City of Coquitlam

Contract Documents
78029

Booth Creek Bridge Rehabilitation – Schoolhouse Street

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Contract No. 78029

Booth Creek Bridge Rehabilitation – Schoolhouse Street

Project Construction Documents

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Invitation to Tender

INVITATION TO TENDER

DATE OF ISSUE: **March 15, 2024**

We acknowledge with gratitude and respect that the name Coquitlam was derived from the hən̓q̓əmiń əm̓ word kʷikʷəƛ̓əm (kwee-kwuh-tlum) meaning "Red Fish Up the River". The City is honoured to be located on the kʷikʷəƛ̓əm (Kwikwetlem) traditional and ancestral lands, including those parts that were historically shared with the sq̓əc̓iy̓aʔɬ təməxʷ (Katzie), and other Coast Salish Peoples.

Tender No. 78029

Booth Creek Bridge Rehabilitation – Schoolhouse Street

The City of Coquitlam invites tenders for **Contract 78029 – Booth Creek Bridge Rehabilitation – Schoolhouse Street**, generally consisting of the following, but not limited to:

Booth Creek bridge approach slab rehabilitation on Schoolhouse Street including placement of lightweight fill, new cast-in-place concrete approach slabs, road paving, new sidewalks and curbs, handrails, lane markings, and other miscellaneous and incidental works as further described in the Contract Documents.

Tender Documents and Drawings are available for downloading from the City of Coquitlam website: www.coquitlam.ca/BidOpportunities

Printing of Tender documents and drawings is the sole responsibility of the Tenderers.

Tenders submitted must be accompanied by a copy of the original specified 10% Bid Bond and will be received:

On or Before 2:00 pm local time
Tuesday, April 9, 2024
("Closing Date and Time")

Addenda

Tenderers are required to check the City's website for any updated information at: www.coquitlam.ca/BidOpportunities.

Where in its sole discretion it considers it to be necessary or desirable, the City may issue Addenda to amend any portion of the Contract Documents.

Any changes to the Tender documentation will be issued by means of written Addenda and posted on the City's website and will form part of the Tender. No amendment of any kind to the Tender is effective unless it is posted in a formal written Addendum on the City website. Upon submitting a Tender, Tenderers will be deemed to have received notice of all Addenda that are posted on the City's website and deemed to have considered the information for inclusion in the Tender submitted.

The City does not retain a bidder's list or bidder's registry. Tenderers are encouraged to register as plan takers and may view the Tender Documents and Drawings by contacting the Vancouver Regional Construction Association (VRCA), website: www.my.vrca.ca, ph: 604-294-3766, or email at vrca@vrca.ca, quoting the Coquitlam Tender Reference Number.

Should there be any discrepancy in the documentation provided, the City's original file copy shall prevail.

Tenders shall remain open for acceptance for 60 days following the submission Closing Date.

The City reserves the right to accept or reject any or all Tenders and the lowest or any Tender may not necessarily be accepted. The City also reserves the right to cancel any request for Tender at any time without recourse by the Tenderer.

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

The City will not be responsible for any costs incurred by the Tenderer in preparing the Tender.

Procurement of goods and services is conducted in accordance with Chapter 5 of the Canadian Free Trade Agreement (CFTA) and the New West Partnership Trade Agreement (NWPTA).

M. Pain
Purchasing Manager

Instructions to Tenderers

Tender 78029

Booth Creek Bridge Rehabilitation – Schoolhouse Street

INSTRUCTIONS TO TENDERERS

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INSTRUCTIONS TO TENDERERS

(FOR USE WHEN UNIT PRICES FORM THE BASIS OF PAYMENT - TO BE USED ONLY WITH THE GENERAL CONDITIONS AND OTHER STANDARD DOCUMENTS OF THE UNIT PRICE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS.)

The City of Coquitlam

Contract: **Booth Creek Bridge Rehabilitation – Schoolhouse Street**

Reference No. **78029**

1.0 Introduction

1.1 These Instructions apply to and govern the preparation of tenders for this *Contract*. The *Contract* is generally for the following work:

Booth Creek bridge approach slab rehabilitation on Schoolhouse Street including placement of lightweight fill, new cast-in-place concrete approach slabs, road paving, new sidewalks and curbs, handrails, lane markings, and other miscellaneous and incidental works as further described in the Contract Documents.

1.2 All inquiries regarding this Tender are to be submitted in writing referencing the **Tender Name and Number** sent to:

E-mail **bid@coquitlam.ca**

The deadline for inquiries is **2:00 PM** local time, **Thursday, April 4, 2024.**

INQUIRIES RECEIVED AFTER THIS DATE AND TIME MAY NOT RECEIVE A RESPONSE.

2.0 Tender Documents

2.1 The Tender Documents which a Tenderer should review to prepare a Tender consist of all of the *Contract Documents* listed in Schedule 1 entitled “Schedule of Contract Documents”. Schedule 1 is attached to the Agreement which is included as part of the Tender Package. The *Contract Documents* include the drawings listed in Schedule 2 to the Agreement, entitled “**List of *Contract Drawings***”.

2.2 A portion of the Contract Documents are included by reference. Copies of these documents have not been included with the tender package. These documents are the General Conditions, Specifications and Standard Detail Drawings. They are those contained in the publication entitled “Master Municipal Construction Documents - General Conditions, Specifications and Standard Detail Drawings”. Refer to Schedule 1 to the Agreement or, if not specified in Schedule 1, then the applicable edition shall be the most recent edition as of the date of the *Tender Closing Date.* All sections of this publication are by reference included in the *Contract Documents*.

2.3 Any additional information made available to Tenderers prior to the Tender Closing Time by the Owner or representative of the Owner, such as geotechnical reports or as-built plans, which is not

expressly included in Schedule 1 or Schedule 2 to the Agreement, is not included in the Contract Documents. Such additional information is made available only for the assistance of Tenderers who must make their own judgments about its reliability, accuracy, completeness and relevance to the *Contract*, and neither the Owner nor any representative of the Owner gives any guarantee or representation that the additional information is reliable, accurate, complete or relevant.

3.0 Submission of Tenders

3.1 Tenders must be submitted on the Tender Form provided, accompanied by a copy of the original 10% Bid Bond quoting the Tender Name and Number, and be uploaded to the City's file transfer website.

Tenders must be received on or before:

Tender Closing Time: **2:00 p.m. local time**
Tender Closing Date: **April 9, 2024**

For the purpose of the Tender submission, digital copies of original documents and signatures sent electronically are accepted. Original documents are required upon request by the City.

Instructions for Tender Submission

3.2 **Tender submissions are to be consolidated into one (1) PDF file and uploaded electronically through QFile, the City's file transfer service accessed at website:**
http://qfile.coquitlam.ca/bid

1. **In the "Subject Field" enter: Tender Number and Name**
2. **Add consolidated Tender file in PDF format and Appendix 1 in XLS format, and Send** (ensure your web browser remains open until you receive 2 emails from Qfile to confirm upload is complete and was sent to email: bid@coquitlam.ca)

Tenderers are responsible to allow for ample time to complete the submission process. For assistance, phone 604-927-3037.

3.3 Tenders submitted shall be deemed to be received when displayed as a new email in the in-box of the above email address. The City will not be responsible for any delay or for any Tenders not received for any reason, including technological delays or issues by either party's network or email program, and the City will not be liable for any damages associated with Tenders not received.

3.4 The City reserves the right to accept late Tenders to allow for technological delays. The City also reserves the right to accept Tenders by email: bid@coquitlam.ca.

BIDS RECEIVED IN-PERSON, BY COURIER, OR BY FAX WILL NOT BE ACCEPTED.

3.5 Tenders will not be opened in public. The unevaluated results will be forwarded to participants by email.

3.6 Tender submissions are subject to the Freedom of Information and Protection of Privacy Act and contents may be disclosed if required to do so, pursuant to the Act.

4.0 Additional Instructions to Tenderers

Additional Instructions to Tenderers

Obtaining Documents

4.1 The following documents which are referred to and form part of the Contract Document package may be obtained as follows:

- Copies of the Master Municipal Construction Documents Volume II (2009), General Conditions, Specifications and Standard Detail Drawings are available separately from:

  Support Services Unlimited
  Suite 102
  211 Columbia Street
  Vancouver, B.C. V6A 2R5
  Tel: 604-681-0295
  Fax: 604-305-0424

- Copies of the City of Coquitlam Supplementary Specifications and Detailed Drawings to the MMCD 2009 Edition are available for viewing and downloading off the City of Coquitlam website: Supplementary Specifications and Detailed Drawings to MMCD

Test Excavations

4.2 Prior to the excavation of test holes on road allowances or privately owned property the Tenderer shall obtain permission from the Municipality or Owner of the property and comply with their requirements for restoration of disturbed surfaces and utilities. Failure to comply with Municipal by-laws restricting this practice may result in prosecution of the offending party.

Business License

4.3 The successful Tenderer shall provide evidence of a City of Coquitlam Business License or Tri-Cities Inter-Municipal Business License prior to commencement of work or supply of materials. For more information, contact Business License Division Ph: 604-927-3085 or apply online at website: City of Coquitlam Business License

No Claim

4.4 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 this Tender, including accepting a non-compliant bid and by submitting a Tender, each Tenderer shall be deemed to have agreed that it has no claim.

No Cost

4.5 The City will not under any circumstances be responsible for any costs incurred by the Tenderer in preparing the Tender.

Right to Accept or Reject any Tender

4.6 The City reserves the right to accept or reject any or all Tenders and the lowest or any Tender may not necessarily be accepted. In its sole discretion, the City may reject or retain for its consideration, tenders which are nonconforming because they do not contain the content or form required by the instructions to tenderers or for failure to comply with the process for submission set out in these instructions to tenderers.

The City specifically reserves the right to reject all Tenders if none is considered to be satisfactory and, in that event, at its option, to call for additional Tenders.

Negotiation

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

Cancellation of Tender

4.8 The City reserves the right to cancel any request for Tender at any time without recourse by the Tenderer. The City has the right to not award this work for any reason including choosing to complete the work with the City's own forces.

Conflict of Interest

4.9 Tenderers shall disclose any actual or potential conflicts of interest and existing business relationships it may have with the City, their elected or appointed officials or employees.

Collusion

4.10 Tenderers will not discuss or communicate with one another in regards to the preparation of their Tenders. Each Tenderer will ensure that its participation in the Tender process and that of its team members is conducted without collusion or fraud. Failure to comply with this requirement may lead to disqualification without further notice or warning.

Instruction to Tenderers – Part II

Delete Instructions to Tenderers – Part II Contained in the Edition of the Publication "Master Municipal Construction Documents 2009" and replace with the following:

5.0 Tender Requirements

5.1 A tender should be on the Form of Tender as provided and be signed by the authorized signatory(s) as follows:

5.1.1 if the tenderer is a partnership or joint venture then the name of the partnership or joint venturer should be included, and each partner or joint venturer should sign personally; if a partner of joint venture is a corporation then such corporation should sign as indicated in paragraph 5.1.3 below; and

5.1.2 if the tenderer is a corporation then the full name of the corporation should be included, together with the names and signatures of authorized signatories.

5.1.3 For the purpose of the Tender submission, digital copies of original documents and electronic signatures are accepted. Original documents are required upon request by the City.

5.2 A tender must be accompanied by tender security ("*Bid Security")* in the form of:

5.2.1 a copy (digital or Electronic copy is acceptable) of the original bid bond in an amount equal to 10% of the Tender Price, issued by a surety licensed to carry on the business of suretyship in British Columbia in a form reasonably satisfactory to the *Owner*;

5.3 Tenderer should be competent and capable of performing the various items of work. Tenderer shall complete the following statement sheets appended to the Form of Tender:

5.3.1 Appendix 1 – the Schedule of Quantities and Prices;

5.3.2 Appendix 2 – a "*Preliminary Construction Schedule*", generally in the form attached as Appendix 2 to the Form of Tender, and showing *Substantial Performance* by the date or within the duration, shown in paragraph 2.2 of the Form of Tender.

5.3.3 Appendix 3 – name and brief description of the previous experience of the *Superintendent* the tenderer will use for the *Work*;

5.3.4 Appendix 4 – a list of previous comparable work, including a brief description of that work, approximate contract value, and references (with phone numbers);

5.3.5 Appendix 5 – a complete list of all subcontractors, if any, that the tenderer will use for the *Work* including full names.; and

5.3.6 Appendix 7 – is provided for information only, to indicate the Contract Insurance is to be submitted by the successful Tenderer upon Notice of Award.

5.4 The successful tenderer will, within 15 *Days* of receipt of the written *Notice of Award*, be required to deliver to the *Owner* the items listed in FT 5.1.1, including a Performance Bond and a Labour and Material Payment Bond as described in FT 5.1.1(a), failing which the provisions of FT 6.1 will apply.

6.0 Qualifications, Modifications, Alternative Tenders

6.1 Tenders which contain qualifications, or omissions, so as to make comparison which other tenders difficult, may be rejected by the *Owner*.

6.2 A tenderer may, at the tenderer's election, submit an alternative tender ("*Alternative Tender*") which varies the materials, products, designs or equipment by the *Owner as Approved Equals* as the case may be, but an *Alternative Tender* must be in addition to, and not in substitution for a tender which conforms to the requirements of the *Contract Documents*.

6.3 The only *Alternative Tender* that the *Owner* may acc*ept* is an *Alternative Tender* submitted by that tenderer whose conforming tender, submitted as required by paragraph 6.2 of these Instructions to Tenderers, would have been accepted by the *Owners* in the preference to other conforming tenders, if no *Alternative Tenders* had been invited.

7.0 Approved Equals

7.1 Prior to the *Tender Closing Time and Date,* a tenderer may request the *Owner* to approve materials, products, or equipment ("*Approved Equal*") to be included in a tender in substitution for items indicated in the Contract Documents.

7.2 Applications for an *Approved Equal* must be in writing, and supported by appropriate supporting information, data, specifications, and documentation.

7.3 If the *Owner* decides in its discretion to accept an *Approved Equal*, then the *Owner* will issue an addendum to all tenderers.

7.4 The *Owner* is not obligated to review or accept an application for an *Approved Equal*.

8.0 Inspection of the *Place of the Work*

8.1 All tenderers, either personally or through a representative, are responsible to examine the *Place of the Work* before submitting a tender. A tenderer has full responsibility to be familiar with and make allowance in the tender for all conditions at the *Place of the Work* that might affect the tender, including any information regarding subsurface soil conditions made available by the *Owner*, the location of the *Work*, local conditions, topographical soil conditions, weather and access. Unless otherwise specified in the *Contract Documents*, a tenderer is not required to do subsurface investigations. By submitting a tender, a tenderer represents that the tenderer has examined the *Place of the Work*, or specifically elected not to. No additional payments or time extensions shall be claimable or due because of difficulties relating to conditions at the *Place of the Work* which were reasonably foreseeable by a contractor qualified to undertake the *Work*.

8.2 Tenderers are referred to GC 11.2.1 regarding **Concealed or Unknown Conditions.**

9.0 Interpretation of *Contract Documents*

9.1 If a tenderer is in doubt as to the correct meaning of any provision of the *Contract Documents*, the tenderer may request clarification as instructed in paragraph 1.2 of the Instructions to Tenderers.

9.2 If a tenderer discovers any contradictions or inconsistencies in the *Contract Documents* or its provisions, or any discrepancies between a provision of the *Contract Documents* and conditions at the *Place of the Work as* observed in an examination under paragraph 8 of the person named in paragraph 1.2 of the Instructions to Tenderers.

9.3 If the *Owner* considers it necessary, the *Owner* may issue written addenda to provide clarification (s) of the *Contract Documents.*

9.4 No oral interpretation or representations from the *Owner* or any representative of the *Owner* will affect, alter, or amend any provision of the *Contract Documents*.

10.0 Prices

10.1 The Tendered Price will represent the entire cost excluding *GST* to the *Owner* of the complete *Work* based on the estimated quantities in the *Schedule of Quantities and Prices* of the Form of Tender. Notwithstanding the generalities of the above, tenderers shall include in the tendered prices (including unit prices, lump sum prices, or other forms of pricing) sufficient amounts to cover:

10.1.1 the costs of all labour, equipment and material included in or required for the *Work*, including all items which, whole not specifically listed in the *Schedule of Quantities and Prices*, are included in the *Work* specifically or by necessary inference from the *Contract Documents;*

10.1.2 all assessments payable with respect to labour as required by any statutory scheme such as unemployment insurance, holiday pay, insurance, CPP and all employee benefits and the Workers Compensation Act;

10.1.3 all overhead costs, including head office and on-site overhead costs, and all amounts for the *Contractor's* profit.

10.2 The tendered prices and all subcontracts must allow for compliance with all applicable laws regarding trade or other qualifications of employees performing the *Work*, and payment of appropriate wages for labour included in or required for the *Work*.

11.0 Taxes

11.1 The tendered prices shall cover all taxes and assessments of any kind payable with respect to the *Work*, but shall not include *GST*. *GST* shall be listed as a separate line item as required by GC 19.3.

12.0 Amendment of Tenders

12.1 A tenderer may amend or revoke a tender by giving written notice, delivered by Email, to the office referred to in paragraph 3.4 of the Instructions to Tenderers at any time up until the *Tender Closing Date and Time*. An amendment or revocation that is received after the *Tender Closing Date and Time* shall not be considered and shall not affect a tender as submitted.

12.2 An amendment or revocation must be signed by an authorized signatory of the tenderer in the same manner as provided by paragraph 5.1 of these Instructions to Tenderers.

12.3 Any amendment that expressly or by inference discloses the tenderer's *Tender Price* or other material element of the tender such that, in the opinion of the *Owner*, the confidentiality of the tender is breached, will invalidate the entire tender.

12.4 An acceptable form of a tender amendment which tenderers may, but are not required to, use is as follows:

"Contract: _____
(TITLE OF CONTRACT)

Reference No. _____
(OWNER'S CONTRACT REFERENCE NO.)

TO: _____
(NAME OF OWNER)

We the undersigned wish to amend our tender which we submitted for the above *Contract* by deleting the following tendered prices or items from our tender:

_____
_____
_____
(TEDNERED PRICES AND/OR TENDER ITEMS IN THE TENDER THAT ARE TO BE AMENDED)

and substituting the following revised tendered prices or items:

_____
_____
_____
(REVISED TENDERED PRICES OR TENDER ITEMS)

The extensions in our tender should be adjusted accordingly, and our ***Tender Price*** as set out in Appendix 1 of our submitted **Form of Tender**, and on the ***Schedule of Quantities and Prices***, increased / decreased by $_____, excluding GST. We have not included our revised ***Tender Price*** in order to preserve the confidentiality of our tender.

Signed and delivered the ___ day of _____, 20___."

13.0 Duration of Tenders

13.1 After the *Tender Closing Time*, a tender shall remain valid and irrevocable as set out in paragraph 5.1 of the Form of Tender.

