin manufacturer shall be required to submit a resin sample for infrared analysis. The infrared spectrum generated from this sample will be compared to the spectrum obtained from samples of the actual Resin used to wet-out the liner.

.10 The minimum structural properties of the Liner System shall satisfy the requirements of Table 1 as per ASTM F1216, or Table 2 as per ASTM F2019.

### Table 1: Minimum Properties as per ASTM F1216

<table>
<thead>
<tr>
<th>Component</th>
<th>Structural Property</th>
<th>Minimum Value (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube</td>
<td>Tensile Strength</td>
<td>5</td>
</tr>
<tr>
<td>Liner System</td>
<td>Flexural Strength</td>
<td>31</td>
</tr>
<tr>
<td>Liner System</td>
<td>Flexural Modulus</td>
<td>1724</td>
</tr>
</tbody>
</table>

### Table 2: Minimum Properties as per ASTM F2019

<table>
<thead>
<tr>
<th>Component</th>
<th>Structural Property</th>
<th>Minimum Value (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tube</td>
<td>Tensile Strength</td>
<td>5</td>
</tr>
<tr>
<td>Liner System</td>
<td>Flexural Strength</td>
<td>45</td>
</tr>
<tr>
<td>Liner System</td>
<td>Flexural Modulus</td>
<td>5000</td>
</tr>
</tbody>
</table>

.11 Verification of structural properties to be used in design shall be made by attaching relevant third party test results. Reports verifying structural properties shall conform to the requirements of Table 3. Flexural strength, tensile strength, and flexural modulus values shall be based on field test results attained by the installer with the specific liner system, tube, and resin proposed for use on this project.

.12 Bench mark testing by the manufacturer of the resin system shall not be used to support design values for short term strength and stiffness, only results from field sampling on previous representative projects.
Table 3: Reference Standard for Structural Property Verification

<table>
<thead>
<tr>
<th>Structural Property</th>
<th>Applicable Standard</th>
<th>Report Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength (Tube)</td>
<td>ASTM D5035</td>
<td>Section 13 of ASTM D5035</td>
</tr>
<tr>
<td>Flexural Strength and Flexural Modulus (Liner System)</td>
<td>ASTM D790</td>
<td>Section 13 of ASTM D790</td>
</tr>
<tr>
<td>Long Term Flexural Creep Modulus (Liner System)</td>
<td>ASTM D2990</td>
<td>Section 13 of ASTM D2990</td>
</tr>
</tbody>
</table>

.14 Submit chemical resistance results for each proposed Liner System.

.15 Third party test results that do not implicitly indicate the resin and tube name on the actual laboratory report shall be supported by the following backup documentation:

.1 a certificate of compliance signed by a representative of the Supplier and a public notary indicating the Resin and Tube name tested on said reports, or

.2 copies of the appropriate contract specifications or approved shop drawings clearly indicating the tube and resin used on and subsequently tested and reported on said reports.

3. **CIPP DESIGN**

3.1 **CIPP Design Objectives for Lining Sewer Pipe, include:**

.1 Maximizing the structural enhancement of the sewer by installing a close-fit CIPP.

.2 Rehabilitate sewer to meet or exceed existing hydraulic capacity.

.3 Reducing infiltration and exfiltration that may compromise long term structural stability of the pipe.

.4 Preventing root intrusion.

.5 Minimizing disruption to the sewer function during the rehabilitation process.

.6 Minimizing the time required to complete the sewer rehabilitation.

.7 Minimizing disturbance to pavements, boulevards, and private property.

.8 Minimizing disruption to vehicular and pedestrian traffic.

.9 Minimizing the impact of construction on commercial, industrial, and institutional facilities.

.10 Select CIPP and plan approach to rehabilitation toward maximizing the achievement of these design objectives.

3.2 **CIPP Design – General**

.1 Design full segment CIPP in accordance with the most current version of Appendix XI of ASTM F1216 and these specifications as a gravity pipe in a fully deteriorated pipe condition in accordance with design conditions noted in the Drawings and Specifications.
.2 Size CIPP in accordance with the design objectives to provide a close-fit to the host pipe with no annulus except for the maximum allowable diametric shrinkage due to curing permitted in ASTM D5813.

.3 Perform a design check to confirm the full flow hydraulic capacity of the CIPP will be equal to or greater than the existing sewer. Use "Manning’s" formula with assumed ‘n’ value of 0.011 for the CIPP and an “n” value for the existing section estimated on the observed condition of the pipeline from the Sewer Maintenance Inspection.

3.3 CIPP Design – Fully Deteriorated Condition

.1 Design CIPP for fully deteriorated pipe condition in accordance with Appendix XI of ASTM F1216 and the following minimum design assumptions.

.1 Include an allowance for an AASHTO HSS25 concentrated live load in the total external pressure on the pipe. Calculate minimum live load surcharge based on Cooper E80 distributed load for portions of CIPP installed under railway lines.
.2 Calculate dead load based on soil density of 1920 kg/m3.
.3 Assume groundwater table is 1.0 m below the existing ground surface for sewers with deep sewers (cover greater than 3 m).
.4 Assume groundwater table is at existing ground surface for sewers with shallow sewers (cover less than 3 m).
.5 Minimum value for ovality of the existing sewer will be 3% unless a greater value is determined from observation during pre-lining inspection.
.6 Long-term value for flexural modulus of elasticity will be considered to be the projected value at 50 years of a continuous application of the design load based on the specific resin and felt composite as established by ASTM D2990.
.7 Modulus of soil reaction (E’s) will be assumed to be 6984 kPa for deep sewers (cover greater than 3 m) and 4825 kPa for shallow sewers (cover less than 3 m) unless a higher or lower value is indicated in the contract specifications.
.8 Minimum factor of safety (N) of 2.
.9 Design values for flexural modulus and flexural strength:

.1 Use design values for flexural modulus and flexural strength that are equal to or greater than the minimum values stipulated in Table 1 of ASTM F1216.
.2 Use only design values that the installer can demonstrate that they consistently achieve in actual field installations based on independent third party testing by a recognized laboratory with adequate experience in carrying out ASTM D790 testing.

3.4 Existing Sewer Design Conditions

.1 The existing sewer conditions were assessed based on the conditions observed from CCTV inspections included in Appendix 5 of the contract documents. CCTV inspections are available online at https://cloud.nanaimo.ca/public.php?service=files&t=14dafcfc54c4b4dfb4390fed23edbc

.2 The specific design conditions and site specific repair requirements included in this work are prepared in the Schedule of Specific Design Conditions and Site Specific Repairs at the end of this document.

.3 The Contractor shall be responsible to determine the actual amount of sediment and debris in the sewers, or any other specific repair requirements to be included in this Work.
3.5 Submittals Before Starting Work

.1 Provide the required submittals to the Contract Administrator a minimum of 10 calendar days before starting the lining.

.2 Submit the CIPP design Shop Drawings sealed and signed by a Professional Engineer licensed to practice in the Province of British Columbia. Include the following information:
   .1 CIPP thickness computations including all specified design checks. Identify design assumptions based on a review of the Sewer Maintenance Inspection that differ from the information provided in the Specifications for the existing sewer design conditions.
   .2 Calculations showing the hydraulic capacity of the CIPP sewer will be equal to or greater than the existing sewer.
   .3 Name and manufacturer of the resin and tube proposed for each CIPP.
   .4 CIPP curing schedule provided by the resin supplier indicating the temperature, staging, duration and pressure required to achieve a proper cure of the resin and fabric tube composite.
   .5 Sufficient results of testing from an independent third party laboratory from previous field installations (minimum of the last three projects) to substantiate the validity of design values used for short term flexural modulus and flexural strength.
   .6 Adequate support documentation to substantiate creep and strength reductions for each CIPP lining system based on ASTM D2990 testing carried out at representative stress levels for the proposed installation. Testing carried out at 25% of the flexural yield strength would be deemed to be acceptable.
   .7 Other information that may reasonably be required by the Contract Administrator to confirm the CIPP design proposed conforms to the specified requirements and design intent.

.3 Provide resin samples as follows:

   .1 Arrange for the manufacturer of the resin to forward a reference sample of each type of resin proposed for use on the works to a test laboratory designated by the Contract Administrator to be used as a comparative reference sample for infrared spectrum testing.
   .2 Deliver a representative sample from each resin batch to be used on the project before adding the catalyst from the wet-out facility to a test laboratory designated by the Contract Administrator.
   .3 The Contract Administrator will arrange for an infrared analysis of the samples; payment will be made from the prime sum allowance.

.4 Submit an operations protocol for the CIPP tube impregnation process that provides information on the following:

   .1 Resin impregnation method.
   .2 Designated location of the wet out facility.
   .3 Documentation the resin to be used has not exceeded its shelf life as recommended by the manufacturer of the resin.
   .4 Volume and weight of resin to be impregnated into each liner and repair section including the proposed excess allowance for polymerization and migration (typically 7%) into cracks and joints of the host pipe.
   .5 Roller gap setting required to provide the final installed CIPP thickness based on the proposed volume of resin.
   .6 Details of the wet-out procedure.

.5 Submit a construction protocol that provides information on the following:
1. Proposed main line and sewer service flow control arrangements.
2. Details of pre-liner installation, if utilized to mitigate any deleterious reaction between existing pipe and the CIPP liner.
3. Minimum pressure to hold the tube tight against the existing sewer and the maximum pressure to not damage the sewer or uncured liner.
4. Provide the maximum allowable axial and longitudinal tensile stress for the fabric tube and the arrangement for monitoring pull-in forces during installation if liner insertion is to be by pull-in methods.
5. Number and location of heat source monitor gauges.
6. Minimum and maximum allowable temperature during each phase of the cure period as measured at the heat source return line.
7. Number of stages and anticipated time for each stage of the curing period based on resin supplier's recommendations.
8. Estimated length of time required to reinstate the main line sewer and sewer services.
9. A styrene management plan
10. A means to axial restrain the pipe to preclude excessive axial shrinkage post cool down of the CIPP liner.

.6 In conjunction with the construction protocol submit a styrene management plan that includes and addresses:

.1 Required limits to be regulatory compliant for discharge based on the Contractor's proposed resin selection, curing method, and discharge location for steam condensate or cure water, etc.
.2 The means, methods, and techniques employed to mitigate styrene levels to within acceptable limits for discharge to the environment, including:
   .1 Resin selection to eliminate or mitigate styrene levels,
   .2 Cure considerations to mitigate excessive styrene volatilization,
   .3 Handling considerations, post cure to mitigate levels discharged to aquatic or other environments that may be deleteriously impacted by excessive styrene levels
   .4 Monitoring to be employed to confirm discharge levels are consistent with the styrene management plans stated discharge limit objectives.