14.0 Qualifications of Tenderers

14.1 By submitting a tender, a tenderer is representing that it has the competence, qualifications and relevant experience required to do the *Work.*

15.0 Award

15.1 In exercising its discretion, the *Owner* will have regard to the information provided in the Appendices to the Form of Tender as described under IT 5.3 including the proven experience of the tenderer, and any listed subcontractors, to do the *Work*.

Tenders received will be evaluated to provide the City with greatest value based on quality, service, price and experience. Evaluation Criteria will include but is not limited to:

1. Ability to meet specifications and required completion date
2. Contractor's past experience, references, reputation and compliance to specifications
3. Demonstrated successful experience on similar projects and specific equipment installation
4. Price: purchase price, maintenance costs, availability of parts and service, warranty and compatibility with existing equipment and/or conditions
5. Any other criteria, the City deems, at its sole discretion, necessary to evaluate Tenders;
6. Lowest price will not necessarily be accepted.

The City may, in its absolute discretion, not award to a Tenderer if the Tenderer, or any officer or director of a corporate Tenderer, is or has been engaged, either directly or indirectly through another corporation or legal entity, in a legal action against the City and its elected and appointed officers and employees or any of them in relation to:

a) any other contract or services; or

b) any matter arising from the City's exercise of its powers, duties or functions under the *Local Government Act,* the *Community Charter* or any other enactments; within five years of this Tender Offer.

For purposes of this section, the words "legal action" includes, without limitation, mediation, arbitration, hearing before an administrative tribunal or lawsuit filed in any court.

Without limiting the City's sole discretion, in determining whether or not to award to a Tenderer pursuant to this clause, the City will consider such factors as whether the legal action is likely to affect the Tenderer's ability to work with the City and its employees, agents, consultants and representatives or any of them and whether the City's past experience with the Tenderer in the matter that resulted in the legal action indicates that the City is likely to incur increased staff and legal costs or either of them in the administration of this contract if it is awarded to the Tenderer.

In the event that the lowest total Tender Price by two or more Tenderers is the same amount, the City will select a Tenderer with an overall satisfactory performance record in having completed work on previous relevant projects that are provided as references, and on City projects. Information obtained from references will not be disclosed or discussed with any Tenderer. If all references are equal, selection will be determined by a coin toss in a manner to be directed by the City.

Where only one Tender is received the City may reject such and re-tender on a selected basis.

15.2 The *Owner* will notify the successful tenderer in writing.

15.3 If there are any discrepancies in the *Schedule of Quantities and Prices* between the unit prices and the extended totals then the unit prices shall be deemed correct, and corresponding corrections shall be made to the extended totals. If a unit price or extended total has been omitted, the following shall apply:

a) If a unit price is given but the corresponding extended total has been omitted, then the extended total shall be calculated from unit price and the estimated quantity, and inserted as the extended total;

b) If an extended total is given but the corresponding unit price has been omitted, then the unit price shall be calculated from the extended total and estimated quantity, and inserted as the unit price;

c) If both the unit price and the corresponding extended total for a tender item have been omitted, then the following test shall be applied to determine whether the tender shall be rejected as incomplete:

(i) the highest of the unit prices tendered by other tenderers for that tender item shall be used as the test unit price, and the corresponding test extended total shall be calculated from the test unit price and the estimated quantity;

(ii) if the test extended total for the tender item exceeds 1% of the revised total *Tender Price*, including the test extended total, or if the revised total *Tender Price*, including the test extended total, alters the ranking of the tenderers according to the lowest *Tender Price*, then the omitted unit price for that tender item is deemed to materially affect the *Tender Price* relative to other tenders and the tender shall be rejected;

(iii) if the tender is not rejected under subparagraph (ii) of this IT 15.3 (c), then the unit price and the extended total for that tender item shall both be deemed to be, and the costs for that tender item shall be zero deemed to be included in other tender items prices;

d) In no event shall page totals in the *Schedule of Quantities and Prices* or the total *Tender Price* be used to calculate missing extended totals or unit prices.

16.0 Subcontractors

16.1 The *Owner* reserves the right to object to any of the subcontractors listed in a tender. If the *Owner* objects to any of the subcontractor(s) then the *Owner* will permit a tenderer to, within 5 days, propose a substitute subcontractor(s) acceptable to the *Owner* provided that there is not resulting adjustment in the *Tender Price* or the completion date set out in paragraph 2.2 of the Form of Tender. A tenderer will not be required to make such substitution and, if the *Owner* objects to a listed *Subcontractor(s)*, the tenderer may, rather than propose a substitute subcontractor(s), consider its tender rejected by the *Owner* and by written notice withdraw it tender. The *Owner* shall, in the event, return the tenderer's bid security

17.0 Optional Work

17.1 If the *Schedule of Quantities and Prices* includes any tender prices for *Optional or Provisional Work*, as defined in GC 7.4.1, the tenderers must complete all the unit prices for such *Optional or Provisional Work*. Such tender prices shall not include any general overhead costs, or other costs, or profit, not directly related to the *Optional or Provisional Work*.

17.2 Notwithstanding that the *Owner* may elect not to proceed with the *Optional or Provisional Work*, the tender prices for any *Optional or Provisional Work*, including the extended totals for *Optional or Provisional Work* unit prices, shall be included in the *Tender Price* for the purpose of any price comparisons between tenders.

Form of Tender

Form of Tender

Tender No. 78029

Booth Creek Bridge Rehabilitation – Schoolhouse Street

Summary

Name of ***Contractor***: _____

Tender Price *(*exclude GST): $ _____
(FROM APPENDIX 1 OF FORM OF TENDER)

Tender submitted must be accompanied by a copy of the original 10% Bid Bond and will be received

On or before 2:00 pm (local time)
Tuesday, April 9, 2024

Instructions for Tender Submission

Tender submissions are to be consolidated into one (1) .pdf file and **uploaded electronically through QFile, the City's file transfer service accessed at website:** qfile.coquitlam.ca/bid

1. **In the "Subject Field" enter:** Tender Number and Name
2. **Add consolidated Tender file in PDF format, and Appendix 1 in XLS format, and Send** (ensure your web browser remains open until you receive 2 emails from Qfile to confirm upload is complete and was sent to the correct email address: bid@coquitlam.ca)

Tenderers are responsible to allow ample time to complete the Tender submission process. If assistance is required, phone 604-927-3037.

THE CITY OF COQUITLAM
3000 Guildford Way
Coquitlam, B.C. V3B 7N2

April 2024

(FOR USE WHEN UNIT PRICES FORM THE BASIS OF PAYMENT - TO BE USED ONLY WITH THE GENERAL CONDITIONS AND OTHER STANDARD DOCUMENTS OF THE UNIT PRICE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS.)

Contract Name: **Booth Creek Bridge Rehabilitation – Schoolhouse Street**
Reference No.: **78029**

TO OWNER:

1 WE, THE UNDERSIGNED:

1.1 have received and carefully reviewed all of the *Contract Documents*, including the Instructions to Tenderers, the City of Coquitlam Supplementary General Conditions, the City of Coquitlam Supplementary Contract Specifications, the specified edition of the "Master Municipal Construction Documents – General Conditions, Specifications and Standard Detail Drawings" and the following Addenda:

_____
_____
_____;
(ADDENDA, IF ANY)

1.2 shall fully disclose any actual or potential conflicts of interest and existing business relationships we may have with the City, their elected or appointed officials or employees:

_____

1.3 have full knowledge of the *Place of the Work*, and the *Work* required; and

1.4 have complied with the Instructions to Tenderers; and

2 ACCORDINGLY WE HEREBY OFFER:

2.1 to perform and complete all of the *Work* and to provide all the labour, equipment and material all as set out in the *Contract Documents*, in strict compliance with the *Contract Documents*; and

2.2 to achieve *Substantial Performance* of the *Work* on or before **August 30, 2024**; and

2.3 to do the *Work* for the price, which is the sum of the products of the actual quantities incorporated into the *Work* and the appropriate unit prices set out in Appendix 1, the "*Schedule of Quantities and Prices*", plus any lump sums or specific prices and adjustment amounts as provided by the *Contract Documents*. For the purposes of tender comparison, our offer is to complete the *Work* for the "*Tender Price*" as set out on Appendix 1 of this Form of Tender. Our *Tender Price* is based on the estimated quantities listed in the *Schedule of Quantities and Prices*, and excludes *GST.*

3 WE CONFIRM:

3.1 that we understand and agree that the quantities as listed in the *Schedule of Quantities and Prices* are estimated, and that the actual quantities will vary.

3.2 that we understand and agree that the owner is in no way obliged to accept this Tender.

4 WE CONFIRM:

4.1 that the following Appendices are attached to and form a part of this tender:

4.1.1 the Appendices as required by paragraph 5.3 of the Instructions to Tenderers - Part II; and

4.1.2 the *Bid Security* as required by paragraph 5.2 of the Instructions to Tenderers - Part II.

4.1.3 the Certificate of Compliance on the form provided in Appendix 7 of this Form of Tender.

5 WE AGREE:

5.1 that this tender will be irrevocable and open for acceptance by the *Owner* for a period of **60** calendar days from the day following the *Tender Closing Date and Time*, even if the tender of another Tenderer is accepted by the *Owner*. If within this period the *Owner* delivers a written notice ("*Notice of Award*") by which the *Owner* accepts our tender we will:

5.1.1 within **15** *Days* of receipt of the written *Notice of Award* deliver to the *Owner*:

a) a Performance Bond and a Labour and Material Payment Bond, each in the amount of 50% of the *Contract Price*, issued by a surety licensed to carry on the business of suretyship in the province of British Columbia, and in a form acceptable to the *Owner*;

b) a "clearance letter" indicating that the Tenderer is in WCB compliance; and

c) a copy of the insurance policies as specified in SGC Section 24 indicating that all such insurance coverage is in place and;

d) a letter confirming the *Contractor* as “Prime Contractor” for the Contract as specified in SGC Section 21.2.1.

5.1.2 within **2** *Days* of receipt of written "*Notice to Proceed*", or such longer time as may be otherwise specified in the *Notice to Proceed*, commence the *Work*; and

5.1.3 sign the Contract Documents as required by GC 2.1.

6 WE AGREE:

6.1 that, if we receive written *Notice of Award* of this *Contract* and, contrary to paragraph 5 of this Form of Tender, we:

6.1.1 fail or refuse to deliver the documents as specified by paragraph 5.1.1 of this Form of Tender; or

6.1.2 fail or refuse to commence the *Work* as required by the *Notice to Proceed*,

then such failure or refusal will be deemed to be a refusal by us to enter into the *Contract* and the *Owner* may, on written notice to us, award the *Contract* to another party. We further agree that, as full compensation on account of damages suffered by the *Owner* because of such failure or refusal, the *Bid Security* shall be forfeited to the *Owner*, in an amount equal to the lesser of:

6.1.3 the face value of the *Bid Security*; and

6.1.4 the amount by which our *Tender Price* is less than the amount for which the *Owner* contracts with another party to perform the *Work*.

7 OUR ADDRESS is as follows:

_____

_____

_____

Phone: _____ - _____ - _____

Email: _____

Attention: _____

This Tender is executed this_____day of_____, 20_____.

Contractor:

_____
(FULL LEGAL NAME OF CORPORATION, PARTNERSHIP OR INDIVIDUAL)

_____
(AUTHORIZED SIGNATORY)

_____
(AUTHORIZED SIGNATORY)

8 WE CONFIRM:

8.1 our Goods and Services Tax (GST) registration status is as follows:

8.1.1 for information purposes, our GST Registration Number is:

_____
(GST REGISTRATION NUMBER)

or;

8.1.2 by signature hereunder, we certify we are **not required** to provide a registration number:

_____
(AUTHORIZED SIGNATORY)

_____
(AUTHORIZED SIGNATORY)

APPENDIX 1
FORM OF TENDER

Contract 78029
Booth Creek Bridge Rehabilitation - Schoolhouse Street

SCHEDULE OF QUANTITIES AND PRICES
(see paragraph 5.3.1 of the Instruction to Tenderers)
(All Tender and Contract Prices shall NOT include GST. GST will apply upon payment)
(Should there be any discrepancy in the information provided, the City's original file copy shall prevail)

ITEM NO.	MMCD Ref. / (Supplementary Contract Specifications)	DESCRIPTION	UNIT	QTY	UNIT PRICE	EXTENDED AMOUNT
1.00	**01 55 00S**	**TRAFFIC CONTROL, VEHICLE ACCESS AND PARKING**				
1.01	(1.5.1)	Traffic Control and Management		Incidental to Contract		
2.00	**01 57 01S**	**ENVIRONMENTAL PROTECTION**				
2.01	(1.6.1)	ESC supply & installation, maintenance and removal		Incidental to Contract		
3.00	**01 58 01S**	**PROJECT IDENTIFICATION**				
3.01	(1.3.1)	Construction Zone Information Signs	ea.	4		
3.02	(1.3.2)	Changeable Message Signs (CMS) (x2 Sign)	month	4		
4.00	**03 20 01S**	**CONCRETE REINFORCEMENT**				
4.01	(1.5.1)	Supply and installation of plain steel rebar	kg	4,500		
4.02	(1.5.1)	Supply and installation of stainless steel rebar	kg	4,000		
5.00	**03 30 20S**	**CONCRETE WALKS, CURBS AND GUTTERS**				
5.01	(1.4.3)	Barrier Type Concrete Curb and Gutter (MMCD C5)	l.m	100		
5.02	(1.4.5)	Concrete Sidewalk, Utility Strip & Wheelchair Letdowns - 100mm Thick - Broom Finished (excl. gravel)	sq.m	190		
5.03	(1.4.5)	Concrete Driveway Letdown, sidewalk crossing - 190mm thick - COQ-C7A	sq.m	60		
6.00	**03 30 53S**	**CAST-IN-PLACE CONCRETE**				
6.01	(1.5.6)	Supply and placement of concrete approach slabs, sidewalk, and curb - Structural Scope (Provisional)	cu.m	85		
7.00	**03 40 01**	**PRECAST CONCRETE**				
7.01	(1.4.2)	Remove and replace Allan Block Wall and Stairs as per Kontur Drawings (east side of Schoolhouse St, north of bridge) - (Provisional)	sq.m	12		
7.02	(1.4.2)	Remove and replace Allan Block Wall (East side of Schoolhouse St., south of bridge) - (Provisional)	sq.m	5		
7.03	(1.4.2)	Remove and replace Allan Block Wall (West side of Schoolhouse St., south of bridge) - (Provisional)	sq.m	7		
8.00	**26 56 01S**	**ROADWAY LIGHTING**				
8.01	1.9.2	Adjustment of all streetlight bases to suit new grade	l.s	1		
9.00	**31 22 16S**	**RESHAPING GRANULAR ROADBED**				
9.01	(1.4.1)	Reshaping Road Bed	sq.m	860		
10.00	**31 24 13S**	**ROADWAY EXCAVATION, EMBANKMENT, & COMPACTION**				
10.01	(1.8.4)	Removal and Offsite Disposal of Existing Asphalt Driveways (All Depths)	sq.m	50		
10.02	(1.8.4)	Removal and Offsite Disposal of Existing Approach Slabs	sq.m	110		
10.03	(1.8.4)	Removal and Offsite Disposal of Existing Concrete Driveways and Sidewalks (All Depths)	sq.m	300		
10.04	(1.8.4)	Removal and Offsite Disposal of Existing Concrete Curb	l.m	137		
10.05	(1.8.5)	Common Excavation - (Provisional)	cu.m	1,500		
10.06	(1.8.7)	1.5m Thick Layer of Light Weight Pumice - Wrapped in Two Layers of Non-Woven Geotextile (Texel 80C or Approved Equivalent)	cu.m	920		
10.07	(1.8.7.1)	Reinstatement of Pipe Zone c/w Geotextile Surround for Existing Utilities within Lightweight Fill Zone as per Contract Drawings	l.m	150		
10.08	(1.8.7.2)	Remove abandoned 150mm dia. CI Watermain within Lightweight Fill Zone and install permanent water tight caps on ends	l.m	30		
11.00	**32 01 16.7S**	**COLD MILLING**				
11.01	(1.5.4)	Full Depth Milling up to 150mm depth	sq.m	890		
12.00	**32 11 16.1S**	**GRANULAR SUBBASE**				
12.01	(1.4.3)	75mm Crushed Minus Granular Subbase - Lightweight Fill Zone	tonne	175		
12.02	(1.4.3)	75mm Crushed Minus Granular Subbase - Outside of Lightweight Fill Zone (Provisional)	tonne	120		
13.00	**32 11 23S**	**GRANULAR BASE**				
13.01	(1.4.3)	19mm Crushed Minus Granular Base - (Provisional)	tonne	310		
13.02	(1.4.3)	19mm Clear Crushed - 150mm Thick c/w Two (2) layers of 6mm Polyethylene Sheet	tonne	90		
14.00	**32 12 13.1S**	**ASPHALT TACK COAT**				
14.01	(1.5.1)	Asphalt Tack Coat	sq.m	890		
15.00	**32 12 16S**	**HOT-MIX ASPHALT CONCRETE PAVING**				
15.01	(1.5.1)	MMCD UC #1 Asphalt - 75mm Thick	tonne	175		
15.02	(1.5.1)	MMCD LC#1 Asphalt - 75mm Thick	tonne	165		
15.03	(1.5.3)	Hand Laid MMCD Upper Course #1 (Driveway) - 75mm Thick	sq.m	90		
16.00	**32 17 23S**	**PAINTED PAVEMENT MARKINGS**				

FORM OF TENDER

ITEM NO.	MMCD Ref. / (Supplementary Contract Specifications)	DESCRIPTION	UNIT	QTY	UNIT PRICE	EXTENDED AMOUNT
16.01	(1.5.3)	Thermoplastic Line and Pavement Markings	l.s	1		
16.02	(1.5.4)	Remove, Protect, and Reinstate Existing Signage	ea.	7		
17.00	**32 31 13S**	**CHAIN-LINK FENCES AND GATES**				
17.01	1.5.3	Remove and Reinstate Wooden Fence and Wooden Gate	l.m	18		
17.02	(1.5.4)	Remove and Replace MMCD C14 Handrail - Attached Mounting	l.m	48		
18.00	**32 91 21S**	**TOP SOIL AND FINISH GRADING**				
18.01	(1.4.1)	Imported Topsoil - 150mm Thick for Seed	cu.m	15		
19.00	**32 92 20S**	**SEEDING**				
19.01	1.8.1	Seeding	sq.m	85		
20.00	**33 44 01S**	**MANHOLE AND CATCH BASINS**				
20.01	(1.5.3.1)	Manhole Frame and Lid Replacement and Adjustment - (Provisional)	ea.	4		
20.02	(1.5.3.1)	Manhole Frame and Cover Adjustment Only - (Provisional)	ea.	4		

Total Tendered Price (exclude GST): $_____

(Transfer the amount to Form of Tender Summary Page 1)

Name of **Contractor:** _____

APPENDIX 2

FORM OF TENDER

Contract 78029
Booth Creek Bridge Rehabilitation – Schoolhouse Street

PRELIMINARY CONSTRUCTION SCHEDULE
(See paragraph 5.3.2 of the Instructions to Tenderers)

INDICATE SCHEDULE WITH BAR CHART WITH CONSTRUCTION DURATIONS

Construction Activity	May				June				July				August				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	5

Substantial Completion Date: **August 30, 2024**

Proposed Disposal Site: _____

APPENDIX 3

FORM OF TENDER

Contract 78029
Booth Creek Bridge Rehabilitation – Schoolhouse Street

EXPERIENCE OF SUPERINTENDENT
(See paragraph 5.3.3 of the Instructions to Tenderers)

Proposed Project Superintendent _____

List of Project Experience

PROJECT:		**Dates:**	
Work Description:			
Responsibility:			
Owner/Reference:		**Phone No.:**	

PROJECT:		**Dates:**	
Work Description:			
Responsibility:			
Owner/Reference:		**Phone No.:**	

PROJECT:		**Dates:**	
Work Description:			
Responsibility:			
Owner/Reference:		**Phone No.:**	

APPENDIX 4

FORM OF TENDER

Contract 78029
Booth Creek Bridge Rehabilitation – Schoolhouse Street

CONTRACTOR'S COMPARABLE WORK EXPERIENCE
(See paragraph 5.3.4 of the Instructions to Tenderers)

PROJECT:		**VALUE ($):**	
OWNER:		**Phone No.:**	
Work Description:			

PROJECT:		**VALUE ($):**	
OWNER:		**Phone No.:**	
Work Description:			

PROJECT:		**VALUE ($):**	
OWNER:		**Phone No.:**	
Work Description:			

PROJECT:		**VALUE ($):**	
OWNER:		**Phone No.:**	
Work Description:			

APPENDIX 5

FORM OF TENDER

Contract 78029
Booth Creek Bridge Rehabilitation – Schoolhouse Street

SUBCONTRACTORS
(See paragraph 5.3.5 of the Instructions to Tenderers)

Trade:		**Tender Item:**	
Work Description:			
Subcontractor:		**Phone No.:**	

Trade:		**Tender Item:**	
Work Description:			
Subcontractor:		**Phone No.:**	

Trade:		**Tender Item:**	
Work Description:			
Subcontractor:		**Phone No.:**	

Trade:		**Tender Item:**	
Work Description:			
Subcontractor:		**Phone No.:**	

Trade:		**Tender Item:**	
Work Description:			
Subcontractor:		**Phone No:**	

APPENDIX 6

FORM OF TENDER

Contract 78029
Booth Creek Bridge Rehabilitation – Schoolhouse Street

Bid Bond

NO. _____ $ _____

KNOW ALL MEN BY THESE PRESENTS THAT

_____
As Principal, hereinafter called the Principal, and

_____
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 _____, 2024, for Contract _____.

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 good and sufficient bonds to secure the performance of the terms and conditions of the Contract, then this obligation shall be null and void; otherwise the Principal and 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 Surety shall not 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 (6) months from the date of this Bond.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its Attorney-In-Fact, this _____ day of _____, 2024.

SIGNED, SEALED AND DELIVERED
In the presence of:

)
)
)
)
_____)

_____
PRINCIPAL

_____
SURETY

APPENDIX 7

FORM OF TENDER

Contract 78029
Booth Creek Bridge Rehabilitation – Schoolhouse Street

CERTIFICATE OF COMPLIANCE for CONTRACT INSURANCE

This is provided for information to certify that the Tenderer does hereby undertake and agree to supply to the City of Coquitlam, upon award, contract insurance listed below for the project requirements indicated:

Contract Number: **78029**

Contract Name: **Booth Creek Bridge Rehabilitation – Schoolhouse Street**

Description of Work:

Booth Creek bridge approach slab rehabilitation on Schoolhouse Street including placement of lightweight fill, new cast-in-place concrete approach slabs, road paving, new sidewalks and curbs, handrails, lane markings, and other miscellaneous and incidental works as further described in the Contract Documents.

Commercial General Liability: **$5,000,000 limit**

Special Coverage Required:

YES	NO	Special Coverage Description
( )	(X)	Shoring and Underpinning Hazard
( )	(X)	Pile Driving and Vibrations
( )	(X)	Excavation Hazard
( )	(X)	Demolition
( )	(X)	Blasting

We also certify that the insurance coverage will meet the requirements of the Supplementary General Conditions Section 24 – Insurance, included as part of the Contract Documents, and that the proof of insurance will be provided on the City of Coquitlam Certificate of Insurance form, without amendments, except for the exclusions noted above.

_____ _____

Name of Tenderer (printed) *Authorized Signature*

_____

Date

Agreement

AGREEMENT

Between Owner and Contractor

(FOR USE WHEN UNIT PRICES FORM THE BASIS OF PAYMENT - TO BE USED ONLY WITH THE GENERAL CONDITIONS AND OTHER STANDARD DOCUMENTS OF THE UNIT PRICE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS.)

THIS AGREEMENT made in duplicate this ____ day of _____ 2024.

Contract: **Booth Creek Bridge Rehabilitation – Schoolhouse Street**

***Reference No*. 78029**

BETWEEN:

The City of Coquitlam
3000 Guildford Way
Coquitlam, B.C. V3B 7N2

(the "*Owner*")

AND:

(the "*Contractor*")

The *Owner* and the *Contractor* agree as follows:

1 THE WORK - START/COMPLETION DATES

1.1 The *Contractor* will perform all *Work* and provide all labour, equipment and material and do all things strictly as required by the *Contract Documents*.

1.2 The *Contractor* will commence the *Work* in accordance with the *Notice to Proceed*. The *Contractor* will proceed with the *Work* diligently, will perform the *Work* generally in accordance with the construction schedules as required by the *Contract Documents* and will achieve *Substantial Performance* of the *Work* on or before **August 30, 2024,** subject to the provisions of the *Contract Documents* for adjustments to the *Contract Time*.

1.3 Time shall be the essence of the Contract.

2 CONTRACT DOCUMENTS

2.1 The "*Contract Documents*" consist of the documents listed or referred to in Schedule 1, entitled "Schedule of Contract Documents", which is attached and forms a part of this Agreement, and includes any and all additional and amending documents issued in accordance with the provisions of the *Contract Documents*. All of the *Contract Documents* shall constitute the entire *Contract* between the *Owner* and the *Contractor*.

2.2 The *Contract* supersedes all prior negotiations, representations or agreements, whether written or oral, and the *Contract* may be amended only in strict accordance with the provisions of the *Contract Documents.*

3 CONTRACT PRICE

3.1 The price for the *Work* ("*Contract Price*") shall be the sum in Canadian dollars of the following:

a) the product of the actual quantities of the items of *Work* listed in the *Schedule of Quantities and Prices* which are incorporated into or made necessary by the *Work* and the unit prices listed in the *Schedule of Quantities and Prices*; plus

b) all lump sums, if any, as listed in the *Schedule of Quantities and Prices*, for items relating to or incorporated into the *Work*; plus

c) any adjustments, including any payments owing on account of *Changes* and agreed to *Extra Work*, approved in accordance with the provisions of the *Contract Documents*.

3.2 The *Contract Price* shall be the entire compensation owing to the *Contractor* for the *Work* and this compensation shall cover and include all profit and all costs of supervision, labour, material, equipment, overhead, financing, and all other costs and expenses whatsoever incurred in performing the *Work*.

4 PAYMENT

4.1 Subject to applicable legislation and the provisions of the *Contract Documents*, the *Owner* shall make payments to the *Contractor*.

4.2 If the *Owner* fails to make payments to the *Contractor* as they become due in accordance with the terms of the *Contract Documents* then interest calculated at 2% per annum over the prime commercial lending rate of the Royal Bank of Canada on such unpaid amounts shall also become due and payable until payment. Such interest shall be calculated and added to any unpaid amounts monthly.

5 RIGHTS AND REMEDIES

5.1 The duties and obligations imposed by the *Contract Documents* and the rights and remedies available hereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

5.2 Except as specifically set out in the *Contract Documents*, no action or failure to act by the *Owner*, *Contract Administrator* or *Contractor* shall constitute a waiver of any of the parties' rights or duties afforded under the *Contract*, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach under the *Contract*.

6 NOTICES

6.1 Communications among the *Owner*, the *Contract Administrator* and the *Contractor*, including all written notices required by the *Contract Documents*, may be delivered by email, or by hand, or by pre-paid registered mail to the addresses as set out below:

The *Owner:*

The City of Coquitlam
3000 Guildford Way
Coquitlam, B.C. V3B 7N2

Tel: 604-927-3500

The *Contractor:*

Tel:
Email:
Attention:

The *Contract Administrator*:

The City of Coquitlam
3000 Guildford Way
Coquitlam, B.C. V3B 7N2

Tel:
Email:
Attention:

6.2 A communication or notice that is addressed as above shall be considered to have been received:

a) immediately upon delivery, if delivered by hand; or
b) immediately upon transmission if sent or received by email; or
c) after 5 days from date of posting if sent by registered mail.

6.3 The *Owner* or the *Contractor* may, at any time, change its address for notice by giving written notice to the other at the address then applicable. Similarly if the *Contract Administrator* changes its address for notice then the *Owner* will give or cause to be given written notice to the *Contractor*.

7 GENERAL

7.1 This *Contract* shall be construed according to the laws of British Columbia.

7.2 The *Contractor* shall not, without the express written consent of the *Owner*, assign this *Contract*, or any portion of this *Contract*.

7.3 The headings included in the *Contract Documents* are for convenience only and do not form part of this *Contract* and will not be used to interpret, define or limit the scope or intent of this *Contract* or any of the provisions of the *Contract Documents*.

7.4 A word in the *Contract Documents* in the singular includes the plural and, in each case, vice versa.

7.5 This agreement shall enure to the benefit of and be binding upon the parties and their successors, executors, administrators and assigns

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

Contractor:

_____
(FULL LEGAL NAME OF CORPORATION, PARTNERSHIP OR INDIVIDUAL)

_____
(AUTHORIZED SIGNATORY)

_____
(AUTHORIZED SIGNATORY AND POSITION - PRINT)

Owner:

The City of Coquitlam

_____
(MANAGER, CAPITAL PROJECTS AND INSPECTIONS)
Representative as Per G.C. 17

_____
(MANAGER, DESIGN AND CONSTRUCTION)

Booth Creek Bridge Rehabilitation - Schoolhouse Street

Reference No: 78029

Schedule 1

Schedule of Contract Documents

(INCLUDE IN LIST ALL DOCUMENTS INCLUDING, IF ANY, SUPPLEMENTARY GENERAL CONDITIONS, SUPPLEMENTARY SPECIFICATIONS, SUPPLEMENTARY STANDARD DETAIL DRAWINGS)

The following is an exact and complete list of the *Contract Documents*, as referred to in Article 2.1 of the Agreement.

NOTE: The documents noted with "*" are contained in the "Master Municipal Construction Documents – General Conditions, Specifications and Standard Detail Drawings", edition dated 2009. All sections of this publication are included in the *Contract Documents*.

1. Agreement, including all Schedules;
2. The following Addenda:
    - As issued
3. Supplementary General Conditions, if any;
4. General Conditions*;
5. Supplementary Specifications, if any;
6. Detail Specifications, if any;
7. Specifications*;
8. Supplementary Detail Drawings, if any;
9. Standard Detail Drawings*;
10. Executed Form of Tender, including all Appendices;
11. Drawings listed in Schedule 2 to the Agreement –"List of Drawings", if any;
12. Instructions to Tenderers;
13. COQUITLAM "Supplementary Specifications Master Municipal Construction Documents" March 2022

Booth Creek Bridge Rehabilitation – Schoolhouse Street

Reference No: 78029

Schedule 2

LIST OF DRAWINGS

(Complete Listing of All Drawings, Plans and Sketches That Are Part of the Contract Documents)

Bound in this Document:

Appendix A: Traffic Management Detail Specifications

Appendix B: Geotechnical Report

Appendix C: Additional Information

Bound Separately: Contract Drawings

TITLE	SHEET NO.	REVISION NO.	DATE
R.F. BINNIE & ASSOCIATES			
COVER SHEET	-	-	-
SCHOOLHOUSE ST AT BOOTH CREEK - NOTES AND DETAILS	1 OF 4	3	2024-03-08
SCHOOLHOUSE ST AT BOOTH CREEK – ROADWORKS – TYPICAL SECTIONS	2 OF 4	3	2024-03-08
SCHOOLHOUSE ST AT BOOTH CREEK – ROADWORKS – PLAN AND PROFILE	3 OF 4	3	2024-03-08
SCHOOLHOUSE ST AT BOOTH CREEK – ROADWORKS – CROSS SECTIONS	4 OF 4	2	2024-03-08
ENTUITIVE			
SCHOOLHOUSE BRIDGE REHABILITATION – EXISITNG SECTIONS	1 OF 4	1	2024-03-08
SCHOOLHOUSE BRIDGE REHABILITATION – PROPOSED SECTIONS	2 OF 4	1	2024-03-08
SCHOOLHOUSE BRIDGE REHABILITATION – REINFORCEMENT DETAILS	3 OF 4	1	2024-03-08
SCHOOLHOUSE BRIDGE REHABILITATION – REINVORCEMENT DETAILS	4 OF 4	1	2024-03-08

Supplementary General Conditions

SUPPLEMENTARY GENERAL CONDITIONS

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1.0 DEFINITIONS

1.1 Abnormal Weather 1.1.1 **(Replace clause 1.1.1 as follows):**
Abnormal Weather" means temperature, precipitation, wind or other weather conditions in which the monthly average, differs from the statistical average for that condition in that period by more than one standard deviation, calculated based on data available from Environment Canada. Coquitlam's Burke Mountain Rain Gauge will be used to compare the rainfall summary versus the available data from Environment Canada.
City of Coquitlam Rainfall

2.0 DOCUMENTS

2.2 Interpretation 2.2.4 (1) **(Replace clause 2.2.4 (1) as follows):**
The Contract Documents shall govern and take precedence in the following order as listed in Schedule 1 of the Agreement, taking precedence over all Contract Documents.

4.0 CONTRACTOR

4.1 Control of the Work 4.1.1 ***(Add to clause 4.1.1 as follows):***
The *Contractor* is responsible for all survey layout for the construction of the Work to the design specifications and/or elevations as shown on the contract drawings or as amended on site by the Contract Administrator.

4.1.2 ***(Add to clause 4.1.2 as follows):***
The Contractor shall not deposit any material upon any street, sidewalk, boulevard or other property, without the Contract Administrator's or the Owner's permission, nor shall they allow the same to remain longer than necessary. All surplus spoil and rubbish and other waste material shall be removed from the site so that the area of work is cleaned up and restored to as clean a condition as it was before the Contract started, within four days of the Contract Administrator's written request to do so, failing which the Owner may carry out the work or have the work carried out by others and recover the costs from the Contractor or may deduct the cost from any monies due or that may become due to the Contractor.

4.1.3 ***(Add new clause 4.1.3 as follows):***
Work can be performed during the normal weekday working hours of 0700h to 1900h, unless specified otherwise in Supplementary Specifications - Appendix A: Traffic Management Detail Specifications. Written

permission from the Contract Administrator will be required for any works to be performed outside of the normal working days of Monday to Friday.

No Sunday work will be permitted, except in case of emergency and then only with the written permission of the Contract Administrator and to such extent as he deems necessary.

In case the Contractor decides to work on a day which is a Statutory Holiday, they shall provide the Contract Administrator in writing at least (4) days in advance of such holiday, stating those places where said work is to be conducted. In case the Contractor fails to give such notice in advance of any Statutory Holiday, no work within the terms of the contract shall be done on such holiday.

The cost of inspections on a Sunday or on a Statutory Holiday by City staff/s will be at Contractor's expense.

4.2 Safety

4.2.2 ***(Add new clause 4.2.2 as follows):***
In an emergency, gas pipeline rupture or leak, Contact FortisBC's 24 Hour Emergency Line (1-800-663-9911) and Coquitlam Fire (911) immediately and then City of Coquitlam's Utility Control Centre (604-927-6287).

4.3 Protection of Work, Property and the Public

4.3.1 ***(Replace clause 4.3.1 as follows):***
In performing the Work, the Contractor shall protect the Work and the Owner's property and other person's property from damage. The Contractor shall at the Contractor's own expense make good any such damage which arises as the result of the Contractor's operations. If the Contractor causes damage to private property, the Contactor must obtain a written release from the owner of the damaged property.

4.3.5.1 ***(Add clause 4.3.5.1 as follows):***
The Contractor shall notify the Contract Administrator immediately if damage occurs to any City or third party utility or structure.

4.3.7 ***(Add new clause 4.3.7 as follows):***
Any lands other than those upon which the work is to be performed, which may be required for temporary facilities, storage purposes or access to the work site, other than those provided by the *Owner*, shall be provided by the *Contractor* at their own cost, with no liability to the *Owner*.

4.6 Construction Schedule

4.6.1 ***(Replace clause 4.6.1 as follows):***
The Contractor shall within the time set out in the Form of Tender prepare and submit to the Contract Administrator for their approval a construction schedule (the Baseline Construction Schedule) indicating the planned start and completion dates of major activities of the Work. The Baseline Construction Schedule shall be in more detail than the Preliminary Construction Schedule and shall indicate completion of the Work in compliance with any specified Milestone Dates, including Substantial Performance.

4.6.6 ***(Replace clause 4.6.6 as follows):***
The time for the performance of the Work shall commence on the date specified in the Notice to Proceed, or if not so specified, on the date the Notice to Proceed is issued. The Notice to Proceed will not be issued until the documentation required under paragraph 5.1.1 of the Form of Tender has been submitted and the construction schedule has been approved.

4.6.8 ***(Add new clause 4.6.8 as follows):***
Any requests to lengthen the work schedule shall be made in writing by the Contractor within five working days of knowledge of the reason for the extension. The Contract Administrator will adjust the schedule at their discretion upon receipt of a written request.

4.7 Superintendent

4.7.4 ***(Add new clause 4.7.4 as follows):***
The key personnel named in the Contractor's Tender response, shall remain in these key positions throughout the project. In the event that key personnel leave the Contractor's firm, or for any unknown reason are unable to continue fulfilling their role, the Contractor must propose a suitable replacement, and obtain written consent from the Owner. Acceptance of the proposed replacement is at the sole discretion of the Contract Administrator and the Owner.

4.8 Workers

4.8.2 ***(Add new clause 4.8.2 as follows):***
The Contractor shall, upon the request of the Contract Administrator, remove any person employed by them for the purposes of the Contract who, in the opinion of the Contract Administrator, is incompetent or has conducted themselves improperly, and the Contractor shall not permit a person who has been removed to return to the Place of Work.