4. CONSTRUCTION METHODS

4.1 Verification of Existing Sewer Dimensions

.1 Verify dimensional requirements of each sewer to be rehabilitated prior to manufacture of the CIPP tube as follows.
   .1 Length of sewer from manhole to manhole for full segment CIPP.
   .2 Diameter and cross-section of the sewer at the upstream and downstream manholes and at a minimum distance of 500 mm inside the sewer from each manhole.

.2 Use calibrated callipers or other suitable measuring device capable of measuring accurately to ± 1 mm to confirm cross section geometry at clock positions of:
   .1 12:00 to 6:00,
   .2 2:00 to 8:00,
   .3 3:00 to 9:00 and
   .4 4:00 to 10:00.

.3 Estimate the remainder of the sewer dimensional requirements based on dimensional checks and the Sewer Maintenance Inspections.
4.2 **Sewer Cleaning**

.1 Remove loose and solid debris, and root masses in accordance with MOESS Section 6.60 to adequately prepare the sewer for lining.

4.3 **Sewer Inspections**

.1 Perform the following sewer inspections in accordance with MOESS Section 6.64 in the presence of the Contract Administrator.

.1 Pre-Lining Inspection after sewer cleaning and preparation. No coding of the submission will be required.

.2 Post-Lining Inspection subsequent to installing the CIPP and sewer service reinstatement. Full coding required. Perform post-lining inspection immediately after sewer connection reinstatement while flow control measures are in place.

.3 Warranty Inspection before expiration of the warranty period and acceptance. Full coding required.

.2 Provide a copy of the video to the Contract Administrator.

.3 Advice the Contract Administrator of any condition that is contrary to the design conditions or assumptions made that may affect either long or short term performance of the CIPP prior to liner design.

.4 Review the Pre-Lining Inspection video with the Contract Administrator at least 24 hours before installing the CIPP and obtain approval to install the CIPP. The Pre-Lining Inspection shall confirm:

.1 Necessary cleaning and pipe preparation work, including internal and external sewer repairs, have been satisfactorily completed.

.2 Condition of the sewer pipe is consistent with the design conditions and the Specifications. Advise the Contract Administrator of any condition that is contrary to the design conditions or assumptions made that may affect either long or short term performance of the CIPP prior to commencing lining.

.3 Location, condition and operational status of all sewer services.

.5 Review Sewer Connection Reports while reviewing the Pre-Lining Inspection.

.6 Post-Lining Inspection is to confirm the adequacy of sewer service reinstatements and the fit and finish of the CIPP.

.7 Perform Post-Lining Inspection within 24 hours of completing the installation of the CIPP liner.

.8 Warranty Inspection to confirm the fit and finish of the CIPP, need for any remedial work and acceptance of any repair work performed during the warranty period. Sewer cleaning in accordance with MOESS Section 6.60 is required to obtain a satisfactory inspection.

4.4 **Sewer Connection Report**

.1 Confirm exact location of all catch basin drain, service laterals and other sewer connections that are connected to the sewer being lined by dye testing, tracing or other methods.

.2 Submit a written Sewer Connection Report for each CIPP location to the Contract Administrator providing the following information for each sewer service including utility drains.
.1 Location of connection (chainage from upstream manhole and clock reference).
.2 Diameter of service connection lateral.
.3 Material type of sewer connection.
.4 Observed condition of connection.
.5 Status of connection (active, inactive or unable to determine).
.6 Property serviced including the address.

4.5 Sewer Lateral Lining

.1 Sewer laterals identified on contract drawings are to be lined in manner described on the drawings.
.2 Laterals are to be lined from the Inspection Chamber (IC) to the new PVC wye or tee installed at the main, unless otherwise noted on the contract drawings.
.3 Laterals identified on the contract drawings to be lined with a One-Piece Main and Lateral Cured-in-Place Liner must be performed in accordance with ASTM F2561.

4.6 Sewer Lateral Replacement

.1 Prior to lining, excavate and replace all service laterals connected to sewer from the main to the property line of Right of Way where noted on the drawings, except when the existing connection is a PVC pipe, which does not need to be replaced.
.2 IC is to be installed at each service lateral as noted on the drawings (most of the IC will be installed prior to this tender).

4.7 Flow Control

.1 Provide necessary flow control measures for the main line sewer and sewer services required to perform the work. Diversion of wastewater flow directly or indirectly to the environment, Drainage Sewers, or Storm Relief sewers will not be allowed.
.2 Provide written flow control plan for each sewer to be lined to the Contract Administrator for review before performing the Work.
.3 Maintain existing sewer flows from upstream sewers during construction around the sewers being lined.
.4 Provide adequate temporary bypass pumping for live sewer services connected to the sewer being lined from when the service is blocked off until it is reinstated.
.5 Provide security personnel for locations where by-pass pumping requires normally secure or locked doors and access areas to be left open or unlocked.
.6 Restore the surface in accordance with MOESS Section 4.27:

4.8 Sewer Preparation and Repairs Prior to Lining

.1 Perform sewer preparation and repairs as indicated in this specification and drawings.
.2 Removal of Intruding Sewer Services and Solid Debris Cutting
   .1 Equipment
.1 Debris cutting equipment to be an accessory or attachment to hydraulic cleaning equipment. Equipment to be capable of removing heavy roots and solid debris such as encrustation and grease.

.2 Intruding Sewer service pipe removal equipment to include remote controlled hydraulically driven cutters and reamers and remotely controlled routers or grinders capable of cutting back intruding sewer service pipes.

2 Execution

.1 Obtain Contract Administrator’s approval prior to undertaking any root cutting.

.2 Run root cutter through entire section of pipeline from manhole to manhole or end of pipe to end of pipe.

.3 Use root cutter head appropriately sized for the diameter of the pipeline.

3 Sewer Service Grouting

.1 Fill voids around sewer services with a non-shrink, watertight cement or chemical grout, an appropriate polyurethane grout compound, or other approved grouting product to form a smooth watertight connection.

4.9 External Point Repair (EPR)

.1 Complete External Point Repair as indicated in this specification and drawings in accordance with MOESS.

.2 Robar couplers are to be used for main and lateral point repairs on sections of pipe not being lined under this contract.

4.10 Manhole Rehabilitation and Replacement

.1 Complete manhole repairs and replacements as indicated in the Drawings in accordance with MOESS:

.1 New Manhole Replacement indicates all new manhole components are required, including manhole base, lid, slab, frame, cover, and riser in accordance with Section 6 of MOESS.

.2 Remove and replace manhole frames, covers, rungs and risers in accordance with Section 6 of MOESS to facilitate the CIPP installation.

4.11 Manhole Rehabilitations to Facilitate Liner Insertion

.1 Where the Contractor’s installation method requires the modification or reconstruction of an access manhole, prepare a Shop Drawing Submission as indicated in Clause 3.5.2.

.2 Install new manhole as indicated on the Shop Drawing Submission in such a manner that the new manhole does not place any adverse loading on the host pipe or new liner.

4.12 Weather

.1 Review the Environment Canada weather forecast with the Contract Administrator before starting CIPP lining installation.

.2 Delay installation of CIPP when the anticipated weather conditions are such that anticipated sewer flow will exceed the flow control measures provided or required extended curing times as identified in the styrene management plan may not be achieved.
4.13 Installation of CIPP

.1 Install liners by inversion methods in accordance with ASTM F1216 or by pull-in methods in accordance with ASTM F1743.

.2 Full segment CIPP shall be cured by hot water or steam.

.3 Carry out workmanship in accordance with ASTM D5813.

.4 Trim ends of CIPP neatly to fit flush with interior vertical surface and manhole benching and seal to make watertight. If required by the construction protocol, provide supplementary means of axial restraint to preclude excessive axial shrinkage.

.5 Fill annular spaces where the CIPP does not make an adequate seal with the host pipe at manholes, termination points and sewer services due to broken or misaligned pipe with a resin mixture compatible with the CIPP.

.6 Extend limits for internal point repairs a minimum of 300 mm in each direction beyond the limits of the defect to be repaired. Extend internal point repairs that terminate at sewer services a minimum distance of 300 mm beyond the limit of the service.

.7 Ensure termination points of internal point repairs provide a smooth and uniform flow transition to the host pipe for the full circumference of the repair.

.8 Follow the protocol for styrene mitigation and monitoring as stipulated in the approved styrene management plan.

4.14 Reinstatement of Sewer Services

.1 Reinstall all active and unable to determine sewer services including utility drains to 100% of the original cross sectional area.

.2 Cut out openings for sewer services from inside the lined sewer with a television camera and a remote controlled cutting device.

.3 Remove sharp edges from opening cut outs and provide a smooth rounded lip with brush finish.

.4 Sewer Service Grouting

.1 Fill voids between the CIPP and the host pipe at sewer service openings with a non-shrink, watertight cement grout or an appropriate polyurethane grout compatible with the liner system, or other approved grouting product to form a smooth watertight connection.

.2 Locations for sewer service grouting shall be identified by the Contract Administrator during review of Post Lining Video Inspection.

.3 If the voids are due to the condition of the existing sewer service and host pipe, sewer service grouting shall be measured and paid for under sewer connection grouting – after lining. If the voids are due to the Contractor’s method of reinstatement, deficiencies in the CIPP installation, or any other reason related to the Contractor’s workmanship or method of operations, they shall be filled at the Contractor’s expense.

.4 Repair of defective or incomplete sewer service grouting shall be at the Contractors own expense.

.5 Ensure that all cut-outs for sewer connections are removed from the sewer and are prevented from being washed into the sewer system downstream of the repair location.
4.15 Sewer Inspection Reports

.1 Provide the Contract Administrator with the following sewer inspection reports prepared in accordance with MOESS Section 6.64 and Pipeline Assessment and Certification Program (PACP).

- .1 Pre-sewer repair inspection before undertaking any repairs.
- .2 Pre and post-lining inspection and reports before Total Performance of Work.
- .3 Warranty inspection report before expiration of the Warranty period

4.16 Quality Control Records

.1 Maintain the following Quality Control records of the work and provide to the Contract Administrator after completion of the work.

- .1 Summary of the resin impregnation process including:
  - .1 Volume of resin supplied.
  - .2 Excess quantity of resin added during the wet out to account for polymerization and migration into the host pipe.
  - .3 Roller gap setting.
  - .4 Resin catalyst(s) used.
  - .5 Time and location of the wet out.
  - .6 Means taken to store and transport the resin impregnated CIPP from the wet out facility to the job site.
  - .7 Means of curing liners.

- .2 Continuous log of pressure maintained in the liner during the curing period.
- .3 Pulling force used to pull or winch CIPP into place in the host sewer and measured liner elongation.
- .4 Continuous log of temperature at boiler in and out and at all thermistors placed between the host pipe and the liner at all manholes during the initial cure, cure, and cool down periods.
- .5 Monitoring and activities carried out in support of the styrene management plan.

4.17 Confined Test Samples

.1 Provide necessary forms of the same diameter as the host pipe and secure a minimum 200 mm long full diameter confined test sample from each CIPP and internal point repair.

.2 Locate the test sample from in an intermediate manhole or at a termination point and invert through the form.

.3 Identify the sewer where the liner sample is from on the form or sample itself if no form and provide to the Contract Administrator intact in the form.

.4 The Contract Administrator will coordinate CIPP sample testing to confirm the CIPP flexural strength, flexural modulus and thickness in accordance with the requirements of ASTM D5813, D790, and ASTM D3567.

.5 If it can be demonstrated that it is impractical to obtain confined test samples due to CIPP size and site specific conditions then results from test plate samples modified in accordance with Clause 4.17 of this specification will be used to confirm flexural strength and flexural modulus.
4.18 Infrared Spectroscopy

.1 The Contract Administrator will arrange for testing to compare the infrared spectrum of the resin field samples supplied from the wet-out to the reference spectrum generated from the resin sample provided by the resin manufacturer to verify installed material acceptability; payment will be made from the Prime Sum Allowance.

4.19 Post Construction Design Review for Total Performance

.1 The Contract Administrator will perform a post-construction design review to ensure that the completed CIPP meets the 50 year design life structural requirements prior to Total Performance. The design review will utilize the measured values for flexural strength, flexural modulus, and CIPP thickness from the confined pipe sample testing or the reduced strength/modulus values obtained from the test plate testing in circumstances where confined pipe samples are not able to be secured.

.2 CIPP strength values will be further reduced to account for creep based on the creep reduction values recommended in the approved Shop Drawing submissions to assess the suitability of the liner to meet the 50 year design life requirement. The use of full enhancement factors in this analysis will be limited to liners that are confirmed by visual classification to be close-fit liners based on the post-lining sewer inspection.

.3 The Contract Administrator will advise of any discrepancies between the constructed CIPP and the design requirements.

.4 Perform necessary remedial measures to confirm that a CIPP deemed as structurally deficient will comply with the 50 year design life requirement such as confirmation of actual ovality, determination of a more representative groundwater elevation locally through monitoring, and supplemental strength testing and thickness measurements.

.5 Repair sections of CIPP removed for supplemental testing by placing a full circumference internal point repair of the same thickness as the full segment liner over and extending 300 millimetres beyond each side of the cut section.

.6 Install a supplemental CIPP of the required thickness to structurally enhance the installed CIPP if supplemental testing fails to confirm the CIPP will meet the 50 year design life requirement.

.7 Review remedial action with the Contract Administrator prior to implementation.

.8 Perform further testing, monitoring and calculations and install structural enhancements at own cost.

.9

5. MEASUREMENT AND PAYMENT

5.1 Mobilization and Demobilization

.1 Mobilization and demobilization will be measured and paid for at the Contract Unit Price for “Mobilization and Demobilization”. 
5.2 **Verification of Existing Sewer Dimensions**

.1 Verification of existing sewer dimensions including the pre-design inspection will not be measured for separate payment and will be included with CIPP installation.

5.3 **Submittals Before Starting Work**

.1 Submittals required before starting work including CIPP design, resin samples, operations protocol and construction protocol will not be measured for separate payment and will be included with CIPP installation.

5.4 **Sewer Cleaning**

.1 Sewer cleaning will not be measured for separate payment and will be included in the Contract Unit Price for CIPP Installation.

.2 Root cutting will not be measured for separate payment and will be included in the Contract Unit Price for CIPP Installation.

5.5 **Sewer Inspections**

.1 CCTV pipeline inspection will not be measured for separate payment and will be included in the Contract Unit Price for CIPP Installation.

.2 Bypass pumping as required will not be measured for separate payment and will be included in the Contract Unit Price for CIPP Installation.

5.6 **Sewer Service Reports**

.1 Sewer service reports will not be measured for separate payment and will be included with CIPP installation.

5.7 **Flow Control**

.1 Flow control measures necessary for mainline and all sewer services will not be measured for separate payment and will be included in the Contract Unit Price for CIPP Installation.

5.8 **Sewer Preparation and Repairs Prior to Lining**

.1 Removal of solid debris including root mass will not be measured for separate payment and will be included in the Contract Unit Price for CIPP Installation.

.2 Removal of intruding sewer connection will be measured on a unit basis and paid for at the Contract Unit Price for "Intruding Sewer Connection Removal". Number of units to be paid for will be the total number of units removed in accordance with this specification and MOESS Section 6.60, accepted and measured by the Contract Administrator.
5.9 **External Point Repair (EPR)**

.1 External Point Repair will be measured and paid under MOESS Section 6.

5.10 **Sewer Lateral Lining**

.1 Service Lateral Lining will be measured on a per metre basis and paid for at the Contract Unit Price for “Service Lateral Lining”. Number of metres to be paid for will be the total length reinstated in accordance with this specification, accepted and measured by the Contract Administrator.

5.11 **Sewer Lateral Replacement**

.1 Service Lateral Replacement will be measured on a unit basis and paid for at the Contract Unit Price for “Service Lateral Replacement (complete with IC)”. Number of units to be paid for will be the total number of units reinstated in accordance with this specification, accepted and measured by the Contract Administrator.

5.12 **Manhole Rehabilitation and Replacement to Facilitate Liner Insertion**

.1 Sewer insertion shaft will be measured on a unit basis for each insertion shaft constructed or modified to facilitate a liner installation. Compensation shall be payment in full for all modifications required to facilitate CIPP installation including any items incidental to the work.

.2 Where no modifications are required to be made to facilitate liner installation, no measurement will be made for as per this item unless the manhole is otherwise noted for rehabilitation in this contract.

5.13 **CIPP Installation**

.1 Liner installation will be measured on a length basis for each size and paid for at the Contract Unit Price for “Full Segment CIPP”. Length to be paid for will be the total length of CIPP supplied and installed in accordance with this specification, accepted and measured by the Contract Administrator.

.2 The price shall include, but not be limited to, excavation, dewatering, bracing, supply of all materials, labour and equipment required to perform the liner installation including flushing the sewer line, temporary bypassing of sewage flows, cleaning the host pipe, clearing obstructions, sealing the liner to manhole benching, testing, clean up, pre- and post-installation video inspection and reports, submittals (including CIPP design, resin samples, operations protocol, construction protocol), verification of existing pipe dimensions, verification of new pipe dimensions, and all related work.

.3 Full segment CIPP measurement will be made horizontally at grade, above the centreline of the pipe from centre to centre of manholes.

.4 Eighty (80) percent of the payment will be made upon satisfactory completion of the CIPP installation work. The remaining twenty (20) percent of the payment will be made upon confirmation of the CIPP strength and delivery and acceptance of all required submissions, shop drawings, and reports.

5.14 **Reinstatement of Sewer Lateral Connection**

.1 Reinstatement of sewer laterals will be measured on a unit basis and paid for at the Contract Unit Price for “Service Lateral Reinstatement”. Number of units to be paid for will be the total
number of units reinstated in accordance with this specification, accepted and measured by the Contract Administrator.

5.15 Verification of Post Lining Sewer Dimensions

.1 Verification of post lining sewer dimensions including the post design inspection will not be measured for separate payment and will be included with CIPP installation.

5.16 Sewer Inspection Reports

.1 Sewer inspections and reports will be not be measured for separate payment and are to be included with payment for CIPP installation.

5.17 Quality Control Records

.1 Quality control records will not be measured for separate payment and will be included with payment for CIPP installation.

5.18 Test Samples

.1 CIPP test samples collected for analysis will not be measured for separate payment and will be included with payment for CIPP installation.

5.19 Manhole Repairs and Replacement

.1 Manhole repairs and/or replacement paid under MOESS Section 6 Sanitary Sewer.

.2 Manhole frames, covers, rungs and risers removed and replaced to facilitate the CIPP installation will not be measured for separate payment and will be included with payment for CIPP installation.
SCHEDULE OF SPECIFIC DESIGN CONDITIONS AND SITE SPECIFIC REPAIRS

City of Nanaimo – 2013 Sanitary Sewer Lining

List of Locations

<table>
<thead>
<tr>
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**Site Specific Repairs**

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**Site Specific Repairs**

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**Site Specific Repairs**

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**Site Specific Repairs**

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH</td>
<td>General Sewer Cleaning</td>
</tr>
</tbody>
</table>

### Line ID 509071

<table>
<thead>
<tr>
<th>Cilaire Drive</th>
<th>From SDMH G to SDMH 39468</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/Shape</td>
<td>200 mm</td>
</tr>
<tr>
<td>Material</td>
<td>AC</td>
</tr>
<tr>
<td>Total Length (m)</td>
<td>55.64 m</td>
</tr>
<tr>
<td>Sewer Depth to Invert – maximum</td>
<td>2.35 m</td>
</tr>
<tr>
<td>Design Condition: 0.0 – 100</td>
<td>Fully Deteriorated – 3% Ovality</td>
</tr>
</tbody>
</table>

**Site Specific Repairs**

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH</td>
<td>General Sewer Cleaning</td>
</tr>
<tr>
<td>55.64 OBI (9)</td>
<td>Remove intruding plug at abandoned service and repair pipe for lining.</td>
</tr>
</tbody>
</table>
Sheet 18182

Line ID 506994

<table>
<thead>
<tr>
<th>Thetis Place</th>
<th>From SCO 813 to SMH 5046</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/Shape</td>
<td>150 mm</td>
</tr>
<tr>
<td>Material</td>
<td>AC</td>
</tr>
<tr>
<td>Total Length (m)</td>
<td>45.4 m</td>
</tr>
<tr>
<td>Sewer Depth to Invert – maximum</td>
<td>2.195 m</td>
</tr>
<tr>
<td>Design Condition: 0.0 – 45.4</td>
<td>Fully Deteriorated – 3% Ovality</td>
</tr>
</tbody>
</table>

**Site Specific Repairs**

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH</td>
<td>General Sewer Cleaning</td>
</tr>
</tbody>
</table>