4.9 Materials

4.9.3 ***(Add new clause 4.9.3 as follows):***
The Contractor shall, at their cost,

a) Be responsible for storing all of the materials supplied for the Work either by themselves or the Owner, until it has been incorporated into the completed Work;
b) Store all materials in a manner which will prevent damage from the weather, dirt, foreign matter, vandalism and theft;
c) Arrange for and/or verify the time of delivery of all materials to be supplied by themselves or the Owner to ensure that delivery will coincide with their work schedules.
d) Examine with the Contract Administrator the quantities and details of all materials supplied by the Owner at the time and place of delivery or those materials already at the Place of Work, and prepare and sign a Statement of Materials Acceptance, specifically noting and rejecting any defective material;
e) Replace all materials supplied by themselves or the Owner which are found to be stolen, missing or damaged while under their care;
f) Replace all materials found to be defective in manufacture which have been supplied by themselves.

4.11 Subcontractors

4.11.3 ***(Replace clause 4.11.3 as follows):***

The Contractor shall, upon notice of the Contract Administrator, remove any Subcontractor employed by them for the purposes of the Contract who, in the opinion of the Contract Administrator, is incompetent or has conducted themselves improperly, and the Contractor shall not permit the Subcontractor who has been removed to return to the Place of Work. The removal of a Subcontractor under this clause shall not be considered a Change and the Contract Price and the Contract Time shall not be adjusted.

4.12 Test and Inspections

4.12.1 ***(Replace clause 4.12.1 as follows):***

The Contractor shall perform or cause to be performed all tests, inspections and approvals of the Work as described in the Contract Documents or a required by the Contract Administrator as part of Quality Control. The Contractor shall complete all the necessary testing at the frequencies described in the Contract Document unless otherwise approved by the Contract Administrator.

Acceptable test and inspection results will not relieve the Contractor of its obligations under the Contract to correct defects or deficiencies in the Work.

4.12.11 ***(Add clause 4.12.11 as follows):***

Failure to follow DFO/FLNRO BMPs and the approved permit for Instream Works or as instructed by Contract Administrator will result in shut-down of the work. The

Contractor must take all steps to mitigate impacts to aquatic resources, environment and habitats before work can re-start on site. No claim will be accepted by the Owner for costs associated with this work shut-down.

4.14 Final Clean-up 4.14.1 ***(Replace clause 4.14.1 as follows):***

Prior to applying for Substantial Performance, the Contractor shall remove all surplus products, tools, construction machinery and equipment relating to the Work that is not required for the performance of the remaining Work. The Contractor shall also remove waste, debris and waste products other than caused by the Owner or Other Contractors, and leave the Place of Work clean and suitable for occupancy by the Owner unless otherwise specified in the Contract Documents or directed by the Contract Administrator.

4.16 Notice of Disruption 4.16.2 ***(Add new clause 4.16.2 as follows):***

Written notice must be provided to all properties which may be physically affected by the construction not less than one week and not more than two weeks prior to construction.

Notify occupants directly affected by the work 48 hours in advance of commencement of construction. Cost of notifying area occupants of ensuing construction and delivery of the notices is incidental to the Contract.

7.0 CHANGES

7.1 Changes 7.1.3 ***(Replace clause 7.1.3 as follows):***

Additional work that the Owner may wished performed that does not satisfy the requirements of subparagraphs (a) and (b) of GC 7.1.1 is extra work (Extra Work) and is not a Change. Pursuant to GC 8, Extra Work may be declined by the Contractor or may, upon agreement between the parties, be undertaken as Extra Work.

7.4 Optional Work 7.4.2 ***(Add new clause 7.4.2 as follows):***

If there are Optional items or Provisional items included in the *Schedule of Quantities and Prices*, those items shall be used only as directed and at the sole discretion of the Contract Administrator through the issue of a Change Order. These items will be paid at the contract unit price as part of regular progress payments. Only quantities used will be eligible for payment. No claim will be accepted for unused Optional or Provisional quantities. Clause 9.4 Quantity Variations will not be applicable for these items.

9.0 VALUATION OF CHANGES AND EXTRA WORK

9.2 Valuation Method 9.2.4 ***(Replace clause 9.2.4 as follows):***
Once a quotation is accepted by the Contract Administrator, or other agreement reached between the Contract Administrator and the Contractor regarding adjustments to the Contract Price or Contract Time on account of a Change or Extra Work, the Contractor shall not be entitled to claim or receive additional payment, or adjustment to the Contract Time on account of a Change or Extra Work.

9.4 Quantity Variation 9.4.1 ***(Replace clause 9.4.1 as follows):***
If for any reason, including an addition or deletion under GC 7.1.1(1) or 7.1.1(2) respectively, the actual quantity of a unit price item varies by more than plus or minus the Variance Threshold Percentage from the estimated quantity for that unit price item listed in the Schedule of Quantities and Prices (the "Tender Quantity") or as otherwise agreed to pursuant to these Contract Documents, then either the Owner or the Contractor may by written notice request the other party to agree to a revised unit price, considering the change in quantities. A party shall make a request for a revised unit price as soon as reasonably possible after the party concerned becomes aware of the quantity variation.

9.4.2 ***(Delete clause 9.4.2 (2)***

10.0 FORCE ACCOUNTS

10.1 Force Account Costs 10.1.1(1) ***(Add to clause 10.1.1(1) as follows):***
Costs for the Contractor's Superintendent, Project Managers, Health and Safety Personnel, and Office/Administration Staff are not eligible for labour costs as those costs are considered incidental to the mark up owing for overhead and labour.

10.1.1(4) ***(Replace clause 10.1.1(4) as follows):***
Force Account Work performed by a subcontractor shall be paid for in the lesser of: (i) the amount provided by subparagraphs (1), (2) and (3) of this GC, plus a mark-up of 5%, or (ii) the actual amount the Contractor pays the subcontractor including a mark-up of 10% on such actual costs to cover all overhead and profit.

12.0 HAZARDOUS MATERIALS

12.2 Discovery of Hazardous Materials 12.2.2

(Replace clause 12.2.2 as follows):
If the Contract Administrator observes any materials at the Place of Work that the Contract Administrator knows or suspects may be Hazardous Materials, then the Contract Administrator shall immediately give written notice to the Contractor and the Contractor shall immediately stop the Work or portion of the Work as required by GC 12.2.1(1).

13.0 DELAYS

13.1 Delay by Owner or Contract Administrator 13.1.2

(Add new clause 13.1.2 as follows):
The Owner may at any time suspend the work or any portion thereof provided they give the Contractor five (5) days' written notice of delay. The Contractor shall resume work upon written notice from the Owner. The Contractor shall be entitled to:

a) An extension of the Contract time equivalent to the length of suspension of work.
b) Reimbursement by the Owner for directly related out-of-pocket additional costs, reasonably and necessarily incurred by the Contractor as a result of such suspension. No additional payment will be made to the Contractor for any loss of profits or overhead.

13.3 Unavoidable Delay 13.3.1

(Add to clause 13.3.1 as follows):
Beyond the reasonable control of the Contractor also includes pandemic or community outbreak

13.8 Direction to Stop or Delay 13.8.3

(Add new clause 13.8.3 as follows):
The Contract Administrator may order the Contractor to stop work if at any time the Contract Administrator is of the opinion that there exists a danger to life or property.

13.9 Liquidated Damages for Late Completion 13.9.1

(Replace clause 13.9.1 as follows):
If the Contractor fails to meet the Milestone Date for Substantial Performance as set out in the Form of Tender, paragraph 2.2 as may be adjusted pursuant to the provisions of the Contract Documents, then the Owner may deduct from any monies owing to the Contractor for the Work:

(1) An amount of $1,000.00 for each calendar day the actual *Substantial Performance* is achieved after the Substantial Performance Milestone Date; plus

(2) All direct out of pocket costs, such as costs for safety, security or equipment rental, reasonably incurred by the Owner as a direct result of such delay.

If the monies owing to the Contractor are less than the total amount owing by the Contractor to the Owner under (1) and (2) then any shortfall shall immediately, upon written notice from the Owner, and upon Substantial Performance, be due and owing by the Contractor to the Owner.

18.0 PAYMENT

18.1 Preparation of Payment Certificate

18.1.1 ***(Replace clause 18.1.1 as follows):***
The Contract Administrator shall prepare and issue a certificate for the period ending the last calendar day of the month.

18.4 Holdbacks

18.4.2 ***(Add to clause 18.4.2 as follows):***
At the sole discretion of the Contract Administrator, an amount equivalent to 10% of the contract award value or 200% of a reasonable estimate, whichever is higher, may be held without interest until all deficiencies have been remedied and accepted by the Contract Administrator.

18.6 Substantial Performance

18.6.5 ***(Replace clause 18.6.5 as follows):***
The Owner may release any builders lien holdback on the 56th day following the date of Substantial Performance, or other date as required by law, but the Owner may hold back the amounts for any deficiencies or filed builders liens as provided in GC 18.4.2, 18.4.3 and 18.4.4.

18.6.6 ***(Replace clause 18.6.6 as follows):***
The *Contract Administrator*, as defined herein, shall be the *Payment Certifier* responsible under Section 7 of the *Builders Lien Act* for certifying *Substantial Performance* of the *Work* of the *Contractor*, but not the *Work* of *Subcontractors*. The *Contractor* shall cooperate with and assist the *Contract Administrator* by providing information and assistance in a timely manner as the *Contract Administrator* considers necessary to carry out the duties of the *Payment Certifier* for the *Contract*.

The *Contractor* shall be the *Payment Certifier* responsible under Section 7 of the *Builders Lien Act* for certifying *Substantial Performance* of the *Work* of each *Subcontractor*. Prior to certifying completion for a *Subcontractor*, the *Contractor* shall consult the *Contract Administrator* and obtain the *Contract Administrator's* comments on the status of completion by the *Subcontractor*, including any deficiencies or defects in the *Subcontractor's Work* noted by

the *Contract Administrator*. The *Contractor* will indemnify and save the *Owner* harmless from any and all liability the *Owner* may have to anyone arising out of the certification by the *Contractor* of *Substantial Performance* for that *Subcontractor*.

Notwithstanding any other provision of the *Contract*, no payments will be due or owing to the *Contractor* so long as a Lien filed by anyone claiming under or through the *Contractor* remains registered against the Project of any lands, or interest therein, on which *Work* for the project was performed. Failure of the *Contractor* to remove all Liens promptly will entitle the *Owner* to damages.

21.0 WORKERS COMPENSATION REGULATIONS

21.2 Contractor is "Prime Contractor"

21.2.1 ***(Add to clause 21.2.1 as follows):***
Prior to the issuance of the "Notice to Proceed" the Contractor must provide a signed "Prime Contractor Designation" form as provided in Appendix IV of these Supplementary General Conditions.

24.0 INSURANCE ***(Replace section 24.0 as follows):***

24.1 General

24.1.1 **Importance of Prompt Attention to Insurance Requirements:**
The Contractor shall provide the Owner with satisfactory evidence that the insurance required to be provided under this GC is in full force and effect.

24.1.2 **Acceptable Insurance Carriers:**
The insurer issuing any policy, or other document which is evidence of insurance to the Contractor, shall be an insurer licensed by the Superintendent of Insurance in the Province of British Columbia and registered with the Department of Insurance for Canada in Ottawa, except the Insurance Corporation of British Columbia, which is not subject to this condition.

24.1.3 **Owner's Right to Change Terms:**
Notwithstanding anything contained in the Contract Documents, the Owner will have the right to request a change to the specified terms and conditions respecting insurance at the sole option of the Owner. The Contractor will be notified in writing of any changes required by the Owner and will provide a quotation for such work.

24.1.4 **Delivery of Insurance Documents:**
All insurance policies or other acceptable specified documents shall be delivered to, and accepted by, the Owner before the Contract Documents are signed. No work shall be commenced by the Contractor or by anyone acting on the instructions of the Contractor, until the required Insurance Documents have been accepted by the Owner and the Contract Documents have been duly signed by the Owner and the Contractor.

24.1.5 **Owner's Right to Insure:**
Should the Contractor for any reason not comply with the specified requirements with respect to the insurance, the Owner will, at the Owner's option, have the right to purchase all or any part of such insurance which, in the opinion of the Owner, may be required to provide the specified insurance, and, in the event of so doing, the Owner will have the right to pay the premiums for such insurance and to withhold the amount of premiums so paid from any amount due and payable to the Contractor under the Contract.

24.2 Required Insurance

24.2.1 **General**
Damage to work (excluding Building Contracts where Section 24.3, Paragraph 24.3.1, Further Responsibilities of Contractor, applies).

The Contractor shall be responsible for any and all loss, or 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, except that loss or damage caused solely by an act of the Owner. In the event of any loss or damage occurring, the Contractor shall, on notice from the Contract Administrator, 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.

The Contractor shall be responsible for any and all loss or damage whatsoever which may occur on or to the works, completed or otherwise, arising out of the negligence of the Contractor, any subcontractors, and the employees or agents of any of them.

24.2.2 **Public Liability Insurance:**
(Other than Automobile Third Party Liability Insurance):

Evidence of Insurance:
The Contractor shall deposit with the Owner, before the work commences, a Certificate of Insurance, signed by an authorized representative of the insurer, such certificate to be as shown in Appendix III.

Effective Dates and Terms:
The effective date of the Certificate of Insurance shall be the date of the execution of the Contract Agreement and the term of this policy shall be from such effective date until a date not less than twelve (12) months after the date of Substantial Performance completion of all work under the Contract.

Limits of Liability:
For bodily injury and for property damage shall be inclusive limits not less than $5,000,000.

24.2.3 **Public Liability Insurance (Automobile):**
The Contractor shall deposit with the Owner before the work commences a Certificate of Insurance with respect to owned automobiles on ICBC Form No. APV 47 entitled "Confirmation of Insurance Coverage" and with respect to Non-Owned Automobiles including hired automobiles and Contractual Liability on ICBC non-owned automobile policy Form APV 29 (if non-owned automobile coverage is not included under the comprehensive general liability coverage) each signed by an authorized representative of the Insurance Corporation of British Columbia.

24.3 Physical Loss or Damage With Respect to New Buildings under Construction and/or Major Additions to Existing Structures

24.3.1 **Responsibility for Placing Insurance:**
The types of insurance required under this section will be provided and maintained at the expense of the City of Coquitlam during the term of the Contract and will be as follows unless otherwise changed by specific endorsement to these Insurance Specifications.

24.3.2 **Insurance Coverage Required:**
Builders Risk Completed Value "All Risks" Course of Construction Insurance. This policy will be written in the names of the City of Coquitlam and the Contractor with loss payable as their respective interests may appear.

24.3.3 **Responsibility of Contractor – Limitations of cover and deductibles:**

The insurance provided by the City of Coquitlam as described herein will not provide the Contractor with full protection against any and all kinds of loss or damage which may arise out of the Contract. It is, therefore, the responsibility of the Contractor to fully understand the scope of the cover provided with particular attention to the exclusions, limitations of cover and deductible provisions contained in the Insuring Agreements of the policies and it is further the responsibility of the Contractor to take out at the Contractor's expense, whatever other additional insurance the Contractor may consider necessary or desirable for his protection subject as hereinafter provided. The Contractor shall act in the same manner on insurance made available through the City of Coquitlam as he would if he had arranged such insurance himself.

24.3.4 **Responsibility of Contractor – Direct Damage Insurance:**

If the Contractor fails to do all or anything that is required of them concerning insurance, the City of Coquitlam may do what is required and any monies expended by the City of Coquitlam for that purpose shall be repayable and recoverable from the Contractor. Should any action, failure or negligence of the Contractor result in higher insurance costs being incurred by the City of Coquitlam, such additional costs shall be payable or recoverable from the Contractor.

24.3.5 **Responsibility of Contractor – Machinery and Equipment Belonging to Others:**

Unless otherwise directed by the City of Coquitlam in writing, the Contractor shall carry insurance covering loss or damage to construction machinery, tools and equipment owned by and/or on bare rental from a third party or parties and used by the Contractor in performing the work, which insurance shall be in a form satisfactory to the City of Coquitlam and having coverage in accordance with the actual cash value of such construction machinery, tools and equipment. Such policies shall also provide for subrogation to be waived against the City of Coquitlam. A certified copy of the policy shall be delivered to the City of Coquitlam not later than thirty days after the commencement of work under the Contract.

24.3.6 **Contractor's Waiver of Liability to Coquitlam:**

The Contractor hereby releases the City of Coquitlam from any and all liability for damages to the extent that such

damages are covered by the course of construction insurance referred to in Section 24.3 of these specifications.

24.3.7 **Liability of Contractor:**

Neither the providing of insurance by the Contractor or the City of Coquitlam in accordance with the requirements hereof, nor the insolvency, bankruptcy, nor failure of any insurance company to pay any claim accruing shall be held to waive any of the provisions of this Contract with respect to the liability of the Contractor or otherwise.

24.3.8 **Responsibility of Contractor for protection of work, persons and property:**

The Contractor and all persons employed by the Contractor or under their control, and all employees and subcontractors, shall use due care that no person or property is injured, and that no rights are infringed in the prosecution of the work. Contractors shall take particular care to protect the work against loss or damage caused by riot, vandalism or malicious mischief and shall be at the expense of the Contractor provide all necessary safeguards in the form of watchmen and/or watch dog protection to prevent loss or damage of this type. The payment of deductibles is the responsibility of the Contractor and if not paid by the Contractor such amounts shall be deducted by the City of Coquitlam from payment due to the Contractor. These deductibles will normally be $250.00 each claim.

24.3.9 **Action to be taken in the event of loss or damage to the work covered by the Contract:**

When any loss or damage occurs to the work or to any materials and supplies on the site of the work, the Contractor shall remove any and all damaged or destroyed property and shall rebuild or replace the damaged or destroyed work, materials, or supplies and complete the work to the satisfaction of the Owner. For such removal, rebuilding, or replacing, the Contractor shall be entitled to receive from the Owner the amount of insurance monies received by the Owner pursuant to the said adjustment which amount shall be paid to the Contractor as the work of rebuilding or replacing proceeds, and in accordance with the Agreement. Damage or destruction of the whole or any part of the work shall not affect the rights and obligations of either party under the Agreement, except that in such event the Contractor shall be entitled to such reasonable extension of time to complete the work as the Architect and/or Contract Administrator may decide.

24.3.10 **Further responsibility of Contractor:**
Other than with respect to loss or damage arising out of insured risks and herein before specified, the Contractor shall be responsible for all loss or 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, except that loss or damage caused solely by an act of the Owner.

In the event of any loss or damage occurring, the Contractor shall on notice from the Owner immediately put the works into the condition it was immediately prior to such loss or damage, all at the Contractor's expense except as previously stated.

24.3.11 **Owner Not Responsible for Loss or Damage or Loss of Use of Property of Contractors and their Employees:**
The Owner will not be responsible for securing or paying for insurance of any kind other than as specified in Section 24.3 of these specifications nor will the Owner have any responsibility whatsoever for loss or damage from whatever cause occurring to property owned, leased, or otherwise in the possession of the Contractor, subcontractors or their employees including, without restricting the generality of the foregoing, machinery, equipment, tools, supplies, and clothing at the construction site or elsewhere including loss of use of same.

24.4 Additional Insured

24.4.1 **The Contractor shall ensure the following are named as "additional insured" on the liability policy for this contract:**

- The City of Coquitlam

The City may identify private properties that are directly affected by construction. If so, the Contractor shall include the legal owners of these properties named as "additional insured" on the liability policy for this contract.

25.0 MAINTENANCE PERIOD

25.1 Correction of Defects

25.1.4 ***(Add new clause 25.1.4 as follows):***
The Owner is authorized to make repairs to defects or deficiencies if, ten days after giving written notice, the Contractor has failed to make or undertake with due diligence the required repairs. However, in the case of emergency where, in the opinion of the Owner, delay is not

reasonable, repairs may be made without notice being sent to the Contractor. All expenses incurred by the Owner in connection with repairs made pursuant to GC 25 shall be paid by the Contractor or may be deducted from the Maintenance Security, or other holdbacks. The Contractor shall promptly pay any shortfall.

27.0 CONTRACTOR PERFORMANCE EVALUATION

27.1 ***(Add new clause 27.1 as follows):***

After the completion of the Contract, the Contractor will be evaluated on their performance of the Work. The evaluation will provide percentage scores on the following categories:

1. *Contract Administration*
2. *Construction Management*
3. *Schedule Management*
4. *Communications*
5. *Resource Management and Contractor Performance*
6. *Quality Management*

An evaluation summary report may be issued to the Contractor with scores for each of these categories. Upon request, the Contractor may attend a meeting with the City to discuss the evaluation.

This internal evaluation may be reviewed for reference on subsequent tenders with the City. Evaluation scores can form part of the tender analysis and influence contract award decisions.
Evaluation Scores in categories that are below 50% may result in a suspension of tendering privileges with the City.

APPENDIX I

PERFORMANCE BOND

NO._____ $_____

KNOW ALL MEN BY THESE PRESENTS THAT

_____
As Principal, hereinafter called the Principal, and

_____
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 entered into a written contract with the Obligee, dated the_____

day of_____20_____, for

_____

_____

in accordance with the drawings and specifications submitted, therefore, which contract, drawings and specifications and addenda thereto, to the extent provided for, 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 said Contract (including any addenda thereto, provided such addenda do not collectively increase the amount to be paid to the Principal by more than twenty per cent (20%) of the amount of the Contract except with the written consent of the Surety) 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 Obligee to be, in default under the Contract, the Obligee having performed 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 Obligee for completing the Contract in accordance with its terms and conditions, and upon determination by Obligee and Surety of the lowest responsible bidder, arrange for a contract between such bidder and Obligee and make available as work progresses (even though there should be a default or a succession of defaults under the contract or contracts of completion arranged 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 Obligee to Principal under the Contract less the amount properly paid by Obligee to Principal.

Any suit under this Bond must be instituted before the expiration of two (2) years from date on which the Notice of Acceptance under the Contract is issued.

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 corporation other than the Obligee named herein or the heirs, executors, administrators, or successors of Obligee.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its Attorney-in-fact, this_____day of_____20_____.

SIGNED, SEALED and DELIVERED
In the presence of

)
)
)
)
)

_____

_____
PRINCIPAL

_____
SURETY

APPENDIX II

LABOUR AND MATERIAL PAYMENT BOND

(Private Contracts – Trustee Form)

NO._____ $_____

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

KNOW ALL MEN BY THESE PRESENTS THAT

_____

As Principal, hereinafter called the Principal, and

_____

As Surety, hereinafter called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto

_____

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

_____Dollars

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

SIGNED AND SEALED this_____day of _____, 20____.

WHEREAS, the Principal has entered into a written contract with the Obligee dated the_____ day of_____, 20____, for

_____

_____

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

NOW, 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 the 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 corporation 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 entitled "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 suite to final judgment for such sum or sums as may be justly due to such Claimant under the terms of his said 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 proceedings 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 expense or liabilities incurred thereon and any loss or damage resulting to the Obligee by reasons 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, Surety and Obligee, stating with substantial accuracy the amount claimed. Such notice shall be served by mailing the same by registered mail to the Principal, Surety and Obligee at any place where an office is regularly maintained for the transaction of business by such persons or served in any manner in which legal process may be served in the Province or other part of Canada in which the subject matter of the contract is located. Such notice shall be given (i) in respect of any claim for the amount or any portion thereof required to be held back from the Claimant by the Principal under either the terms of the Claimant's contract with the Principal or under the Mechanic's 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; (ii) in respect of any claim other than for the holdback or portion thereof referred to above within one hundred and twenty (120) days after the date upon which such claimant did

or performed the last of the 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 guarantees provided in the Contract.

c) Other than in a court of competent jurisdiction in the Province or District of Canada in which the subject matter of the Contract or any part thereof is situated and none elsewhere, and the parties hereto agree to submit to the jurisdiction of such court.

4. The amount of this Bond shall be reduced by and to the extent of any payments made in good further and in accordance with the provisions 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.
5. The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

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

SIGNED, SEALED and DELIVERED
In the presence of

)
)
)
)
)

_____
PRINCIPAL

_____
SURETY

_____

APPENDIX III

CERTIFICATE OF INSURANCE

This Certificate issued to the City of Coquitlam is to certify that policies of insurance, as described below, have been issued to the Insured named below and are in force at this time. It is understood and agreed that thirty (30) days' prior written notice by registered mail of any material alterations, transfer, assignment or cancellation of any of the policies listed below, either in part or in whole, will be given to the holder of this Certificate.

A. This Certificate is issued to:

City of Coquitlam
3000 Guildford Way
Coquitlam, BC V3B 7N2

Named Insured and Mailing Address:

B. CONTRACT NUMBER AND/OR NAME

Description of the Work:

C. INSURANCE POLICY

Name of Insurer:
Policy Number:
Effective Date:

Liability Limit:
Expiry Date:

D. INSURANCE COVERAGE

COMMERCIAL GENERAL LIABILITY coverage is required to insure against liability from the activities arising out of operations or work in connection with the above-described project, including liability arising out of the use of City property.

D.1 The minimum limit shall be $5,000,000.00 inclusive per occurrence against bodily injury, personal injury and property damage.

D.2 The City of Coquitlam, its employees, officers, agents and volunteers are added as Additional Insureds, but only with respect to operations conducted by or on behalf of the Named Insured in connection with the above-described project, operations or work.

D.3 This insurance shall be primary as regards the City of Coquitlam, its employees, officers, agents and volunteers as Additional Insureds.

D.4 Any deductible or reimbursement clause contained in the policy shall not apply to the City of Coquitlam and shall be the sole responsibility of the Named Insured.

D.5 The insurance shall include the following coverages:

- D.5.1 Cross Liability Clause
- D.5.2 Non-Owned Automobile Liability
- D.5.3 Unlicensed Automobile Liability
- D.5.4 Blanket Contractual Liability
- D.5.5 Broad Form Property Damage Liability
- D.5.6 Owner's & Contractor's Protective Liability
- D.5.7 Products & Completed Operations Liability

D.6 Indicate provision of special coverage for this project as required by the City:

YES	NO	Special Coverage Description
( )	(**X**)	Shoring and Underpinning Hazard
( )	(**X**)	Pile Driving and Vibrations
( )	(**X**)	Excavation Hazard
( )	(**X**)	Demolition
( )	(**X**)	Blasting

Authorized Signature and Stamp

Date

Name and Title

City' broker to return to City Representative

Department

APPENDIX IV

PRIME CONTRACTOR DESIGNATION

Subject: **Prime Contractor Designation**
Contract No.: **78029**
Contract Name: **Booth Creek Bridge Rehabilitation – Schoolhouse Street** (the "Project")

_____ (the "Contractor") represents, acknowledges and agrees that:

1. in accordance with section 24 of the *Workers Compensation Act*, R.S.B.C. 2019, c. 1 (the "*Workers Compensation Act*"), the Contractor shall be the "Prime Contractor" and is qualified to act as the "Prime Contractor" in respect of the Project;
2. the Contractor accepts the duties and responsibilities for coordination of health and safety in accordance with the *Workers Compensation Ac*t and further agrees that it will do everything necessary to establish and maintain a system or process that will insure compliance with the *Workers Compensation Act* and the Regulations thereto;
3. the Contractor shall fulfill all the obligations of an "Owner" under section 25 of the *Workers Compensation Act* in respect of the Project site; and
4. that the City of Coquitlam has fulfilled its obligations as an "Owner" under section 25 of the *Workers Compensation Act*, in respect of the Project site.

Prime Contractor Name & Address:

_____

_____

_____

_____ _____
Prime Contractor Signature Date

_____
Print Name

Please return a signed copy of this memo to the City of Coquitlam, 3000 Guildford Way, Coquitlam, B.C. V3B 7N2
If you have any questions, please contact the City's Health and Safety Advisor at 604-927-3068.

Supplementary Contract Specifications

Supplementary Contract Specifications

to the
MASTER MUNICIPAL SPECIFICATIONS
Volume II – Platinum Book

BOOTH CREEK BRIDGE REHABILITATION – SCHOOLHOUSE STREET

CONTRACT 78029

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The following Supplementary Specifications are to be considered part of the Specifications. These Supplementary Specifications take precedence over the Master Municipal Specifications.

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1.00 CONTRACT SPECIFIC INSTRUCTIONS

1.01 Coordination of Work

The Contractor shall be responsible to consult with all affected businesses, residents and transportation companies regarding delays, detours, and any other works affecting any transit service in the area, and will be responsible to coordinate the works with City crews and other contractors working in the area. If working area is to become a multiple-employer workplace as defined by WorkSafe BC, the Contractor shall remain the Prime Contractor.

1.02 Outside Agency Approval

In accordance with the Contract Documents, the Contractor is responsible to consult with and obtain any approval required to meet and comply with all the conditions required from outside agency such as, but not limited to, BC One Call, Metro Vancouver, BC Hydro, Telus, Kinder Morgan, and Fortis BC in the area of the place of Work.

1.03 Waste Collection Coordination

1. Contractor is responsible to accommodate all waste collection vehicles and cart pick up schedules throughout construction. Collection schedule can be found in https://www.coquitlam.ca/157/Collection-Calendar-Guidelines .

2. If waste collection will be impacted the contractor is responsible to:
   a. Provide advanced notification to:
      i. The City's Solid Waste staff at 604-927-3500 or wastereduction@coquitlam.ca; and
      ii. The City's Contract Administrator.
   b. Provide access for collection trucks to closed streets due to road work; or
   c. Move waste carts for collection:
      i. The Contractor is required to ensure each cart is labelled with the property address and returned to the correct address after collection (each cart has its own individual cart identification code and is specifically assigned to each property). **Contractors will be responsible for the costs to replace missing carts.**

3. Contractor's Request for Change in Collection Time (e.g. PM to AM):
   i. The Contractor must provide residents with as much notice as possible – minimum 5 working days.
   ii. The contractor must follow all conditions of Clause 1.04 and is responsible to deal with any missed collections. For example, taking garbage to the United Boulevard Recycling and Waste Centre or covering the cost associated for any missed collection to be rescheduled.

Questions: wastereduction@coquitlam.ca

1.04 Cooperatrion with Emergency and Maintenance Activities

The Contractor will be responsible to cooperate with regular maintenance or emergency vehicles and staff for access to the site when required including:

- Fire, Police, and Ambulance
- Collection (garbage/recycling pick-up)
- City Utilities Maintenance (or representatives)
- Other Contractors

1.05 Site Safety

The Contractor is responsible to ensure the construction site is safe at all times for workers, pedestrians, and vehicle traffic. During non-working hours, the Contractor must ensure that the site has all potentially hazardous areas appropriately identified and protected, and also must provide appropriate signage, lighting, and markings for the direction of vehicle and pedestrian traffic, all to ensure the safety of the public. Supply and use of this equipment is considered incidental to the contract.

Manhole lids, valve boxes and other appurtenances within the roadway that may present a traffic hazard during construction must be clearly marked for traffic.

Manhole lids left raised in preparation for paving must have a rubberized protector ring painted with bright color for traffic safety. Supply and use of this equipment is considered incidental to the contract.

1.06 Lane Closure Restrictions

The Contractor shall refer to Contract Supplementary Specifications Section 01 55 00S and to Appendix A: Traffic Management Detail Specifications.

The Contractor must take the above information into account in the preparation and submission of the Tender.

1.07 Location of Existing Utilities

The Contractor is responsible to verify the depth and location of all utilities (watermains, storm mains, sanitary mains etc.), including outside agency utilities (i.e. Fortis BC Gas Mains etc.) and service connections (water, storm and sanitary services at the mains, and property lines) by hand digging or by Hydro-Vac in the presence of the Inspector.

Pre-locates must be completed as soon as possible after award of the Contract so changes can be completed by the Engineer prior to site construction. Contact Metro Vancouver for location of their utilities and BC One for location of other outside agency utilities. The Contractor will not receive any compensation or allowance for delays if work is halted due to utility and service connections not located prior to commencing construction.

City of Coquitlam does not guarantee water, storm or sanitary services connections are perpendicular to the mains or property lines, the Contractor will not receive any compensation for the time to locate these connections or for exposing hidden services at the property lines.

Payment for this work will be treated as incidental to payment for work described in other Sections.

1.08 Manholes and Valves

Access to manholes and valves must be maintained at all time for City utilities crews and external utility companies. In case of an emergency the cost for exposing any buried manhole or valve covers during construction will be paid by the Contractor.

1.09 Verification of Dimensions and Quantities

Before proceeding with work the Contractor shall visit the site and check and verify dimensions and quantities. Report variations between drawings and site conditions to the Contract Administrator before proceeding with work. Payment for this work will be treated as incidental to payment for work described in other Sections.

1.10 Precautions

Protect areas under construction from damage caused by excessive erosion, flooding, heavy rains, etc. Repair or replace unprotected damaged areas as directed by the Contract Administrator at no cost to the Owner.

1.11 FORTIS BC Emergency Protocol

In an emergency, gas pipeline rupture or leak, Contact Fortis BC 24 Hour Emergency Line (1-800-663-9911) & Fire Department (911) immediately and then City of Coquitlam's Utility Control Centre (604-927-6287)

1.12 Temporary Asphalt Pavement Restoration

The Contractor will be required to backfill all trenches (in paved areas) and place a temporary patch (50mm of hot mix asphalt), as per Coquitlam Standard Drawing COQ-G4, the same day excavation is made, unless otherwise approved by the Contract Administrator.

Temporary asphalt patch on driveways is not required, but access must be maintained for property owners.

2.00 CONSTRUCTION ACTIVITY

2.01 Construction Materials in Sewer Manholes and Pipe

The Contractor is responsible to ensure that construction activities do not deposit construction materials (e.g. gravels) into the storm sewer or sanitary sewer manholes or pipe. The City has a video record of the pipe before construction. Prior to Substantial Performance, the City may again video inspect the lines to ensure no problems exist due to construction activities under this contract. If problems are encountered, the Contractor will be responsible for the cost of the video and all costs associated with the cleaning of the pipe.

2.02 Site Clean-up During Construction and End of Construction

The Contractor will be responsible for the complete clean-up of the work site during construction, at the end of construction, and prior to the Substantial Performance review.

The work will include cleaning of all catch basins periodically or as directed by the Contract Administrator within the Work area, or nearby location as affected by the Work, to the same condition of the catch basins prior to starting the Work. All cleaning is to be performed by vacuum truck to the satisfaction of the Contract Administrator and will include off-site disposal of waste material.

Payment for this work will be treated as incidental to payment for work described in other Sections.

3.00 MANDATORY MEETINGS AND CONTRACTOR REPRESENTATIVES AND SUBCONTRACTORS

3.01 Pre-Construction Meeting Requirements

After the Award of the Contract, the Contractor (Project Manager and Superintendent) will be required to attend a Pre-Construction Meeting with the Contract Administrator and provide all necessary information required by the Contract Administrator prior to provision of a Notice to Proceed. Items required to be provided at the meeting include:

1. A Detailed Construction Schedule showing the start date, completion date, and durations of major work components showing how all work will be completed within the Contract Duration.
2. Proof of Insurance
3. Performance Bond and Labour and Materials Payment Bond
4. WCB Clearance Letter and Copy of Notice of Project
5. City of Coquitlam Business License
6. A copy of portions of your Health and Safety Plan including the Title Page, Table of Contents, and portion showing latest revision date.

3.02 Contract Schedule, Contract Duration, and Charges

A detailed, realistic construction schedule for this project will be required to be presented at the pre-construction meeting. The schedule must show major components and durations.

All work under this project is to be completed within the designated Contract Duration as contained in the signed Contract Agreement, or as formally amended.

3.03 Contract Superintedent and Subcontractors

In compliance with the MMCD General Conditions, Section 4.7, Superintendent, the Contractor shall have a competent senior representative, (the “Superintendent”) in FULL TIME attendance at the Place of Work while work is being performed for the duration of the contract.

This FULL TIME attendance is also required when work is being performed by Subcontractors.

Work done by Subcontractors is to be directed by the Superintendent and monitored on site ensuring conformance to the Contract Documents and other particular direction to the Superintendent by the Contract Administrator.

The Owner and Contract Administrator are not responsible for the direction of Subcontractors.

3.04 Changes of Contractor Representatives & Subcontractors

The Superintendent and Subcontractors indicated in the Form of Tender shall not be changed unless:

1. The Owner requests a replacement.
2. The Contractor submits an application for a change, in writing, to the Contract Administrator with the change being approved in writing.

3.05 Mobilization and Demobilization

Payment for mobilization and demobilization of all equipment, labour and materials (both from the Contractor and all sub-contractors) shall be incidental.

END OF SECTION

1.0 GENERAL

1.3	**Submission**	Delete 1.3.2 and replace with the following	Submit one copy of accurate project record documents in final form prior to applying for Substantial Performance including all video and material testing reports. Record documents to include changes in the Issued for Construction Drawings, new elevation, location of all walkways and sidewalks, all utilities, manhole rims, catchbasin rims, vaults, valve boxes and inverts affected by the Work. Substantial Performance and release of Holdbacks will not be issued until record documents have been submitted and accepted by the *Contract Administrator* and the City.