Line ID 506996

<table>
<thead>
<tr>
<th>Beach Drive</th>
<th>From SMH 5047 to SMH 5048</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/Shape</td>
<td>150 mm</td>
</tr>
<tr>
<td>Material</td>
<td>AC</td>
</tr>
<tr>
<td>Total Length (m)</td>
<td>48.03 m</td>
</tr>
<tr>
<td>Sewer Depth to Invert – maximum</td>
<td>3.368 m</td>
</tr>
<tr>
<td>Design Condition: 0.0 – 48.03</td>
<td>Fully Deteriorated – 3% Ovality</td>
</tr>
</tbody>
</table>

**Site Specific Repairs**

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH</td>
<td>General Sewer Cleaning</td>
</tr>
</tbody>
</table>

Line ID 506998

<table>
<thead>
<tr>
<th>Beach Drive</th>
<th>From SMH 5048 to SMH 5035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/Shape</td>
<td>150 mm</td>
</tr>
<tr>
<td>Material</td>
<td>AC</td>
</tr>
<tr>
<td>Total Length (m)</td>
<td>108.68 m</td>
</tr>
<tr>
<td>Sewer Depth to Invert – maximum</td>
<td>3.368 m</td>
</tr>
<tr>
<td>Design Condition: 0.0 – 108.68</td>
<td>Fully Deteriorated – 3% Ovality</td>
</tr>
</tbody>
</table>

**Site Specific Repairs**

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH</td>
<td>Grind protruding AC coupling / collar flush with pipe prior to lining.</td>
</tr>
<tr>
<td>20.3 OBI</td>
<td></td>
</tr>
</tbody>
</table>
Sheet 18183

Line ID 506984

<table>
<thead>
<tr>
<th>Beach Drive</th>
<th>From SCO 802 to SMH 5003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/Shape</td>
<td>150 mm</td>
</tr>
<tr>
<td>Material</td>
<td>AC</td>
</tr>
<tr>
<td>Total Length (m)</td>
<td>79.43 m</td>
</tr>
<tr>
<td>Sewer Depth to Invert – maximum</td>
<td>1.379 m</td>
</tr>
<tr>
<td>Design Condition: 0.0 – 79.43</td>
<td>Fully Deteriorated – 3% Ovality</td>
</tr>
</tbody>
</table>

Site Specific Repairs

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH 0.0</td>
<td>Remove roots in pipe at SMH 5003 prior to lining.</td>
</tr>
</tbody>
</table>

Line ID 506986

<table>
<thead>
<tr>
<th>Beach Drive</th>
<th>From SMH 5003 to SMH 4985</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/Shape</td>
<td>150 mm</td>
</tr>
<tr>
<td>Material</td>
<td>AC</td>
</tr>
<tr>
<td>Total Length (m)</td>
<td>57.23 m</td>
</tr>
<tr>
<td>Sewer Depth to Invert – maximum</td>
<td>1.952 m</td>
</tr>
<tr>
<td>Design Condition: 0.0 – 57.23</td>
<td>Fully Deteriorated – 3% Ovality</td>
</tr>
</tbody>
</table>

Site Specific Repairs

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH</td>
<td></td>
</tr>
</tbody>
</table>

Sheet 18184

Line ID 500325

<table>
<thead>
<tr>
<th>Albion Street</th>
<th>From SMH 4128 to SMH 4129</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size/Shape</td>
<td>150 mm</td>
</tr>
<tr>
<td>Material</td>
<td>AC</td>
</tr>
<tr>
<td>Total Length (m)</td>
<td>45.4 m</td>
</tr>
<tr>
<td>Sewer Depth to Invert – maximum</td>
<td>1.16 m</td>
</tr>
<tr>
<td>Design Condition: 0.0 – 45.4</td>
<td>Fully Deteriorated – 3% Ovality</td>
</tr>
</tbody>
</table>

Site Specific Repairs

<table>
<thead>
<tr>
<th>Location – Defect (clock reference)</th>
<th>Required Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance From Upstream MH</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 1

Receipt Confirmation
RECEIPT CONFIRMATION FORM

Invitation to Tender No. 1470

2013 SEWER RELINING

Closing date and time: 3:00 PM, Pacific Standard Time, September 11, 2013

As receipt of this document, and to directly receive any further information about this Tender, please return this form to:

Attention: Kurtis Felker
Manager, Purchasing & Stores
City of Nanaimo
2020 Labieux Road, Nanaimo, BC, V2T 4M7
Fax: 250.756.5327
Email: purchasinginfo@nanaimo.ca

COMPANY NAME: ________________________________________________

STREET ADDRESS: _______________________________________________

CITY/PROVINCE: _________________________________________________

POSTAL CODE: _________________________________________________

PHONE NUMBER: ________________________________________________

FAX NUMBER: _________________________________________________

CONTACT PERSON: ______________________________________________

EMAIL ADDRESS: ________________________________________________

SIGNATURE: ____________________________________________________
APPENDIX 2

Asbestos Cement Pipe
Safework Procedure
Asbestos Cement Pipe Safe Work Procedures

Background:

Although AC pipe will not be used in new installations, there is still a need for work to be done on existing AC pipe. Cutting into AC pipe sections may sometimes be required for repair or tying into new connections. Exposure to asbestos can occur during work performed on AC pipes.

To minimize fiber release, and prevent exposure to fibers during work activities, the following procedures are to be followed when performing work on AC pipe. All employees and contractors throughout The City of Nanaimo must understand the requirements of these procedures prior to conducting any work on AC pipe.

The following procedures are for snap cutters, handsaws, tapping machines and hand drills. The operation of hand tools with AC pipe has been determined to be a Moderate Risk Work Activity as outlined in Worksafe Regulation 6.1.

Snap cutters (roller chain cutters) consist of deep penetrating cutting wheels mounted in a chain that is wrapped around the pipe barrel. A cut is made when pressure is applied by means of a hydraulic pump or a manual ratchet depending on the size of the pipe.

Hazards:
- The use of powered disc saws (cut-off saw, K-5 saw, stihl saw, etc) **MUST NOT** be used to cut AC pipe. The use of such abrasive disc saws will release excessive levels of asbestos fibres into the atmosphere and cause over-exposure to employees, contractors and the public.
- Exposure to asbestos fibres can lead to grievous long term illness and death. All efforts must be made to avoid exposure to asbestos fibres. If an exposure is suspected during your shift, report this suspected exposure to the OH&S Department without delay.
- If clothing is exposed to asbestos fibres, that clothing needs to be bagged, marked and cleaned appropriately. Don’t risk bringing asbestos home to your family.
- Heat Exposure is amplified during the summer months while performing this procedure due to the use of Tyvek suits. Workers and supervisors should be aware of the signs and symptoms of Hyperthermia (unsafe increase in the body’s core temperature). If the worker is feeling these signs and symptoms, they should follow decontamination procedures to exit the “Asbestos Work Zone” and take a break in a cool place while having some water.

PPE Required:
The use of disposable material is to ensure asbestos fibres that can be found in the AC pipe debris do not get transferred out of the asbestos workzone.

| ½ Mask Respirator with a “100” (HEPA) filter | Disposable Coveralls – Impermeable protective coveralls must have a hood, and elastic seals |
| Rubber Boots - NO laces | Disposable Gloves | Hardhat |
| Eye Protection (Where Required) | Hearing Protection (Where Required) |

Special Equipment Required:
- Asbestos Disposal Bags
- Asbestos Warning Tape

- Snap Cutters or Wet Saw
- Duct Tape for sealing bags
- Asbestos Hazard Warning Signs

- 4 “Candle Stick” style traffic delineators for creating the 4 corners of the “Asbestos Work Zone”, OR, any other suitable posts or stakes
Pre Set-Up:

- Perform pre-excavation hazard identification through the use of a Pre-Excavation Checklist. Keep completed checklist on site.
- Complete the appropriate WSBC NOP for work on Asbestos Containing Materials.
- Ensure that the Pre-Ex is on site and utilities have been marked out before carrying out any excavations.
- Set up work zone appropriately – utilize traffic control if needed.
- Ensure all workers on site are trained and aware of the hazards which exist.
- Any workers who are going to be carrying out AC Pipe procedures need to have attended an AC Pipe Procedures safety talk.
- Ensure this procedure and the AC Pipe Exposure Control Plan are on site and that all workers have been trained in both.
- Ensure a continuous water supply is available on site.

Procedure:

- Expose AC Pipe in accordance with City of Nanaimo Excavation and Trenching Safety program.
- Create an “Asbestos Work Zone”. Use four “Candlestick” style traffic control posts as the corners of the work zone. Use “Asbestos Hazard” warning tape to create a barrier surrounding the work zone, connecting all 4 corners. The work zone barrier should keep all non protected workers 10 feet away from the work zone. Post Asbestos Warning Signs where appropriate.
- Employees entering the “Asbestos Work Zone” must be wearing the required personal protective equipment.
- Low flow water must be constantly applied to the area being cut and continued until the cutting is complete. Ensure the water is applied in sufficient quantities so that the area being cut is continuously wet and no asbestos fibres are being released. (If using wet diamond saw, ensure that the water flow is 1 -3 gallons per minute)
- Operate the cutting tool in accordance with the manufacturer’s instructions and City of Nanaimo SWPs until cutting is complete. Snap Cutters are generally the preferred tool for cutting AC Pipe. If the use of Snap Cutters is impractical (i.e. large service main), then a wet diamond saw may be used. Take great care as this method releases more fibres than snap cutting.
- Once the final cut has been completed, thoroughly wash the cutting equipment in the excavation with clean water to remove all AC pipe debris. Pass tools out of the excavation once they are cleaned.
- If this method is not possible, wash the equipment in large buckets of water and dump that water into the excavation.
- There are two different options for the waste pipe:
  1) Remove from trench and dispose in asbestos waste bin:
     - Cut the pipe into short enough pieces (4 foot lengths) to fit into the Asbestos Waste Bags while still in the trench.
     - Place the pipe piece and any visible pieces or debris into the Asbestos Waste Bag.
     - Twist the top of the bag to close it, and then fold over twisted portion and use duct tape to tape the twisted portion to the bag.
     - Place the bagged section near the edge of the “Asbestos Work Zone”.
     - Wipe down bag with a wet disposable cloth to remove any asbestos debris.
     - Place the bag into a second Asbestos Waste Bag and duct tape closed the same way.
Where use of Asbestos Waste Bags is not applicable (i.e. length of AC Pipe to be removed is longer than 4 feet or too large for the bag to contain) Polyethylene drop sheets can be utilized. Two layers of Polyethylene drop sheets will be placed beneath the section of AC Pipe to be removed. Once removed, the AC Pipe will be placed directly onto the Polyethylene drop sheets. The first layer of the Polyethylene drop sheet will be used to contain the AC Pipe by wrapping around the pipe and tying the ends in a goose neck fashion and sealing with duct tape. The second layer of Polyethylene sheeting will be utilized to further contain the AC Pipe by double-wrapping the pipe and tying the ends in a goose neck fashion and sealing with duct tape. The double wrapped AC Pipe will then be labelled with an Asbestos Warning Sticker or marked appropriately with other means.