END OF SECTION

1.0	**GENERAL**	Add 1.0.6	The Supplementary Specifications contained herein must be read in conjunction with the Master Municipal Specifications contained in the Master Municipal Construction Documents, Volume II (**Platinum Edition 2009**) as identified in the Instructions to Tender.
		Add 1.0.7	The Supplementary Contract Specifications follow the same format and numbering system as the Master Municipal Specifications, but is differentiated from it by having the letter "S" placed after the section number.
1.2	**REFERENCED SPECIFICATIONS**	Add 1.2.25	The Provincial Ministry of Transportation and Infrastructure has produced a 2020 Standard Specifications for Highway Construction (Volume 1 & 2), which applies to heavy civil materials and bridge construction and will be referenced in this document as SS. Description of the supply, shipping, installation and payment of the structural materials are described in this publication. This contract will refer to this provincial document as a reference and will be binding. To view or to obtain a digital copy of theses specifications go to: Standard Specifications for Highway Construction - Province of British Columbia (gov.bc.ca)
		Add 1.2.26	The Government of Canada has produced master specification for construction projects in Canada. The MMCD specification numbering system follows the National Master Specifications. For specifications in this document that do not correspond to a MMCD specification, the Contractor shall follow the NMS specification. This contract will refer to this document as a reference and will be binding. To obtain a digital copy of theses specifications go to: https://nrc.canada.ca/en/certifications-evaluations-standards/canadian-national-master-construction-specification/nms-overview

END OF SECTION

1.0 QUALITY

The Contractor shall provide a final product conforming to the Contract Documents and the intent of the work.

The work is to be accurate to the dimensional and tolerance requirements of the contract.

Payment will be subject to adjustments based on quality assurance tests performed by the Contract Administrator.

1.01 Quality Control (QC) by Contractor

The MMCD (2009) definition of "Quality Control" is the process by which the *Contractor* checks specific materials, products, and workmanship to ensure strict conformance with the Contract Documents.

The Contractor is fully responsible for quality control of the materials, production, and construction processes.

Quality control tests shall be performed by the Contractor, at their own expense, to ensure that products meet the contract specifications.

Failure by the Contractor to conduct adequate quality control testing during production and construction will negate the Contractor's ability to appeal the quality assurance tests used for acceptance/rejection of the work.

Under no circumstances will QC test results produced after completion of the Quality Assurance (QA) results be considered for appeal purposes.

Any changes in the Work with respect to the location, grade, or line shall be approved in advance by the Contract Administrator. Failure to notify the Contract Administrator of changes in writing may result in rejection of Work.

1.02 Inspection of Work, Quality Assurance, and Material Testing, by the Owner

The MMCD (2009) definition of "Quality Assurance" means the process by which the *Owner* evaluates if the work is being constructed in accordance with the Contract Documents. This definition will be used for this contract.

The *Contract Administrator* will provide construction review through spot inspections and spot materials testing for Quality Assurance.

Any materials testing results indicating a non-conformance to the Contract Documents will require construction corrective action by the *Contractor*.

All subsequent testing to corrective action to verify conformance to the Contract Documents will be the full responsibility of the *Contractor*.

Inspection review by the Owner will not relieve the Contractor from providing a product that meets or exceeds the requirements of the Contract Documents.

1.1 Inspection

Materials testing shall be as described in MMCD General Conditions, Section 4.12 with the following change:

Delete Section 4.12.2(a) and insert the following:

Where the MMCD specification clauses for Inspection and Testing indicate the Contract Administrator will arrange for all testing for work described in this section will be amended to read The Contractor will arrange for and pay for all testing for work described in this section. The testing shall take place at the following prescribed rates and as directed by the contract administrator. The contract administrator has the authority to call for testing, up to the rates and frequencies specified, at the Contractors cost.

All testing covered under this item shall be performed by a CSA certified laboratory and technicians with copies of all test results to be sent directly to the Contract Administrator. Re-testing resulting from failed first tests shall be at the Contractors expense.

1.2 Survey Layout

All Survey Layout will be completed by the Contractor in accordance with the Contract Drawings and Coordinate System set out within them. The Contractor will be provided digital AutoCAD files but shall be responsible to confirm elevations and tie in locations and report any discrepancies prior to construction.

1.3 Testing

Contractor shall carry out inspection and testing (QC) to ensure compliance with Contract Documents. Contractor shall submit test results within one week of testing to the Contract Administrator.

The Contractor shall provide test results prior to the preparation of the payment certificate.

1.4 Contractors Responsibilities

Furnish labour and facilities to:

1. Provide access to work to be inspected
2. Facilitate inspections and tests
3. Make good work disturbed by inspection and tests

1.5 Access to Work

Allow inspection testing agencies access to Work.

1.6 Tests

Test rates and frequencies (excluding failed tests), when not defined in the MMCD or Detail Specifications Sections shall be at the following frequencies:

1. Trench Backfilling and Compaction
1.1 Compaction: 1 test / 25 lm / 300mm lift
1.2 Sieve: 1 test / placed material / 50 m^3

2. Granular Base
2.1 Compaction: 1 test / 500m^2 / 100mm depth of granular base
2.2 Sieve: 1 test / placed material / 250 TONNES

3. Granular Subbase
3.1 Compaction: 1 test/500m^2 / 300mm depth of granular subbase
3.2 Sieve: 1 test / placed material / 250 TONNES

4. Embankment (Subgrade)
4.1 Compaction: 1 test/ 50m^2 / 300mm depth of fill
4.2 Sieve: 1 test / placed material / 100 TONNES

5. Asphalt
5.1 Marshall test: test per 250 TONNES placed, per mix specified, min. 1 / day
ASTM D1559, D3203, C117, C136
5.2 Superpave: test per 250 TONNES placed, per mix specified, min. 1 / day
CAI-SP2, ASTM D3203, C117, C136
5.3 Cores: 1 per 500 m^2/lift
5.4 Continuous asphalt density testing during paving.

6. Subgrade Preparation
6.1 Compaction & Moisture: 1 test / 500 m^2

7.Concrete Tests
7.1 Air, Slump & 1 Set Cylinders: 1 test / 10 m^3, min. 1 set / day

1.7 Measurement for Payment

Payment for all work performed under this section will be incidental to payment for work described in other Sections

END OF SECTION

1.0	**GENERAL**	Add 1.0.6	The *Contractor* is responsible for all temporary traffic control on the streets required for completion of the work. The *Contractor* will be responsible to provide a Traffic Management Plan (TMP) for approval (5) five working days prior to any lane closures taking place. TMP is to be prepared by a professional certified by the American Traffic Safety Services Association. The TMP shall outline the approach to traffic management, show recognition and minimization of risks indicates signing locations, identify Traffic Control Persons (TCP) stations, show lane shifting and proposed closures. The Contractor shall ensure safe passage of vehicles, cyclists and pedestrian through the work zone.
		Add 1.0.7	A Road and Sidewalk Closure Permit is required from Coquitlam for all work affecting pedestrian and traffic flow related to construction. A permit is required for each specific construction interference with pedestrian and traffic flow. The road and sidewalk closure permit form can be obtained for use from the City's website at http://www.coquitlam.ca. The Contractor must follow the approved TMP. Any changes to this TMP must be submitted to City's Traffic Operations for approval
		Add 1.0.8	Refer to Appendix A – Traffic Management Detail Specifications
1.4	**Traffic Control**	Delete 1.4.1 and replace with the following	The Contractor shall conduct their operations so as to cause the minimum obstruction and inconvenience to traffic and to places of business and residences adjacent to the Place of Work. No greater quantity of work shall be undertaken at any one time than can be properly conducted with due regard to the rights and interests of the public as may be determined by the Contract Administrator. The Contractor is to provide at all times safe and convenient means of approach and entrance to adjoining lanes, driveways, buildings and property both for vehicles and pedestrians to the satisfaction of the Contract Administrator. For this purpose, they shall construct and maintain suitable and safe platforms, approaches, structures, bridges, diversions or other works. Where traffic must cross open trenches, the Contractor shall provide suitable bridges. Where trenches have been backfilled or where road improvements are incomplete the Contractor shall take any steps necessary to prevent potholes or other traffic hazards. Where the Contract Administrator so instructs or where Contract Specifications so require, the Contractor shall provide temporary asphalt patching of such hazards.
		Add 1.4.9.3.1	The *Contractor,* as required by the *Contract Administrator* and the City, is to supply Construction Zone information signs (stationary), refer to MMCD 01 58 01 for the required identification signage. The *Contractor* is responsible for the removal of the signs at the completion of the work.
		Delete 1.4.10.1.3 and replace with the following	When workmen or equipment are employed over travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

1.5	**Measurement for Payment**	Delete 1.5.1 and replace with the following	Payment for all work performed under this section including submission of Traffic Management Plan (TMP), Traffic Control Persons (TCP), and all temporary traffic signs, devices as required for traffic and pedestrian safety; and all other items described in the Traffic Regulartion Section, and all labor, material, equipment and work described under ***Appendix A: Traffic Mangement Detail Specifications*** shall be treated as incidental to payment for work described in other Sections unless shown otherwise in the Schedule of Quantities and Prices.

END OF SECTION

1.0	**GENERAL**	Add 1.0.3	The project will require work above the natural boundary of watercourses that meets the definition of a *'stream'* pursuant to the Water Sustainability Act. While the Contractor is not responsible for environmental notifications or approvals, the Contractor is required to review and understand provincial best management practices for working in and about water contained within: *Standards and Best Practices for Instream Works:* www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf *A Users Guide for Working Around Water:* A USERS GUIDE (gov.bc.ca) This section of the supplemental specifications do not supercede MMCD Clause 20.4.
1.2	**Temporary Erosion and Sediment Controls**	Delete 1.2.1.1 and replace with the following	Properly drain all portions of the site. Protect the site and the watercourses to which it drains, directly or indirectly, against erosion and siltation in accordance with the City of Coquitlam Stream and Drainage System Protection Bylaw No. 4403, 2013 during construction and until the Place of Work has been restored to the satisfaction of the *Contract Administrator*. Ensure no silt, gravel, debris or other deleterious substance resulting from construction activity discharges into existing drainage systems or watercourses or onto highways or adjacent property. The *Contractor* is responsible for all damage that may be caused by water backing up or flowing over, through, from or along any part of the work or otherwise resulting from his operations. Keep existing culverts, drains, ditches and watercourses affected by the work clear of excavated material at all times. When it is necessary to remove or alter any existing drainage structure, provide suitable alternative measures for handling the drainage. Adequately support culverts and drainpipes across trenches to prevent displacement and interference with the proper flow of water due to trench settlement. Sweep streets, and clean catch basins, manhole sumps, detention tanks, and maintain siltation controls as often as the *Contract Administrator* and the City deems necessary.
		Delete 1.2.2.2 and replace with the following	Do not operate construction equipment in watercourses.
		Add 1.2.2.9	All work must be carried out during favorable and low water conditions.
		Add 1.2.2.10	Any fill used on this project shall be certified inert and from a source which is confirmed to be free of contaminants.
		Add 1.2.2.11	All work within a watercourse must be undertaken and completed in isolation of all flowing water to maintain downstream water quality and unrestricted flows.
		Add 1.2.5	The Contractor will prepare a Spill Response Plan prior to Construction. Costs of the preparation of the spill response plan are incidental to the Contract.

The Contractor will develop and identify waste receptacles for the safe disposal of hydrocarbons and lubricant fouled waste material, and use those receptacles. Contractor shall ensure that any fuel stored on-site is located at least 30m from the nearest stream, and is placed within a bermed and lined area, in order to prevent leaks or spills into the environment.

There will be no machine refueling within 30 m of a watercourse. The Contractor must keep emergency spill kit at each bridge repair site. The Environmental Monitor will inspect and confirm that a spill kit is onsite prior to commencement of bridge repair work. Each spill kit will at a minimum have the following:

- 2 - 5 m long absorbent spill booms
- 50 - 16" x 20" Sorbent Pads (Oil, Gas & Diesel)
- 6 - 48" x 3" Sorbent Socks (Oil, Gas & Diesel)
- 4 -120" x 3" Sorbent Socks (Oil, Gas & Diesel)
- 4 - 8" x 18"Sorbent Pillows (Oil, Gas & Diesel)
- Nitrile Gloves
- Hand Wipes
- 2 - Disposable Respirators N958 HD
- Hazmat Disposal Bags

Spills of any substance toxic to aquatic life of reportable quantities will be immediately reported to the Provincial Emergency Program 24 hour phone line at 1-800-663-3456.

Contractor shall immediately contain and clean up any leaks and spills of prohibited materials on the Project Site.

Contractor shall immediately notify the Contract Administrator of any leaks or spills of prohibited materials that occur on the job site.

The Contractor is wholly responsible for costs associated with clean-up of spills originating from their equipment or work practices.

Add 1.2.6

The Contractor is required to complete construction in a manner that will prevent the release of sediment or sediment laden waters to the watercourses, ditches, and swales draining to fish habitat.

Add 1.2.7

There will be no disposal of solid wastes into sumps, ditches, streams, culverts, road edges or private property.

The Contractor's will supply trash cans for the disposal of crew generated wastes.

Littering is prohibited and monitoring for this activity will be on-going throughout the project.

Add 1.2.8

The Contractor shall undertake all concrete/grouting work with caution, as wet cement/grout is highly toxic to aquatic organisms. The Contractor shall comply with, at a minimum, the following procedures:

1. The Work shall be isolated from watercourses through the use of berms, pits or tarpaulins.
2. There shall be no direct contact between work activity and any watercourse through spillage, hosing off surfaces, rain or cleaning of tools.

3. Complete isolation of all cast-in-place concrete and grouting from any watercourse for a minimum of 72 hours.
4. Exposed concrete will be covered if there are forecast rains.
5. No wash water shall be allowed to discharge to any watercourse.
6. Any water that contacts uncured or partly cured concrete shall be isolated and held (and treated until the pH is between 6.5 and 9.0.
7. The Contractor must follow BC Environmental Management Act – Spill reporting regulation procedures relating to emergency mitigation and clean up measures for managing the cleanup and recover of concrete materials.
8. All wash water from concrete works shall be contained and removed from site.
9. All accepted temporary disposal area locations must be cleaned up and re-seeded prior to demobilization.
10. Concrete dust from saw cutting and drilling shall be prevented from entering any watercourse.

1.4	**Environmental Protection**	Add 1.4.3.5	Immediately contain and clean up any leaks and spills of prohibited materials at the *Place of Work*.
		Add 1.4.3.6	Ensure that a well-stocked spill kit is on-site at all times and that the *Contractor*'s employees are familiar with appropriate spill response techniques. Any spill of reportable quantities must be immediately reported to the Provincial Emergency Program's 24 hour phone line at 1-800-663-3456.
		Add 1.4.3.7	Immediately notify the *Contract Administrator* and the City of any leaks or spills of prohibited materials that occur at the *Place of Work*.
		Add 1.4.3.8	Ensure that any fuel stored on-site is located at least 15 metres from the nearest stream, and is placed within a bermed and lined area, in order to prevent leaks or spills into the environment.
		Add 1.4.3.9	All equipment and machinery must be in good working condition (power washed), free of leaks or excess oil and grease. No equipment refueling or servicing shall be undertaken within a minimum of 15 metres of any water course or surface water drainage.
		Add 1.4.3.10	During all phases of the operation, the Contractor shall take precautions to abate nuisance caused by mud or dust by clean up, sweeping, sprinkling with water or dust control, or other means as necessary to accomplish results satisfactory to the Contract Administrator.
1.6	**Measurement and Payment**	Delete 1.6.1 and replace with the following	Payment for all work, unless included in the Schedule of Quantities and Prices, performed under this section will be incidental to payment for work described in other Sections. These works for Erosion and Sediment Control (ESC) will include silt fencing, interceptor channel/swale/ditch construction, interceptor drain pipe, check dams, catch basin, socks, and all materials to complete the work as shown on the Contract Drawings or as directed by the Contract Administrator

		Add 1.6.2	Payment for this item as directed by the Contractor Administrator includes supply, placement, maintenance, materials, removal and incidentals required for environmental protection.
		Add 1.6.3	Payment for the poly cover or temporary tarps over stock pile materials or exposed road subgrades shall be treated as incidental work.
1.9	**Archaeological / Historical Resources**	Add 1.9	Immediately cease work and inform the *Contract Administrator* and the City, if any archaeological or historical resources are encountered during construction. Leave these resources in place and do not disturb them in any way. The Contractor must allow the Archaeological and Historical Resources group to perform duties around the site during construction. The Contract Administrator shall coordinate all other work being performed at the site with the Contractor.
1.10	**Contractor's Hydrocarbon Wastes and Fuel Spill Mitigation Measures**	Add 1.10	The Contractor will prepare a Spill Response Plan prior to Construction. Costs of the preparation of the spill response plan are incidental to the Contract. The Contractor will develop and identify waste receptacles for the safe disposal of hydrocarbons and lubricant fouled waste material, and use those receptacles. There will be no machine refueling within 30 m of a watercourse. The Contractor must keep emergency spill kit at each bridge repair site. The Environmental Monitor will be inspect and confirm that a spill kit is on site prior to commencement of bridge repair work. Each spill kit will at a minimum have the following: • 2 - 5 m long absorbent spill booms • 50 - 16" x 20" Sorbent Pads (Oil, Gas & Diesel) • 6 - 48" x 3" Sorbent Socks (Oil, Gas & Diesel) • 4 -120" x 3" Sorbent Socks (Oil, Gas & Diesel) • 4 - 8" x 18"Sorbent Pillows (Oil, Gas & Diesel) • Nitrile Gloves • Hand Wipes • 2 - Disposable Respirators N958 HD • Hazmat Disposal Bags Spills of any substance toxic to aquatic life of reportable quantities will be immediately reported to the Provincial Emergency Program 24 hour phone line at 1-800-663-3456. The Contractor is wholly responsible for costs associated with clean-up of spills originating from their equipment or work practices.
1.11	**Non-Hazardous Waste Handling Requirements**	Add 1.11	There will be no disposal of solid wastes into sumps, ditches, streams, culverts, road edges or private property. The Contractor's will supply trash cans for the disposal of crew generated wastes. Littering is prohibited and monitoring for this activity will be ongoing throughout the project.

1.12 Control of Cement and Cement Grouts

Add 1.12

The Contractor shall undertake all concrete/grouting work with caution. The Contractor shall comply with, at a minimum, the following procedures:

.1 The Work shall be isolated from watercourses through the use of berms, pits or tarpaulins.

.2 There shall be no direct contact between work activity and any watercourse through spillage, hosing off surfaces, rain or cleaning of tools.

.3 Complete isolation of all grouting from any watercourse for a minimum of 72 hours.

.4 No wash water shall be allowed to discharge to any watercourse.

.5 The Contractor must follow BC Environmental Management Act – Spill reporting regulation procedures relating to emergency mitigation and clean up measures for managing the cleanup and recovery of concrete materials.

.6 All wash water from concrete works shall be contained and removed from site.

.7 If required, concrete wash water may be disposed in a temporary disposal location that has been reviewed and accepted by the Owner. This location may be a rock pit or grassy area, provided the wash water will be contained in an upland location at least 30m away from the high water mark, and at least 30m away from the top of bank of watercourses and there is landowner approval.

.8 All accepted temporary disposal area locations must be cleaned up and re-seeded prior to demobilization.

Concrete dust from saw cutting and drilling shall be prevented from entering any watercourse.

END OF SECTION

1.3	**Measurement and Payment**	Delete 1.3.1 and replace with the following	Payment for the installation of 1.2m x 1.2m static construction Information signs as shown in Appendix A – Traffic Management Detail Specifications includes supply, placement and removal, and will be incidental to payment for work described in other Sections, unless shown otherwise in the Schedule of Quantities and Prices.
		Add 1.3.2	Payment for changeable message signs (CMS) including supply, placement, communication management & removal as required for traffic & pedestrian safety and as shown in in Appendix A – Traffic Management Detail Specifications will be incidental to payment for work described in other Sections, unless shown otherwise in the Schedule of Quantities and Prices. When shown in the Schedule of Quantities and Prices, payment for CMS used for only a fraction of a month will be paid prorata.

END OF SECTION

3.1	**Fabrication and Erection**	Delete 3.1.4 and replace with the following	Formwork shall be in accordance with SS 211.
3.3	**Measurement and Payment**	Add 3.3.1	Formwork for the cast-in-place concrete work will be included in the price per cubic meter for cast-in-place concrete. No separate payment will be made for the supply, transport and installation of the formwork required as part of another Item. Payment shall be considered incidental to the concrete work being considered.

END OF SECTION

1.0	**General**	Delete 1.0.1 and replace with the following	Section 03 20 01 refers to those portions of the work that require nominal reinforcement such as cast-in-place products for any structural facilities requiring site specific structural engineering design. This section includes the supply, fabrication and installation of reinforcing for concrete structures as specified in BC MoTI Standard Specifications SS412
1.3	**Certification**	Delete 1.3.2 and replace with the following	All certificates for the reinforcement steel shall be provided to the Contract Administrator.
1.5	**Measurement and Payment**	Delete 1.5.1 and replace with the following	Reinforcing steel for the cast-in-place concrete work will be made at the Unit Price per kg of reinforcing. Payment includes supply, transport, installation of rebar and includes all form work, wire ties, and all other work and materials necessary to complete installation as shown on Contract Drawings.
2.1	**Materials**	Delete 2.1.1 and replace with the following	Reinforcing steel shall comply with CAN/CSA G30.18, 400W unless otherwise specified on the Drawings. Reinforcement to be stainless steel unless otherwise noted.
3.2	**Placing Reinforcement**	Delete 3.2.1 and replace with the following	Reinforcing steel shall be supplied and installed in accordance with MoTI Standard Specifications SS412 unless otherwise specified on the Drawings. Welding of reinforcing steel shall be permitted only where shown on the Drawings or when acceptable to the Contract Administrator and shall be in accordance with CSA W186-M.

END OF SECTION

1.4	**Measurement and Payment**	Delete 1.4.3 and replace with the following	Payment for machine placed or hand formed C5 wide base concrete curb and gutter, excluding granular base, includes supply and placing of the concrete curb and gutter, tie-ins, transitions, subgrade preparation, compaction, saw cutting and slot paving and will cover all straight and curve sections and will be made separately for each specified type. Payment for excavation and disposal of excavated material will be made under Section 31 24 13S – Roadway Excavation, Embankment and Compaction as shown in the Schedule of Quantities and Price. Payment for granular subbase and granular base under curb and gutter will be made under payment items in Section 32 11 16.1S and 32 11 23S, Granular Subbase and Granular Base, respectively.
		Delete 1.4.5 and replace with the following	Payment for broom finished concrete sidewalks, infill, slopes, ramps, utility strips, driveway letdowns, and wheelchair letdowns, excluding granular base, includes supply and placing of the concrete, tie-in's, field fits and adjustments and will be made separately for each specified thickness and type. Payment for granular subbase and granular base under curb and gutter will be made under payment items in Section 32 11 16.1S and 32 11 23S, Granular Subbase and Granular Base, respectively.
2.1	**Materials**	Delete 2.1.5.1 and replace with the following	Hand-formed and hand-placed concrete: Slump: 80 mm Air entrainment: 5 to 8%. Maximum aggregate size: 20 mm. Minimum cement content: 335 kg/m3. Minimum 28 day compressive strength: 32 MPa.
		Add 2.1.7	Tactile warning surface tile shall be replaceable cast-in-place style. Truncated domes shall be in square grid pattern with a 5 mm nominal raised height, base diameter of 23 mm and top diameter of 11.5 mm. Dome spacing range shall be between 40 mm – 60 mm. Color of the panel shall be Federal Yellow (Y) per US Federal Standard 595B Table IV, Color No. 335. Minimum size of the panel shall be 600 mm in width by varying lengths, contingent on the application..
3.0	**EXECUTION**		
3.5	**Concrete Placement**	Delete 3.5.9 and replace with the following	The *Contractor* is responsible for adjusting all utility manhole frames and valve boxes, belonging to Coquitlam and/or other agencies that are affected by the road works. All adjustments to utilities must be completed to the satisfaction of the utility owner. Riser rings will not be accepted. The *Contractor* should note that certain utility owners may decide to complete their own adjustments. The *Contractor* will be required to cooperate with any utility company providing their own adjustments. The *Contractor* shall be responsible to contact the appropriate utility company within a minimum of seventy-two (72) hours of the work. No adjustment shall be made without the written approval of the

			utility company. All manholes must be vertically adjusted a minimum of twenty four (24) hours prior to concrete placement.
3.9	**Expansion Joints**	Delete 3.9.1 and replace with the following	Form transverse expansion joints at both ends of curb returns and at maximum spacing of 9.0 m for sidewalks, 30.0 m of curb and gutter, at each end of driveway crossing, at tangent point of circular work, and on either side of catch basins.

END OF SECTION

1.0	**General**	Delete 1.0.1 and replace with the following	The concrete work shall be in accordance with MoTI Standard Specifications SS 211, 413, 931 and 933, and the general notes and Specifications shown on the drawing 32801-01.
1.4	**Construction Quality Control**	Add 1.4.2	The Contractor shall be responsible for the design and quality control for all concrete used on this project. All concrete materials and admixtures for concrete shall conform to the requirements of SS 211.04, unless otherwise specified in these Provisions and the Drawings.
1.5	**Measurement and Payment**	Add 1.5.6	Payment for concrete will be made in accordance with MoTI Standard Specifications SS 211.21.02 at the applicable Unit Price per cubic metre as listed in the Schedule of Quantities and Unit Prices. No payment will be made under this Item for concrete supplied as part of another Item. All concrete work shall be in accordance with MoTI Standard Specifications SS 211 and 933, unless otherwise specified in these Special Provisions. Payment shall also include quality control, submissions, any falsework and bracings for the formwork, joint preparation, epoxy bonding agents, finishes, and all work and materials required to complete the work as shown in the Contract Drawings.
2.2	**Concrete Mixes**	Delete 2.2.1 and replace with the following	Concrete design mixes will be delivered to the Contract Administrator for approval.
2.3	**Forms**	Delete 2.3.1 and replace with the following	Formwork and falsework shall be in accordance with MoTI Standard Specifications SS 211. All formwork or falsework for any cast-in-place components will be considered as formwork.
3.5	**Inspection**	Add 3.5.1	Immediately prior to placement of concrete, carefully inspect all formwork to ensure forms are properly set at required horizontal and vertical alignment, sufficiently rigid, clean, surface treated and ready for placement of concrete. Obtain Contract Administrator's approval of formwork and compacted base.

END OF SECTION

1.4	**Measurement and Payment**	Delete 1.4.2 and replace with the following	Payment for Allan Block Retaining Wall includes excavation and disposal of excavated material for the wall construction and removal of any existing retaining wall, all work and incidentals, site preparation, 19mm Clear Crush Drain Rock backfill, SDR28 perforated pipe, weep hole, and capstone. Measurement of height of all for purposes of calculating areas for payment will be taken from the bottom of the installed block to top of cap above the block. Payment will be made at the respective unit prices bid in the Schedule of Quantities and Prices.

END OF SECTION

1.0	**GENERAL**		
1.3	**Shop Drawings**	Delete 1.3.4 and replace with the following	Shop drawings for pole structures, where required, to be sealed by a Professional Engineer registered in British Columbia.
1.4	**Electrical Energy Supply**	Add 1.4.4	The Electrical *Contractor* shall process a letter of application to the City of Coquitlam for the Utility Company and attain all required permits.
1.5	**Contractor Qualifications**	Add 1.5.3	All on-site traffic signal installations shall be under the responsibility of a primary journeyman electrician with IMSA Level 1 Roadway Lighting Certification and have a minimum of three (3) years experience maintaining and installing street lighting systems. This primary journeyman electrician is expected to be on the work site and report work progress to City of Coquitlam's Traffic Operations staff, in addition to reporting to the *Contract Administrator*.
1.6	**Permits and Tests**	Add 1.6.4	*Contractor* shall provide the BC Safety Electrical Permit, and arrange all inspections with the City. The inspection entails, but not limited to, Coquitlam's Street Lighting Inspection Report, which can be obtained from Coquitlam's Traffic Operations staff.
		Add 1.6.5	*Contractor* to obtain approval of all buried portions of the installation from the City Inspector before any backfill is commenced.
2.0	**PRODUCTS**		
2.1	**General**	Delete 2.1.2 and replace with the following	All products supplied to be new, in accordance with *Contract Documents*. All products are to meet Canadian Electrical Code requirements and be certified by either CSA, UL©, or Intertek Testing Systems (Warnock Hersey) and be supplied with the certifier's label.
		Delete 2.1.3 and replace with the following	All products shall be in accordance with the City of Coquitlam's List of Approved Materials and Products List. Any products not listed with in the Approved List shall default to the current BCMOTI specification.
		Delete 2.1.5 and replace with the following	Equipment models listed within the City of Coquitlam's List of Approved Materials and Products shall be confirmed with the City immediately prior to their order to ensure that they are current. Cut-sheets, equipment make, model and serial number list to be provided to the City by the *Contractor*.
2.2	**Conduit**	Add 2.2.1.3	All exposed metallic surfaces to be hot dip galvanized.
2.3	**Trench marker Tape**	Add 2.3.2	Detectable (Magnetic) marker tape shall be used in all trenches containing interconnection (communications) conduit.
2.6	**Concrete Bases**	Add 2.6.2	Maximum of four (4) conduits shall enter the base of a luminaire pole, however more than four (4) may enter a service base.
2.8	**Conductors and Cables**	Add 2.8.5	.1 Minimum conductor size to be as follows, unless specified otherwise on *Contract Drawing*: .1 No 6 AWG for feeder conductors in conduit.

			.2 No 8 AWG for bond conductors in conduit. .3 No 12 AWG for luminaire conductors in poles.
2.9	**Conductor Tags**	Delete 2.9 and replace with the following	Refer to the City of Coquitlam's List of Approved Materials and Products.
2.11	**Fuses and Fuse Holders**	Delete 2.11 and replace with the following	Refer to the City of Coquitlam's List of Approved Materials and Products.
2.13	**Receptacles**	Add 2.13.3	Receptacles shall have a spring loaded cast aluminum covers.
		Add 2.13.4	Refer to the City of Coquitlam's List of Approved Materials and Products.
2.14	**Luminaires**	Add 2.14.6	Refer to the City of Coquitlam's List of Approved Materials and Products.
2.19	**Service Panels**	Add 2.19.1	Type 40A 120/240V, 60A 120/240V roadway lighting and 100A 120/240V combination roadway lighting / traffic signal, per *Contract Drawing* to include items listed within the 2009 MMCD Section 34 41 13 - Traffic Signals - 2.11.2
		Add 2.19.2	Refer to the City of Coquitlam's List of Approved Materials and Products.
2.20	**Wire Anti-Theft Devices**	Add 2.20.1	Handhole access shall utilize security covers with reinforced backing bars.
3.0	**EXECUTION**		
3.1	**General**	Add 3.1.5	During the installation of the lighting system, maintain the existing system as noted on the *Contract Drawing*. If temporary or permanent relocations of related lighting equipment are required, such equipment shall be reinstated as required under the *Contract Documents* or as directed by the *Contract Administrator*.
3.3	**Concrete Bases**	Add 3.3.7	Concrete service bases detailed on Standard Detail Drawings CE1.3 and CE1.4, Type C1 and C3 service bases shall have five (5) conduits. See Coquitlam Standard Detail Drawing SS-E7.3.
		Add 3.3.8	All concrete bases shall be pre-cast concrete only, unless noted on *Contract Drawing* or directed by the *Contract Administrator*.
3.4	**Junction Boxes and Vaults**	Delete 3.4.1 and replace with the following	Install junction boxes as shown on Standard Detail Drawings E2.2 to E2.4. Install vaults as shown on Coquitlam Standard Detail Drawing SS-E2.5.
		Add 3.4.5	Bell end fittings shall be installed in all conduits entering junction boxes or vaults.
		Add 3.4.6	All junction boxes shall be provided with RPVC bars to support electrical connections and fuse holders. The RPVC bars shall be attached into the junction box side walls with the electrical connections/fuse holders tie-wrapped in place and installed in the up-right position.

		Add 3.4.7	Junction boxes requiring 3 or more sections must be approved by the City of Coquitlam's Traffic Operations staff.
3.5	**Underground Conduit**	Delete 3.5.2 and replace with the following	Minimum cover over conduits to be 600 mm in boulevard areas and 900 mm in roadway areas.
		Delete 3.5.3 and replace with the following	Place trench marker tape 300 mm above installed conduit in trench. Trench marker tape not required for conduits installed via trenchless technology.
		Delete 3.5.5 and replace with the following	Empty conduits shall have a No. 8 HB Yellow/Green Mk pull string and capped at both ends.
		Add 3.5.6	Conduit run shall contain no more than the equivalent of 4 – 90-degree bends.
		Add 3.5.7	Conduits shall be blown out with compressed air, from both ends if necessary, then swabbed out to remove stones, dirt, water and other material which may have entered during installation.
		Add 3.5.8	All conduits entering poles and cabinets shall be sealed with "Duct Seal".
		Add 3.5.9	Conduit depth of bury to be recorded when a trenchless technology method is used.
		Add 3.5.10	Conduit shall not be bent in the field. Only factory bends will be accepted.
3.7	**Electrical**	Delete 3.7.2 and replace with the following	Mount electrical service panels in service base or on poles as shown on Standard Detail Drawings E7.2, E7.6 to E7.9, as well as Coquitlam Standard Detail Drawings SS-E7.3 to SS-E7.5.
3.8	**Wiring**	Delete 3.8.3 and replace with the following	Make conductor splices in handholes. See Standard Detail Drawing E7.11 for splice details.
		Delete 3.8.6 and replace with the following	Wire each luminaire and receptacle separately from the base of pole.
		Delete 3.8.7 and replace with the following	Neatly arrange and bundle wiring in junction boxes, pole handholes and service panels. Conductor connections in all access points to be installed in the up-right position, allowing for easy access
		Delete 3.8.11 and replace with the following	Bond all luminaires and receptacles with No. 12 RW90 green conductor, and steel junction box lids with No. 8 RW90 green conductor.
3.9	**Pole Mounted Receptacle**	Delete 3.9.1 and replace with the following	Pole mounted receptacles to be installed as detailed on the *Contract Drawing* and Coquitlam Standard Detail Drawings SS-E7.19 to SS-E7.23.
3.10	**Luminaires and Photocells**	Add 3.10.4	NEMA wattage label shall be visible at the bottom of the luminaire on all fixtures.

3.11 Grounding & Bonding

Add 3.11.5

Ground plates and grounding conductors are to have a minimum of 5 meters clearance between them and other utility grounding.

Add 3.11.6

Remove all paint around bonding studs on inside of pole to expose the galvanized or metal surface prior to bonding equipment.

3.13 Pole Finish Application

Delete 3.13 and replace with the following

.1 Prior to producing a powder finish product the supplier must provide a Certificate of Compliance indicating that they have met or exceeded the following specifications. The supplier will name their independent testing agency and this information will be submitted to the City for their files.

.2 The application process will be as follows:

.1 The pole or product will be hot dip galvanized.

.2 Powder will only be applied after the product is completely fabricated. No welding or bending will take place after the powder is applied.

.3 The pole or product will be thoroughly cleaned by brush blasting in accordance with SSPC-SP7. The brush blast will maintain a minimum profile of 0.5 mils. If brush blasting is done off site then the product will be covered and shielded from any dirt or moisture during its return to the powder applicators facility. Where poles or products are not kept clean and dry or have any signs of flash rust they will be returned for further brush blasting.

.4 Once at the applicators facility the pole or product will be thoroughly cleaned and dried with an air gun. All hand marks or grease spots will be cleaned with a mild solvent.

.5 After brush blasting the entire pole or product will be pre-baked in an oven at 220 degrees C for at least 30 minutes to 1 hour, depending on steel thickness. The pre-baking must be done to prevent out-gassing during the curing cycle.

.6 The base powder coat will then be applied electrostatically while the pole or product is cooling from the 220 degrees C pre-bake period to allow the powder to melt and fuse to the surface. The base coat will be a minimum of 3 mils in thickness.

.7 After base coat is applied and set the topcoat will be applied to a thickness of 3 to 5 mils. The pole or product will be returned to the oven and heated to 190 to 220 degrees C (temperature will not exceed pre-bake) for a minimum of 25 minutes, depending on steel thickness. Thicker product material may require longer bake cycles to fully cure. Upon removal of the pole or product from the oven it will be left to rest until the pole or product is cool enough to the touch.

.8 Once the topcoat has cured and the poles or product cooled, they will then be individually wrapped (min 4" overlapping method) with 1/8" foam wrap over the entire pole or product. The poles or product will be bundled together and separated with suitable wood dunnage to avoid contact between the poles, product or other bundles. All bundles themselves will be fully wrapped with foam and with stretch-wrap as noted above. The poles or products will be handled and shipped with great care to prevent damage; damaged product will be cause for rejection of the item(s).

.3 Testing process will be as follows:

.1 Each run of product in an oven will have at least one sample tested for:

.2 Adhesion – The finished powder surface will have minimum pull-off strength exceeding 1000 PSI as tested in accordance with ASTM D4541.

.3 Quality – The finished powder surface will be free from any holidays (skips or misses) as tested in accordance with ASTM D4541. The product will also be free from wrinkles, orange peel, cracking, pinholes, fish eyes, blisters, etc by visual inspection.

.4 Color – The color will be verified to be within 3 DE of specialized color.

.5 An independent firm such as CanSpec Testing who are qualified to test powder finish will do the testing at the supplier's expense. The result of tests must accompany the Certificate of Compliance and will be made available to the City or their representative upon request. A supplier who fails to test product as noted above will have their product rejected until the testing is completed and the product deemed acceptable by the testing agency.