Place the bag back of truck and dispose of in the designated Asbestos Disposal Bin at the back of the yard and advise Stores that you have done so. AC Pipe must never be left in the back of a truck overnight.

2) Leave in trench whole:

- If the trench is large enough to leave the AC Pipe section in the trench, this is another option. However, this practice is discouraged as the remaining AC Pipe must now be marked on the City of Nanaimo Asbestos Inventory and an exposure control plan must be implemented for future work in the area.
- Cut AC Pipe into sections small enough to either fit into Asbestos Waste Bags or small enough to be able to wrap poly around it.
- Place the AC Pipe section into an Asbestos Waste Bag and seal in a goose neck fashion with duct tape. Place that bagged piece into a second bag and seal in the same fashion.
- If section is too big to fit into Asbestos Waste Bag, wrap with poly and mark the poly wrap with Asbestos Hazard Stickers.
- Place “Asbestos Hazard” warning tape over the waste pipe during back fill.
- Forward location of buried and marked AC Pipe to OH&S and Public Works for placement into the Asbestos Inventory.

Post Procedure/Take Down

- All tools and surfaces which have been contaminated should be cleaned off prior to removal from “Asbestos Work Zone”. If tools cannot be decontaminated prior to removal, they must be double bagged in the Asbestos Waste Bags and cleaned while wearing full PPE at a later date.
- Thoroughly wash off boots
- Remove coveralls and place into Asbestos Waste Bag.
- Remove respirator cartridges and place into Asbestos Waste Bag.
- Carefully Remove Gloves (First Aid Method) and dispose of into Asbestos Waste Bag.
- Take down barrier and dispose of tape. If AC Pipe and/or bagged waste is being left in the trench, bury tape above waste 2 feet below grade.
- Wash hands and face with disposable wet cloth.
- Thoroughly clean all PPE used with a disposable wet cloth.
- Dispose of cloth in Asbestos Waste Bag.
- Backfill excavation as per usual procedures.
APPENDIX 3

Private Property Conditions Sheets
<table>
<thead>
<tr>
<th>Property</th>
<th>Condition (Contractor Responsibility)</th>
<th>Condition (City Responsibility)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 Cortez Place</td>
<td>Daycare on property. If the house plumbing is shut down while the daycare is in operation, the owner requires provincial authorities approval.</td>
<td>Additional top soil, if required and seeding. If any excavating is required, City to provide temporary fencing between house and rear fence; Port-a-potty with child seat, if required.</td>
<td>Access only required for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>2266 Ocean Terrace</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Remove and replace fence panel if required. Remove and replant any damaged plantings if required. Additional top soil, if required and seed.</td>
<td>Access required for root removal, relining equipment and videos.</td>
</tr>
<tr>
<td>2234 Ocean Terrace</td>
<td>Place 0.3m of mulch over roots where equipment is driving and remove after work is done. Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Remove and replace cinder blocks if required. Remove and replace fence panels. Additional top soil, if required and seeding.</td>
<td>Access point for mini excavator and bobcat to other properties if required. Access only expected for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>2200 Ocean Terrace</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Remove and replace fence panels. Additional top soil, if required and sod.</td>
<td>Access point for excavation equipment to other properties if required. Access only expected for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>2190 Ocean Terrace</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration. Contractor responsible for any damage to the carport from the work.</td>
<td>Remove and replace fence panels. Additional top soil, if required and seeding. Reinstatement of gravel surfaces.</td>
<td>Can access cleanout through this property using mini excavator or flush truck. Property disturbance from excavation for new cleanout and service.</td>
</tr>
<tr>
<td>2166 Ocean Terrace</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access only required for service video. Damage to property anticipated from excavation on neighbouring property.</td>
</tr>
<tr>
<td>2130 Estevan Road</td>
<td>Contractor to minimize damage to property. Use bark mulch, plywood or other approved method for equipment access routes. Any damage to be restored so suitable for surface restoration.</td>
<td>Removal of hot tub and rear deck material. Additional top soil, if required and seeding.</td>
<td>Access for mini excavator and bobcat for excavation for new cleanout and service for 35 Thetis, relining equipment and video.</td>
</tr>
<tr>
<td>2120 Estevan Road</td>
<td>Contractor to minimize damage to property. Use bark mulch, plywood or other approved method for equipment access routes. Any damage to be restored so suitable for surface restoration.</td>
<td>Replacement of shrubbery garden. Additional top soil, if required and seeding.</td>
<td>Access for mini excavator and bobcat for excavation for new cleanout and service for 35 Thetis, relining equipment and video.</td>
</tr>
<tr>
<td>17 Thetis Place</td>
<td>Contractor to minimize damage to property. Use bark mulch, plywood or other approved method for equipment access routes. Any damage to be restored so suitable for surface restoration.</td>
<td>Remove and repair stone wall if required. Repair of asphalt driveway. Additional top soil, if required and seeding.</td>
<td>Access for mini excavator and bobcat for excavation for new cleanout and service for 35 Thetis, relining equipment and video.</td>
</tr>
<tr>
<td>35 Thetis Place</td>
<td>Remove unsuitable soils from cleanout excavation and import crushed granular material for backfill suitable for bank restoration. Prune tree roots as directed by arborist. Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Remove and replace shed. Retain arborist to review excavation around tree roots. Retain geotechnical engineer to review backfill requirements to ensure bank stabilization.</td>
<td>Property disturbance from excavation for new cleanout and service. Work is adjacent to Northfield Creek bank.</td>
</tr>
<tr>
<td>71 Thetis Place</td>
<td>Contractor to minimize damage to property. Use bark mulch, plywood or other approved method for equipment access routes. Any damage to be restored so suitable for surface restoration.</td>
<td>Removal and replacement of fence and tree if required. Additional top soil, if required and seeding.</td>
<td>Access required for new IC installation and video.</td>
</tr>
<tr>
<td>Property</td>
<td>Condition (Contractor Responsibility)</td>
<td>Condition (City Responsibility)</td>
<td>Comment</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>97 Thetis Place</td>
<td>Contractor to minimize damage to property. Use bark mulch, plywood or other approved method for equipment access routes. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access required for new IC installation on 71 Thetis, relining equipment and video.</td>
</tr>
<tr>
<td>11 Galiano Place</td>
<td>Contractor to minimize damage to property. Use bark mulch, plywood or other approved method for equipment access routes. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access required for new IC installation and video.</td>
</tr>
<tr>
<td>37 Galiano Place</td>
<td>Contractor to minimize damage to property. Use bark mulch, plywood or other approved method for equipment access routes. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access required for new IC installation and video.</td>
</tr>
<tr>
<td>Property</td>
<td>Condition (Contractor Responsibility)</td>
<td>Condition (City Responsibility)</td>
<td>Comment</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>151 Kneen</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for grass seeding. Owner’s dog is overly friendly.</td>
<td>Front yard of house - Disturbed ground area to be sprayed with grass hydro seed. Additional top soil, if required and seeding.</td>
<td>Access required for manhole installation, relining equipment and videos.</td>
</tr>
<tr>
<td>2340 / 2344 DBR</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for sod.</td>
<td>Additional top soil, if required and sod.</td>
<td>Access required for relining equipment and videos.</td>
</tr>
<tr>
<td>2350 / 2352 DBR</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for grass seeding.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access only required for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>2364 DBR</td>
<td>House with barber shop - Beware of garden irrigation equipment. Contractor to minimize damage to property. Any damage to be restored so suitable for grass seeding.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access only required for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>2376 DBR</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for grass seeding. Owner’s very big dog seems friendly.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access only required for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>2406 DBR</td>
<td>House - Stamped concrete patio in rear yard is fragile &amp; requires special protection – cover with plywood etc. Contractor responsible for any damage to the patio.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access required for relining equipment and service video.</td>
</tr>
<tr>
<td>2198 DBR</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration, (e.g. gravel placement, seeding and retaining wall installation)</td>
<td>House - 1 foot high wood garden-tie retaining wall may have to be removed and reinstalled. Gravel surface in front of shed &amp; adjacent possible lawn area may require restoration – small area.</td>
<td>Property disturbance from excavation for new cleanout and service.</td>
</tr>
<tr>
<td>2186 DBR</td>
<td>Dentist’s office - Beware of irrigation equipment. Contractor to minimize damage to property. Any damage to be restored so suitable for grass seeding. All work to occur on week-ends or Mondays.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access for excavation of new cleanout and service.</td>
</tr>
<tr>
<td>2174 DBR</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Church – possible repair to asphalt parking or adjacent green area.</td>
<td>Access required for relining equipment and video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>11 Cilaire</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access only required for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>124 Black Powder</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration. Contractor to use caution when working near the relocated greenhouse.</td>
<td>House – relocation of greenhouse. Professional trimming or removal of tree branches, grape vine. Removal and reinstatement of wire fence along sidewalk. Restoration of lawn – top soil &amp; grass hydro seed</td>
<td>Access for excavation of new cleanout and service.</td>
</tr>
<tr>
<td>130 Black Powder</td>
<td>Beware of sprinklers &amp; irrigation lines. Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>For new IC install, house – nice garden area may be affected . Removal and reinstatement of wood fencing for access. Possible lawn repair – top soil &amp; grass seed. 1 yard top soil required. City to reimburse owner for any plants which do not survive reinstatement. 2 trees likely to die from install of IC. City to arrange for removal &amp; reinstall of replacement trees or to compensate.</td>
<td>Access only required for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>136 Black Powder</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>For new IC install – possible removal &amp; replacement of concrete block compost bin (for access to adjacent property IC). Additional top soil, if required and seeding.</td>
<td>Access required for relining equipment and video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>Property</td>
<td>Condition (Contractor Responsibility)</td>
<td>Condition (City Responsibility)</td>
<td>Comment</td>
</tr>
<tr>
<td>------------------</td>
<td>------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>142 Black Powder</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>For new IC install – area of excavation for IC to be left in state suitable for future gardening. Possible loss of 2 Cedar trees – to be replaced with nursery stock approx 5 foot high or more. Additional top soil, if required and seeding.</td>
<td>No access to property and no IC will be installed. Damage to property not anticipated.</td>
</tr>
<tr>
<td>148 Black Powder</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>No access to property and no IC will be installed. Damage to property not anticipated.</td>
</tr>
<tr>
<td>154 Black Powder</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>Access only required for service video. Damage to property not anticipated.</td>
</tr>
<tr>
<td>160 Black Powder</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Replacement / reinstallation of existing (or newer) fence panels for access? Additional top soil, if required and seeding.</td>
<td>Access for excavation of new cleanout 2 services, relining equipment and video.</td>
</tr>
<tr>
<td>166 Black Powder</td>
<td>Contractor to minimize damage to property. Any damage to be restored so suitable for surface restoration.</td>
<td>Additional top soil, if required and seeding.</td>
<td>No access anticipated.</td>
</tr>
<tr>
<td>133 Cilaire</td>
<td>Contractor to minimize damage to property. Sawcut concrete for point repair. Backfill to City specs for travelled areas and temporary surface restoration. Any damage to be restored so suitable for surface restoration. Site meeting may be required with owner before work starts.</td>
<td>Concrete replacement. General restoration to lawn area – ruts to be filled with top soil &amp; spray of grass hydro seed. Be careful with owner.</td>
<td>Access for excavation for point repair, relining equipment and video.</td>
</tr>
</tbody>
</table>
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002503
Project: 2012-00138

PID: 002-615-835

Lot 1, Section 1, Nanaimo District, Plan 13015, Except those parts in Plan 18748 and 27115
Legal Description of the "Property"

151 Kneen Place, Nanaimo, BC, V9S 5G4
Street Address of the "Property"

Owner(s) Name and Phone #:  

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works, the surface of the ground shall be left in a condition as specified on the attached Condition Sheet.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 19 day of July, 2013.

in the presence of:

Witness
926 Malaspina Cres
Address

Retired Machinist
Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to restore the property in accordance with the terms enclosed.

CITY OF NANAIMO:

General Manager of Community Safety & Development

Corporate Officer
City of Nanaimo

CONDITION SHEET

Registered Owner(s): [Redacted]

Civic Address: 151 Kneen Place, Nanaimo, BC, V9S 5G4

Mailing Address: 151 Kneen Place, Nanaimo, BC, V9S 5G4

Registered Owner(s) Phone No.: [Redacted]

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all City construction works, and where disturbed by excavation or damaged by general entry, the City will restore the surface of the ground with spray of grass hydro seed.

3. The City to compensate the owner for; demolition of the shed, removal of demolition material and for purchase of replacement building material for construction of new shed, by payment of the sum of [Redacted]

4. The owner agrees not to construct or place a shed or structure within the area defined by plan of right of way 1624 RW or 1625 RW.

5. The owner agrees to sign a new right of way agreement in the form attached.

6. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

July 19, 2013
Robert:

This email confirms that we have no objection to the City of Nanaimo accessing a manhole located at the above-mentioned property for the purposes of:

a) locating and replacing a sewage "stump" connecting a main sewer line to the sewer lines coming from the above-mentioned property; and
b) lining the existing main sewer line with a protective liner.

This access is granted on the following conditions:

a) any access must be at a convenient time and with reasonable notice to the tenant on the property, [redacted] She is receiving a copy of this email so you can contact her directly;
b) any excavation, digging or other disruption to the property will be promptly remediated. In particular, if the replacement of the sewage stump occurs in March and the lining occurs in November, the yard will be remediated in March and then again in November, if necessary, to a mutually agreeable standard;
c) you have advised that a camera will be inserted into the sewer line to locate the sewage stump and assess its condition. You will advise us of the condition of the property's sewer line as viewed on the camera so we can take preventative maintenance of our property if needed and at the same time you are excavating and replacing;

I trust the foregoing is satisfactory.
Yes
Sent from my iPhone

On Feb 27, 2012, at 6:14 PM, Robert Senyk <Robert.Senyk@nanaimo.ca> wrote:

Hello Mr. & Mrs. [Redacted];
I sent you a letter about 2 weeks back (copy attached above), asking for permission to enter onto 2350 Departure Bay Rd for sewer maintenance work. There is a small section of pipe (13 feet) & inspection chamber the City wishes to replace with new. Only a small excavation will be required in the back yard. We promise to repair any damage to the lawn by placing top soil & grass seed. May I receive your permission for this purpose?

Robert Senyk
Property Agent
Community Safety & Development
Ph: 250-755-4507
Fax: 250-755-4421
Email: robert.senyk@nanaimo.ca

<image001.png>

<4091_001.pdf>
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002506
Project: 2012-00138

PID: 003-803-830
Lot 57, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

2364 Departure Bay Road, Nanaimo, BC, V9S 3V8
Street Address of the "Property"

Owner(s) Name and Phone #: (360) 708-6922

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

\[\text{Signed, Sealed and Delivered by the Owner}\]
\[\text{4th day of June, 2013.}\]

in the presence of:

\[\text{Robert Semyk}\]
Witness

\[\text{238 Brooklyn}\]
Address

\[\text{Property Agent}\]
Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to restore the property in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO was hereunto affixed in the presence of:

\[\text{General Manager of Community Safety & Development}\]

\[\text{Manager of Legislative Services}\]
City of Nanaimo

CONDITION SHEET

File: LD002506
Project: 2012-00138

Registered Owner(s): [REDACTED]
Civic Address: 2364 Departure Bay Road, Nanaimo, BC, V9S 3V8
Mailing Address: 2364 Departure Bay Road, Nanaimo, BC, V9S 3V8
Registered Owner(s) Phone No.: [REDACTED]

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. The City acknowledges the existence of an underground irrigation system in close proximity to the proposed work. The City will undertake its works so as to not damage the irrigation system. In the event the City's work does result in damage to the irrigation equipment, the City will perform all required repair.

4. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

June 4, 2013
DATE
City of Nanaimo

CONDITION SHEET

File: LD002507  Project: 2012-00138

Registered Owner(s):  
Civic Address: 2376 Departure Bay Road, Nanaimo, BC, V9S 3V8  
Mailing Address:  
Occupant Phone No.: (250)

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping.

3. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

KELOWNA

12th July 2013
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002507
Project: 2012-00138

PID: 003-803-619

Lot 56, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

2376 Departure Bay Road, Nanaimo, BC, V9S 3V8
Street Address of the "Property"

Owner(s) Name: [Redacted]
Occupant Name & phone number (250) -

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in a condition similar as was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, by the Owner this 12th day of July 2013.

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to restore the property in accordance with the terms enclosed.

CITY OF NANAIMO:

______________________________
General Manager of Community Safety & Development

______________________________
Corporate Officer
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002508
Project: 2012-00138

PID: 003-803-601

Lot 55, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

2406 Departure Bay Road, Nanaimo, BC, V9S 3V8
Street Address of the "Property"

Owner(s) Name and Phone #: [Redacted] (250) 585-5570

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2012 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

This __ day of __________, 2012.

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO
was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002508
Project: 2012-00138

Registered Owner(s): Botkain, 4730-58 Avenue

Civic Address: 2406 Departure Bay Road, Nanaimo, BC, V9S 3V8
Mailing Address: 2406 Departure Bay Road, Nanaimo, BC, V9S 3V8

Registered Owner(s) Phone No.: 250-754-9999

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

4. Stamped concrete path is finished with pre-mixed special cement.

DATE: Feb 15/12

Signature: R. Ewan
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002509
Project: 2012-00138

PID: 003-807-240

Lot 220, Section 1, Nanaimo District, Plan 18900
Legal Description of the “Property”

2198 Departure Bay Road, Nanaimo, BC, V9S 3V6
Street Address of the “Property”

Owner(s) Name and Phone #: [Redacted]

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2012 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

his 16 day of February, 2012

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002509
Project: 2012-00138

Registered Owner(s): 

Civic Address: 2198 Departure Bay Road, Nanaimo, BC, V9S 3V6
Mailing Address: 2198 Departure Bay Road, Nanaimo, BC, V9S 3V6

Registered Owner(s) Phone No.: 

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

Feb 16, 2012

Feb 16, 2012

DATE
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002510
Project: 2012-00138

PID: 003-809-323

Lot 221, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

2186 Departure Bay Road, Nanaimo, BC, V9S 3V6
Street Address of the "Property"

Owner(s) Name and Phone #: [Redacted]

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

Signed, Sealed and Delivered by the Owner
3rd day of May, 2013

in the presence of:

Witness

Address

Property Agent

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and restore the property in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002510
Project: 2012-00138

Registered Owner(s): [Redacted]
Civic Address: 2186 Departure Bay Road, Nanaimo, BC, V9S 3V6
Mailing Address: 2186 Departure Bay Road, Nanaimo, BC, V9S 3V6
Registered Owner(s) Phone No.: [Redacted]

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

4. Work to occur on weekends or Mondays.

DATE: May 3/13

by its authorized signatory
City of Nanaimo

CONDITION SHEET

File: LD002511
Project: 2012-00138

Registered Owner(s): Hope Lutheran Church
Civic Address: 2174 Departure Bay Road, Nanaimo, BC, V9S 3V6
Mailing Address: 2174 Departure Bay Road, Nanaimo, BC, V9S 3V6
Registered Owner(s) Phone No.: [redacted]

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

DATE 23 Feb 2012

Hope Lutheran Church
by its authorized signatory
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002511
Project: 2012-00138

PID: 023-881-933

Lot A (DD EL106574), Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

2174 Departure Bay Road, Nanaimo, BC, V9S 3V6
Street Address of the "Property"

Owner(s) Name and Phone #: Hope Lutheran Church (250) 758-1232

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2012 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

<table>
<thead>
<tr>
<th>His 24 day of December 2012</th>
</tr>
</thead>
</table>

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO
was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002512
Project: 2012-00138

PID: 000-371-882

Lot 217, Section 1, Nanaimo District, Plan 18900
Legal Description of the “Property”

11 Cilaire Drive, Nanaimo, BC, V9S 3C9
Street Address of the “Property”

Owner(s) Name and Phone #: ________________

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such person(s).

This agreement shall be valid for a period expiring not later than December 31, 2012 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

is 10 day of October, 2012

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO
was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002512
Project: 2012-00138

Registered Owner(s): [Redacted]
Civic Address: 11 Cilaire Drive, Nanaimo, BC, V9S 3C9
Mailing Address: 11 Cilaire Drive, Nanaimo, BC, V9S 3C9
Registered Owner(s) Phone No.: [Redacted]

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

DATE: Feb 10, 02
[Signature]
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002513
Project: 2012-00138

PID: 003-803-015

Lot 145, Section 1, Nanaimo District, Plan 18900
Legal Description of the “Property”

124 Black Powder Trail, Nanaimo, BC, V9S 3G6
Street Address of the “Property”

Owner(s) Name and Phone #: NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN

I, the Owner of the Property, hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The “Works”)

Upon completion of the Works the property shall be left in a condition similar to as existed prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this ______ day of ______, 2013

in the presence of:

______________________________
Witness

______________________________
Address

______________________________
Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to restore the property in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO
was hereunto affixed in the presence of:

______________________________
General Manager of Community Safety & Development

______________________________
Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002513
Project: 2012-00138

Registered Owner(s): (Name)
Civic Address: 124 Black Powder Trail, Nanaimo, BC, V9S 3G6
Mailing Address: 124 Black Powder Trail, Nanaimo, BC, V9S 3G6
Registered Owner(s) Phone No.: (250) 753-5510

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property and involving:
   - A relocation of the existing Greenhouse to a new location alongside the sidewalk as indicated on the attached Schedule A.
   - A trimming and or removal of branches from fruit trees to allow the temporary passage of personnel, materials & back-hoe equipment.
   - A trimming of the Grape Vine on the existing wire fence along the sidewalk.
   - A temporary removal & reinstallation of the wire fencing along the sidewalk.
   - The restoration of the grassed area with placement of top soil & grass hydro-seed.
   - Plants within & adjacent to Greenhouse to be moved by owner.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

JULY 4, 2013
DATE
Signed by: [Signature]
Hi,
I have revised the condition sheet to reflect the discussion we last had. If you think it’s accurate, please have both forms signed by you & your husband, scan & send them back to me.

Cheers,
Bob.
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002514
Project: 2012-00138

PID: 003-802-892

Lot 144, Section 1, Nanaimo District, Plan 18900
Legal Description of the “Property”

130 Black Powder Trail, Nanaimo, BC, V9S 3G4
Street Address of the “Property”

Owner(s) Name and Phone #: [Redacted]

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The “Works”)

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 16 day of May, 2013
in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to restore the property in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002515
Project: 2012-00138

PID: 000-620-599
Lot 143, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

136 Black Powder Trail, Nanaimo, BC, V9S 3G6
Street Address of the "Property"

Owner(s) Name and Phone #: [Redacted]

I, Owner of the Property, we hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 14th day of May, 2013

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agree to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to restore it in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO
was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002515
Project: 2012-00138

Registered Owner(s): [Signature]

Civic Address: 136 Black Powder Trail, Nanaimo, BC, V9S 3G6
Mailing Address: 136 Black Powder Trail, Nanaimo, BC, V9S 3G6

Registered Owner(s) Phone No.: (250) 471-0888

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

DATE: May 14, 2013

[Signature]
City of Nanaimo

CONDITION SHEET

File: LD002516
Project: 2012-00138

Registered Owner(s): 

Civic Address: 142 Black Powder Trail, Nanaimo, BC, V9S 3G6

Mailing Address: 

Registered Owner(s) Phone No.: 

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property on the following basis:
   a) Area of proposed excavation previously used as a garden will be left in a state that can be used for future gardening.
   b) Any trees required to be removed due to construction purposes (estimated at 2) will be replaced with approximately five foot high standard nursery stock as may be typically available from a nursery.
   c) Lawn area damaged by city personnel will be repaired with top soil & a spray of grass seed / mulch mix.

3. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

June 18, 13

Shelly Ann Jones
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002517
Project: 2012-00138

PID: 003-800-822

Lot 141, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

148 Black Powder Trail, Nanaimo, BC, V9S 3G6
Street Address of the "Property"

Owner(s) Name and Phone #: [REDACTED]

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2012 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 21st day of February, 2012

in the presence of:

Robert Seale
Witness

455 Wallace
Address

Property Agent
Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO
was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002517
Project: 2012-00138

Registered Owner(s):

Civic Address: 148 Black Powder Trail, Nanaimo, BC, V9S 3G6
Mailing Address: 148 Black Powder Trail, Nanaimo, BC, V9S 3G6

Registered Owner(s) Phone No.: 

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

DATE

[Signature]
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002519
Project: 2012-00138

PID: 003-803-261

Lot 139, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

160 Black Powder Trail, Nanaimo, BC, V9S 3G6
Street Address of the "Property"

Owner(s) Name and Phone #: [Redacted]

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in a condition similar to as existed prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 4th day of January, 2013
in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to restore the property in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO
was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File:                 LD002519
Project:             2012-00138

Registered Owner(s):  
Civic Address:       160 Black Powder Trail, Nanaimo, BC, V9S 3G6
Mailing Address:     160 Black Powder Trail, Nanaimo, BC, V9S 3G6
Registered Owner(s) Phone No.:  (###)###-####

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property including;
   e. Installation of top soil and spray of grass hydro-seed.
   e. Re-installation of existing wood fence panel(s), or newer material depending on circumstances encountered.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

July 4/2013

DATE

Zvonko Malenica
City of Nanaimo

Permission to Enter and Perform Work on Private Property

File: LD002520
Project: 2012-00138

PID: 003-803-309

Lot 138, Section 1, Nanaimo District, Plan 18900
Legal Description of the "Property"

166 Black Powder Trail, Nanaimo, BC, V9S 3G6
Street Address of the "Property"

Owner(s) Name and Phone #: 

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of access for sewer maintenance. (The "Works")

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s).

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than December 31, 2012 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

his __ day of ___, 2012

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

The Corporate Seal of the CITY OF NANAIMO was hereunto affixed in the presence of:

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

CONDITION SHEET

File: LD002520
Project: 2012-00138

Registered Owner(s): [Redacted]
Civic Address: 166 Black Powder Trail, Nanaimo, BC, V9S 3G6
Mailing Address: [Redacted]
Registered Owner(s) Phone No.: [Redacted]

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. On completion of all construction works, the City will complete surface restoration of the property to City standards.

3. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, causes of action, or demands that may exist or may arise from or connected with the Works.

Feb 11 2012

DATE

Kevin J. Hardy
Mareile E. Hardy

Please forward a copy of all time schedule as well to:

166 Black Powder Trail
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 005-427-916

Legal Description of the "Property"
Lot 77, Section 1, Nanaimo District,
PLAN 9915

22 Cortez Place,
Nanaimo BC V9S 2Y7

Dear [Redacted],

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Excavation shall be seeded with grass or asphalt replaced.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 30, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner this 30 day of March 2012.

in the presence of:

Witness

Address

Early Childhood Educator Assistant

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

[Signature]
General Manager of Community Safety & Development

[Signature]
Manager of Legislative Services

[Rubric: City of Nanaimo to provide temporary fencing]

[Rubric: Work to be done between 9:00 AM to 3:00 PM]
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 005-427-860

Legal Description of the "Property"
Lot 74, Section 1, Nanaimo District,
PLAN 9915

2266 Ocean Terrace,
Nanaimo BC V9S 2Z3

Dear [Name]

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). See Addendum A to this agreement for specific remediation conditions agreed to by Property Owner and the City of Nanaimo. In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 30, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 5 day of April 2012

in the presence of:

WITNESS

BILL CORSAN
Commissioner for taking
Affidavits for British Columbia
455 Wallace Street
Nanaimo, BC V9R 5J6

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms above as well as on Addendum A.

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo
Property Remediation

‘Addendum A’ to the “Permission to Enter and Perform Work on Private Property”

Dated April 5, 2012

Registered Owner: [redacted]

Civic Address: 2266 Ocean Terrace, Nanaimo BC V9S 2Z3
PID: 005-427-860

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. The City will consult with owner to discuss restoration options.

3. On completion of all construction works, the City will complete surface restoration of the property to City standards.

4. All restoration work performed by the City shall be of a standard consistent with the current level of improvements/landscaping. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, and causes of action, or demands that may exist or may arise from or connected with the Works.

5. Replace or rebuild one OSB fence panel.

6. Stonework to be rebuilt to the same condition as before construction.

7. Any damaged bulbs, perennials or ornamental shrubs to be replanted or replaced.

8. Remove large existing Laurel located adjacent to manhole. Plant three nursery stock Laurel's along fence line.

9. Lawn to be remediated and seeded where required.

Bruce Cameron
Property Services Agent

Property Owner

Bill Corsan
Commissioner for taking
Affidavits for British Columbia
455 Wallace Street
Nanaimo, BC V9R 5J6
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 005-427-843

Legal Description of the "Property"
Lot 73, Section 1, Nanaimo District,
PLAN 9915

2234 Ocean Tce.
Nanaimo BC V9S 2Z3

Mr. [Name]

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of lining the sanitary sewer main (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner. See Addendum A to this agreement for specific remediation conditions agreed to by Property Owner and the City of Nanaimo.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 30, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 2 day of May, 2013

in the presence of:
Witness

[Signature]

Property Services Agent

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms above as well as Addendum A.

[Signature]

General Manager of Community Safety & Development

[Signature]

Manager of Legislative Services

Now owned by
City of Nanaimo

Property Remediation

Addendum A to the “Permission to Enter and Perform Work on Private Property”

Registered Owner: [redacted]

Civic Address: 2234 Ocean Terrace, Nanaimo, BC V9R 2C6

PROJECT CONDITIONS INCLUDE:

1. The property owner will be notified prior to entering property for commencement of the project.

2. City to use; (a) driveway for backhoe/skid steer access to rear of property. (b) carport/driveway for work material storage. If non-operational vehicle in carport, City to remove and return to carport at completion of project.

3. Excavation of house sewer to sanitary sewer connection dug by hand.

4. Cinder blocks adjacent to 2266 Ocean Terrace to be protected from damage including careful removal and return to same location.

5. To protect roots from machine one foot of mulch to be laid down adjacent to fir trees at rear of property.

6. Three fence panels to be replaced on west boundary.

7. Back yard lawn to be top dressed with topsoil and seeded from rear plane of house to rear property boundary.

8. On completion of all construction works, the City will complete surface restoration of the property to City standards. The Owner shall be notified by the City once all works are completed and shall have sixty (60) days from the date of the receipt of Notice to present any deficiencies for remedy. Failure to notify the City of deficiencies within sixty (60) days shall indicate acceptance and approval of the completed works undertaken by the City and releases the City from any and all claims, actions, and causes of action, or demands that may exist or may arise from or connected with the Works.

Bruce Cameron
Property Services Agent

[signature]

[signature]
Property Owner
Land Title District: VICTORIA
Land Title Office: VICTORIA

Title Number: CA2695426
From Title Number: ET45877

Application Received: 2012-08-01
Application Registered: 2012-08-07

Registered Owner in Fee Simple:
Registered Owner/Mailing Address: 2234 OCEAN TERRACE
NANAIMO, BRITISH COLUMBIA V9S 2Z3

Taxation Authority: CITY OF NANAIMO

Description of Land:
Parcel Identifier: 005-427-843
Legal Description:
LOT 73, SECTION 1, NANAIMO DISTRICT, PLAN 9915

Legal Notations:
LAND HEREIN WITHIN BUILDING SCHEME SEE 70229N AND 75761N

BYLAW CONTRAVENTION NOTICE, COMMUNITY CHARTER, SECTION 57
SEE FA46200

Charges, Liens and Interests:
Nature: RESTRICTIVE COVENANT
Registration Number: 197148G
Remarks: DD 75761N

Nature: UNDERSURFACE RIGHTS
Registration Number: M76301
Registered Owner:
HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA
INTER ALIA
Remarks: AFB 38.90.D32027, DD 39643N
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 005-427-827

Legal Description of the "Property"
Lot 72, Section 1, Nanaimo District,
PLAN 9915

2200 Ocean Tce.
Nanaimo BC V9S 2Z3

Mr. & Mrs. [Signature]

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of lining the Sanitary Sewer main and performing maintenance on the house drain.

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Sod shall be planted over excavation; top of inspection chamber to be flush with sod. Fence panels removed on west side of property to be replaced, maintained to be replaced and existing lawn remediated.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 30, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this [ ] day of [ ]

in the presence of:

[Signature]
Witness

[2200 Ocean Tce.
Address

[ ]
Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

[Signature]
General Manager of Community Safety & Development

[Signature]
Manager of Legislative Services
THIS IS PHOTO REFERENCED IN PERMISISON/CONDITION FORM SIGNED BY

INDEPENDENT ON MAY 1, 2012.

INCLUDING PERPENDICULAR FENCING FROM HOUSE TO GREEN 4X4 POST.

CITY OF NANAIMO
THE HARBOUR CITY

Bruce Cameron, RI
PROPERTY AGENT, REAL ESTATE
DEVELOPMENT SERVICES DEPARTMENT
bruce.cameron@nanaimo.ca

DIRECT LINE:
250-441-75

[Image with dimensions and metadata]
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 005-427-797

Legal Description of the "Property"
Lot 71, Section 1, Nanaimo District,
PLAN 9915
2190 Ocean Tce.
Nanaimo BC V9S 3A5

Dear Mr./Mrs./Ms.:

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation shall be seeded with grass. Gravel parking pad to be replaced with gravel upon completion of manhole at top end. In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 30, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 30 day of March, 2012
in the presence of:

[Signatures]

Witness

Commissioner for taking
Affidavits for British Columbia
455 Wallace Street
Nanaimo, BC V9R 5J6

Property Services Agent

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

[Signature]
General Manager of Community Safety & Development

[Signature]
Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 005-427-762

Legal Description of the "Property"
Lot 70, Section 1, Nanaimo District,
PLAN 8915

2166 Ocean Tce.
Nanaimo BC V9S 2Z3

Dear MANAGER,

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Excavation shall be backfilled and seeded with grass or same surface as was disturbed.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 30, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 30th day of March 2012

in the presence of:

Witness

BILL CORSAN
Commissioner for taking
Affidavits for British Columbia
455 Wallace Street
Nanaimo, BC V9R 5J6

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 000-063-378

Legal Description of the "Property"
Lot 4, Section 1, Nanaimo District,
PLAN 12530

2130 Estevan Road, Nanaimo BC

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation shall be seeded with grass, HOT TUB & PART OF REAR DECK MATERIAL REMOVED BY CITY.
In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

this 5th day of March 2018

In the presence of:

Witness

BILL CORSAN
Commissioner for taking Affidavits for British Columbia
455 Wallace Street
Nanaimo, BC V9R 5J6

Address

__________________________
Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 004-778-138

Legal Description of the "Property"
Lot 5, Section 1, Nanaimo District,
PLAN 12530

2120 Estevan Road, Nanaimo BC

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation shall be seeded with grass.
In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this 15th day of March, 2013

in the presence of:

Witness

BILL CORSAN
Commissioner for taking
Affidavits for British Columbia
455 Wallace Street
Nanaimo, BC V9R 5J6

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development
Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 004-778-154

Legal Description of the "Property"
Lot 6, Section 1, Nanaimo District,
PLAN 12530

17 Thelis Place, Nanaimo BC

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation shall be seeded with grass. ASPHALT DRY. *STONE WALL TO BE REPAIRED OR REPLACED AS REG'D. In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such person(s).

This agreement shall be valid for a period expiring not later than August 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this _13th_ day of _MARCH_ , 2012

in the presence of:

Witness

Address

Heir/descend

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 000-428-060

Legal Description of the "Property"
Lot 7, Section 1, Nanaimo District,
PLAN 12530

35 Thelis Place, Nanaimo BC

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation to be seeded with grass. "SHED TO BE DISASSEMBLED, MOVED & CAREFULLY LOCATE IN EXISTING LOCATION"

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

this 15th day of March, 2012

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 004-778-182

Legal Description of the "Property"
Lot 9, Section 1, Nanaimo District,
PLAN 12530

71 Thetis Place, Nanaimo BC

As Owner of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation to be seeded with grass.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

this 2nd day of ________,

In the presence of:

Witness

Address

Biologist

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 000-199-389

Legal Description of the "Property"
Lot 10, Section 1, Nanaimo District,
PLAN 12530

99 Thetis Place, Nanaimo BC V9S 3A5

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of lining the Sanitary and Storm Sewer and small area to be excavated to clear obstruction in Sanitary pipe.

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn to be seeded with grass.
In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 31, 2013. and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner this 24th day of APRIL, 2012

in the presence of:

Witness

Bill Consan

Commissioner for taking
Affidavits for British Columbia
455 Wallace Street
Nanaimo, BC V9R 5J6

Occupation:

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 005-423-546

Legal Description of the "Property"
Lot 6, Section 1, Nanaimo District,
PLAN 9915

11 Galiano Place, Nanaimo BC V9S 3A4

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of the Sanitary Sewer and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation shall be seeded with grass.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such persons(s).

This agreement shall be valid for a period expiring not later than August 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner
this ___ day of ____________,

in the presence of:

Witness

Address

Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development

Manager of Legislative Services
City of Nanaimo

Permission to Enter and Perform Work on Private Property

PID: 000-401-200

Legal Description of the "Property"
Lot 7, Section 1, Nanaimo District,
PLAN 9915

37 Galiano Place, Nanaimo BC

As Owners of the Property, I hereby authorize the City of Nanaimo by its Officers, Employees, Contractors or Agents to enter upon the Property at all reasonable times between 7:00 a.m. and 8:00 p.m. for the purpose of replacement and relining of Sanitary and Storm Sewers and all related appurtenances (The "Works").

Upon completion of the Works the property shall be left in essentially the same condition as it was prior to entry, unless agreed to in writing by the City of Nanaimo and the Property Owner(s). Lawn excavation to be seeded with grass.

In the event that I sell or lease the Property, I hereby undertake to inform the purchaser or lessee of this agreement and to deliver a copy of this agreement to such person(s).

This agreement shall be valid for a period expiring not later than August 31, 2013 and may be extended by mutual consent of the parties.

SIGNED, SEALED AND DELIVERED by the Owner

this ______ day of __________, 2013,

in the presence of:

Witness

Address

Property Services Agent
Occupation

In consideration of granting this Agreement, the City of Nanaimo hereby agrees to indemnify and save harmless the Owner from any and all liability arising out of the entry hereby permitted and to deal with the property and restore it in accordance with the terms enclosed.

General Manager of Community Safety & Development

Manager of Legislative Services
APPENDIX 4

Sewer Flows
| Model Pipe ID | LENGTH (m) | Pipe Dia (mm) | Slope (m/m) | INVUP | INVDN | QFULL (l/s) | DESIGNQ (l/s) | DESIGNVEL (m/s) | EPI_DOVERD | EPI_NEWDA |
|--------------|------------|---------------|-------------|-------|-------|------------|---------------|----------------|-------------|-----------|---------|
| 591          | 31.0559    | 150           | 0.05602     | 38.69 | 36.95 | 36.00      | 1.00          | 0.43           | 0.122      | 0         |
| 2228         | 113.423    | 150           | 0.05766     | 45.23 | 38.69 | 37.00      | 0.00          | 0.384          | 0.122      | 0         |
| 2229         | 60.2406    | 150           | 0.083       | 36.93 | 31.93 | 44.00      | 1.00          | 0.697          | 0.122      | 0         |
| 2240         | 104.251    | 150           | 0.04326     | 59.67 | 55.16 | 32.00      | 1.00          | 0.57           | 0.163      | 0         |
| 2269         | 131.14     | 150           | 0.00282     | 32.85 | 32.48 | 8.00       | 0.00          | 0.114          | 0.163      | 0         |
| 2270         | 110.428    | 150           | 0.01928     | 35.16 | 33.03 | 21.00      | 0.00          | 0.278          | 0.122      | 0         |
| 2271         | 51.0737    | 150           | 0.01076     | 32.48 | 31.93 | 16.00      | 1.00          | 0.292          | 0.203      | 0         |
| 2274         | 54.6718    | 200           | 0.02286     | 28.46 | 27.21 | 50.00      | 4.00          | 0.671          | 0.244      | 0         |
| 2279         | 44.8862    | 150           | 0.12765     | 60.58 | 54.85 | 55.00      | 1.00          | 0.438          | 0.122      | 0         |
| 2892         | 41.8816    | 150           | 0.01169     | 60.89 | 60.4  | 17.00      | 0.00          | 0.085          | 0.081      | 0         |
| 2894         | 46.1381    | 150           | 0.02644     | 55.04 | 53.82 | 25.00      | 0.00          | 0.342          | 0.122      | 0         |
| 2895         | 103.468    | 150           | 0.08901     | 53.82 | 44.61 | 46.00      | 1.00          | 0.6            | 0.122      | 0         |
| 2919         | 76.7919    | 150           | 0.07578     | 27.66 | 21.84 | 42.00      | 0.00          | 0.396          | 0.081      | 0         |
| 2920         | 57.5067    | 150           | 0.05164     | 21.84 | 18.87 | 35.00      | 0.00          | 0.288          | 0.122      | 0         |
APPENDIX 5

Video Inspection Reports

Available online at

https://cloud.nanaimo.ca/public.php?service=files&t=14dafcfc54c4b4dfbc4390fed23edbc