.6 Where the tested product fails on a given production run then a minimum of 30 % of the entire production run will be tested. If no other failures are found then the individual failed product will be stripped, reapplied and re-tested until it passes. If any of the 30% of product tested fails then the entire order will be stripped, reapplied and retested until it passes.

.4 Field repairs will be undertaken as required to fix any scratches or imperfections in the final finish. Field repairs will be done as follows:

.1 Feather the damaged area with sandpaper.

.2 Clean area with solvent.

.3 Let dry.

.4 Neatly brush on an application of Aliphatic Urethane Acrylic Semi-Gloss High Build applied at 2-4 mils DFT over the entire sanded and damaged area. The ambient conditions will be dry and over 10 degrees C when the paint is applied.

.5 The pole supplier will warranty the integrity of the surface for a minimum of 1 year from the date of installation. The warranty will include all labour and materials required to provide replacement product if required. The powder finish will be the responsibility of the pole supplier. The warranty will apply to fading, blistering, cracking or chipping of the surface.

END OF SECTION

1.4	**Measurement and Payment**	Delete 1.4.1 and replace with the following	Measurement for 19mm granular base placed underneath walkways, curbs, multi-use pathway or underneath concrete retaining wall of variable thickness will be for actual quantity placed based on weigh tickets provided to Contract Administrator as loads are delivered.
		Add 1.4.2	Measurement for 19mm granular base for each specified thickness will be for the actual area placed.
		Add 1.4.3	Payment for Subsection 1.4.1 & 1.4.2 above includes supply, subgrade preparation, placement, compaction of aggregates, adjustment of moisture content, boning to establish the cross-section, shall be included in the unit price bid in the Schedule of Quantities and Prices.
2.0	**PRODUCTS**		
2.3	**Pit Run Gravel**	Add to 2.3.2	The use of recycled concrete shall be approved by the *Contract Administrator* and the City prior to use.
		Add 2.3.3	Asphalt millings free from contaminated and other extraneous material, conforming to the specified gradations may be used as pit run gravel. The use of asphalt millings shall be approved by the *Contract Administrator* and the City prior to use.
2.7	**Granular Pipe Bedding and Surround Material**	Add to 2.7.1	All recycled or other extraneous materials shall be approved by *Contract Administrator* and the City prior to use.
2.10	**Granular Base**	Delete 2.10.2	
		Add 2.10.3	All 25 mm minus granular base is to conform to the following gradation specifications for Collector / Arterial Roads:

Sieve Designation (mm)	Percent Passing (%)
25	100
19	80-100
12.5	75-90
9.5	50-85
4.75	35-70
2.36	25-50
1.18	15-35
0.30	5-20
0.075	0-5

		Add 2.10.4	The intention of the Gradation Chart is to identify the desired mix of size of aggregate in the granular base. The Target Percentage Passing is the middle of the shown Range. Tests that show sieve values of Percent Passing that are consistently low or consistently high in two (2) or more consecutive tests will be considered to be non-conforming.

2.11	**Recycled Aggregate Material**	Delete 2.11.1 and replace with the following	Aggregates containing recycled material may be utilized if approved by the Contract Administrator and the City. In addition to meeting all other conditions of the specifications, recycled material should not reduce the quality of the construction achievable with quarried materials. Recycled material shall consist only of aggregates, crushed portland cement concrete, or asphalt that is free of impurities.

END OF SECTION

1.4	**Measurement and Payment**	Delete 1.4.1 and replace with the following	Payment for all work, unless included in the Schedule of Quantities and Prices, performed under this section will be incidental to payment for Work described in other Sections. Clearing and grubbing includes removal and disposal of all branches, stumps, trees, debris, hedges, timbers, logs and vegetation to complete the work and as shown on the Contract Drawings or as directed by the Contract Administrator. Works include cutting of branches affected by Work to create the necessary clearance to accommodate the construction and intended function of the Work, and as shown on Contract Drawing. Payment includes trimming of small branches from trees or hedges as required to provide minimum 2.5m vertical and 0.5m horizontal clearance from edge of new road. Branch cutting/pruning to have a clean cut flush to branch collar and use of an approved tree paint to repair damage to surviving vegetation where branches have been removed. Existing grass and top soil removal will be paid under Common Excavation, less the portion under Grubbing as defined in Clause 1.2.

END OF SECTION

2.0 PRODUCTS

2.1	**Materials**	Add 2.1.10	Protective Fencing: Posts - Pressure treated wood 100 mm dia.; Post to be 1.8 m to 2.0m in height at 2.0 m O.C. Snow fence as per Coquitlam Approved Products List; Flagging Tape - 4" Orange glow - 'Tree Retention Area'.

2.0 EXECUTION

3.1	**Existing Trees**	Add 3.1.7	The Contractor is responsible to minimize damage to all trees which are to remain.
		Add 3.1.8	The Contractor will be responsible for all claims and costs including the cost of examination by an Arborist, repair, removal and replacement of trees, as required by the Arborist, the Contract Administrator and the City for tree damage where proper notification was not received from the Contractor. Damage will be assessed based on the International Society of Arboriculture Guidelines. The term shall be for a period of one year following the date of Substantial Performance of the Work.
		Add 3.1.9	Place protective fencing/barricades as detailed on Coquitlam Standard Detail Drawings COQ-R26, where shown on *Contract Drawings*. Contractor shall maintain fence in good condition during construction.
		Add 3.1.10	When work is to be performed inside fenced areas, Contractor shall take care to avoid damage to existing vegetation. Work to be done inside areas of existing vegetation to be retained includes: .1 Removal of isolated trees as directed by the Contract Administrator and the City. .2 Selective pruning and tree removal at edges to create tidy and well-shaped forest edge. .3 Placing planting soil and planting of trees.
		Add 3.1.11	Do not park, service or fuel vehicles within the vegetation retention areas.
3.4	**Pruning**	Add 3.4.2	Do not cut roots or branches of retained trees without approval of the Contract Administrator and the City.

END OF SECTION

1.4	**Measurement and Payment**	Delete 1.4.1 and replace with the following	Payment for reshaping existing roadbed includes all spreading and grading of materials, adjustment of moisture content, compaction, boning and disposal of excess material offsite to establish the road existing cross-sections.
		Delete 1.4.2 and replace with the following	Payment for additional granular base material required for reshaping described above will be made under Section 32 11 23S Granular Base.
		Delete 1.4.3 and replace with the following	Payment for excavation of unsuitable materials including disposal off-site prior to reshaping granular roadbed will be made under Section 31 24 13S – 1.8.10 Roadway Excavation, Compaction and Backfill.

END OF SECTION

1.8 Measurement and Payment

Delete 1.8.4 and replace with the following

Payment under this item will only apply to removal of the components included in this item under a separate operation as shown on the Contract Drawings or as directed by the Contractor Administrator. No payment will be made under this item for removal of these components as part of the operation for common excavation, and such removal will be treated as common excavation.

Payment will be made at the respective unit prices bid in the Schedule of Quantities and Prices and will include sawcutting, removal, offsite disposal and all labour, and equipment required to complete the work, including offsite disposal. It is the responsibility of the contractor to locate and verify all utilities.

Delete 1.8.5 and replace with the following

Payment for Common Excavation includes:

1. Unless noted in the Schedule of Quantities and Prices as removal in square meters, common excavation will be measured in cubic metres calculated from measurements taken by the Contract Administrator in the areas of excavation (stripping inclusive).

2. Cross-sections will be taken after clearing and grubbing immediately prior to excavation of material to be incorporated into work.

3. Cross-section will be taken after excavation to deisgn elevation and prior to placement of fill.

4. Where determined by the Contract Administrator that truck box volume will be used to determine excavation quantities, the table below will be used.

Truck Type	Material Type	Volume (cu.m)
Tandem	ordinary material	7
Tandem	asphalt/concrete/pipe	4
Triaxle	ordinary material	8
Triaxle	asphalt/concrete/pipe	5
Tandem and Pony	ordinary material	11
Tandem and Pony	asphalt/concrete/pipe	7.5
Triaxle and Pony	ordinary material	13
Triaxle and Pony	asphalt/concrete/pipe	9
Tandem and Transfer	ordinary material	19
Tandem and Transfer	asphalt/concrete/pipe	13

5. Contractor to provide truck slips detailing location type of common excavation, time loaded and location of dump site. The slips are to be given to Contract Administrator by the end of shift or Contract Administrator can deny quantities subsequently submitted.

6. Payment for on-site reuse includes grading, adjustment of moisture content and compaction of the reused material

Payment will be made at the respective unit prices bid in the Schedule of Quantities and Prices and will include all labour, and equipment required to complete the work, offsite disposal, and includes all costs associated with temporarily supporting utilities and

			third party utilities within the excavation. It is the responsibility of the contractor to locate and verify all utilities.
		Delete 1.8.7 and replace with the following	Payment for lightweight fill (pumice) shall include transport, temporary stockpiling, dewatering of excavation, supply and installation of geotextile, placement and compaction as per provided Geotechnical Report requirements, spreading and grading to the limits as shown on the Contract Drawings. Payment will be made per cubic metre basis. Measurement will be made based on neatline survey of the excavated area.
		Add 1.8.7.1	Payment for reinstating pipe pipe zone for existing utilities includes supply and installation of granular pipe bedding gravels, non-woven geotextile surround, and all labor and materials needed to complete installations as shown in Contract Drawings. Payment will be made per lineal metre basis.
		Add 1.8.7.2	Payment for abandoned watermain removal includes excavation, offsite disposal, supply and installation of (2) permanent caps, and all labour and materials needed to complete the work as described in Contract Drawings.
2.0	**PRODUCTS**		
2.2	**Specified Materials**	Delete 2.2.1.3	Pit Run Sand
		Delete 2.2.1.4	River Sand
		Delete 2.2.2 and replace with the following	Lightweight Fill (Pumice) Refer to Geotechnical Report by Kontur for material specifications for lightweight pumice fill and for placement requirements.

END OF SECTION

1.5 Measurement and Payment Add 1.5.4

Payment for this item will be made for the depth specified in the Schedule of Quantities in the Form of Tender. Payment will be made for the removal of existing asphalt, granular and native materials within the roadway to the depth specified, as detailed in the Contract Documents, regardless of removal method, as conditions of the existing asphalt pavement may or may not be suitable for removal by cold milling operations. If asphalt removal is done by excavation methods, there will be no common excavation quantity associated with the removal of granular to the removal depths indicated below design elevations.

Payment will be made for each square metre of asphalt removed and includes the off-site disposal of all milled material. Payment includes mobilization, demobilization, demonstration milling test section, the cost of transport and disposal off-site, saw cutting, street sweeping or cleaning to allow for the placement of required thickness of asphaltic concrete. Saw cutting and milled key at project limits will be incidental under payment item 32 12 16 – Hot Mix Asphaltic Concrete Paving.

MILLING OF EXTENSIVE AREAS THAT CANNOT BE PAVED WITHIN 48 HOURS PERIOD (2 DAYS) WILL NOT BE PERMITTED.

No additional payment will be made for multiple passes or remobilization, as required, to mill to the depth(s) specified in the Schedule of Quantities in the Form of Tender.

END OF SECTION

1.4	**Measurement and Payment**	Delete 1.4.1 and replace with the following	Measurement for granular subbase of variable thickness will be for actual quantity placed based on weigh tickets provided to Contract Administrator as loads are delivered.
		Delete 1.4.2 and replace with the following	Measurement for granular subbase for each specified thickness will be for the actual area placed.
		Delete 1.4.3 and replace with the following	Payment for Subsection 1.4.1 & 1.4.2 above includes supply, placement and compaction of granular subbase material, adjustment of moisture content, and boning to establish the road cross-section, shall be included in the unit price bid in the Schedule of Quantities and Prices. Payment includes submission of tickets as loads are delivered. Tickets not submitted within 72 hours of load delivery to site will not be paid.
		Delete 1.4.4 and replace with the following	Payment for removal of unsuitable subgrade including disposal off-site prior to direct placement of granular subbase will be made under Section 31 24 13S – Roadway Excavation, Embankment and Compaction.
2.0	**PRODUCTS**		
2.1	**Specified Materials**	Delete	2.1.1.1: Select Granular Subbase 2.1.1.2: 75 mm Pit Run Gravel 2.1.1.4: Pit Run Sand 2.1.1.5: Approved Native Material 2.1.1.7: River Sand

END OF SECTION

1.4	**Measurement and Payment**	Delete 1.4.1 and replace with the following	Measurement for granular base of variable thickness will be for actual quantity placed based on weigh tickets provided to Contract Administrator as loads are delivered.
		Delete 1.4.2 and replace with the following	Measurement for granular base for each specified thickness will be for the actual area placed.
		Delete 1.4.3 and replace with the following	Payment for Subsection 1.4.1 & 1.4.2 above includes supply, placement and compaction of granular base material, adjustment of moisture content, and boning to establish the road cross-section, factored into the unit price bid in the Schedule of Quantities and Prices. Payment includes submission of tickets as loads are delivered. Tickets not submitted within 72 hours of load delivery to site will not be paid.
		Delete 1.4.4 and replace with the following	Payment for removal of unsuitable subgrade including disposal off-site prior to direct placement of granular subbase will be made under Section 31 24 13S – Roadway Excavation, Embankment and Compaction.
2.0	**PRODUCTS**		
2.1	**Granular Base**	Add 2.1.1.3	19 mm minus crushed gravel conforming to the gradation specifications for Collector/Arterial Roads under Section 31 05 17S – 2.10.3.
3.0	**EXECUTION**		
3.5	**Proof Rolling**	Delete 3.5.1 and replace with the following	For proof rolling, use fully loaded single axle, to 80 KN (18, 000 lb) minimum, dump truck.
		Add 3.5.7	Prior to paving with asphalt concrete, the base surface shall be checked by the *Contract Administrator* and the City, for deflections utilizing a Benkelman Beam, in order to ensure that the final rebound requirements can be obtained with the asphalt pavement. In the event that such deflection is in excess of those required to produce the final standards, then the base shall be adequately strengthened by additional gravel or asphalt concrete to insure that final deflections as follows are not exceeded. The Benkelman spring rebound value of the completed pavement surface shall not at any point exceed 0.75 mm for arterial industrial roads and lanes, 1.15 mm for collector roads, and 1.5 mm for local roads and lanes as determined in the procedures outlined in the Transportation Association of Canada publication "Pavement Management Guide."

END OF SECTION

1.5	**Measurement and Payment**	Delete 1.5.1 and replace with the following	Payment for all work performed under this Section will be incidental to payment for work described in other Sections unless shown otherwise in the Schedule of Quantities and Prices.
		Delete 1.5.2 and replace with the following	Pavement surface cleaning, as per section 32 01 11, and all other work incidental to the application of tack coat is deemed to be incidental to payment for work described in other Sections unless shown otherwise in the Schedule of Quantities and Prices.
3.0	**EXECUTION**		
3.2	**Application**	Add to 3.2.3	Asphalt tack coat to be applied using a truck mounted spray bar unless otherwise approved by the *Contract Administrator* and the City. Contractor shall demonstrate, to the *Contract Administrator* and the City, prior to application that all spray nozzles are operational and providing a consistent application.

END OF SECTION

1.0	**GENERAL**		
1.4	**Submission of Mix Design**	Delete 1.4.1 and replace with the following	Submit asphalt concrete mix design, including RAP content and trial mix test results to Contract Administrator for review at least two weeks prior to commencing work.
1.5	**Measurement and Payment**	Delete 1.5.1 and replace with the following	Payment for asphaltic concrete paving includes all construction joint preparation, surface milling to tie into existing asphalt, saw cutting, supply and placing of the asphaltic concrete, compaction and cleaning frames, covers and lids of castings affected and taped temporary pavement markings. Curb face cleaning of dust and debris prior to asphalt paving will be considered incidental to the work as described above. Measurement for asphaltic concrete paving for the specified design mixes will be made at the respective unit prices bid in the Schedule of Quantities and Prices and incorporated into Work will be asphalt concrete actually based on weigh tickets provided to the Contract Administrator as loads are delivered. Payment includes submission of tickets as loads are delivered. Tickets not submitted within 24 hours of load delivery to site will not be paid. The contractor will not receive any additional compensation above the respective unit prices bid in the Schedule of Quantities and Prices for Hand Work, Special Equipment & Machinery to complete the Hot Mix Asphaltic Paving Work as shown on the Contract Drawings or as directed by the Contract Administrator. **MILLED SURFACES MUST BE PAVED WITHIN 48 HOURS PERIOD (2 DAYS).**
		Delete 1.5.3 and replace with the following	Payment for machine/hand placed asphaltic concrete driveways includes all construction joint preparation, tie-in to curb, tie-in to new or exisiting asphalt, saw cutting, supply and placing of the asphaltic concrete, tack coat, compaction, cleaning frames, covers and lids of castings affected. Measurement for asphaltic concrete paving for the specified design mixes will be made at the respective unit prices bid in the Schedule of Quantities and Prices will be made for asphalt concrete actually based on weigh tickets provided to the Contract Administrator as loads are delivered. Payment includes submission of tickets as loads are delivered. Tickets not submitted within 24 hours of load delivery to site will not be paid. Payment for this item includes all applicable materials, specifications and work described in 1.5.1.
1.6	**Inspection and Testing**	Add 1.6.3	Test cores are to be taken in the areas of new paving and will include cores along construction joints to ensure compliance with the required design and compaction.
2.0	**PRODUCTS**		
2.1	**Materials**	Add 2.1.2.1	Usage of recycled asphalt shingles or any other materials not specified in the Contract Documents will not be permitted.

		Add 2.1.2.2	Usage of softening agents, rejuvenators, or recycling agents will not be permitted.
2.2	**Mix Design**	Delete 2.2.2 and replace with the following	Mix may contain up to a maximum of 10 % by mass of RAP for Upper Course Asphalt and 15 % by mass of RAP for Lower Course Asphalt without a special mix design. The *Contract Administrator* and the City may approve higher proportion of RAP if *Contractor* demonstrates ability to produce mix meeting requirements of the specification.
		Delete 2.2.3.2 Marshall Stability and replace with the following	Marshall Stability at 60ºC for both lower and upper courses to be 10 KN min.
3.0	**EXECUTION**		
3.3	**Preparation**	Delete 3.3.3 and replace with the following	The *Contractor* is responsible for adjusting all utility manhole frames and valve boxes, belonging to Coquitlam and/or other agencies that are affected by the road works. All adjustments to utilities must be completed to the satisfaction of the utility owner. Utility adjustment within the paved surface will be considered incidental to the *Work* unless otherwise noted in the *Contract Documents*. The *Contractor* should note that certain utility owners may decide to complete their own adjustments. The *Contractor* will be required to cooperate with any utility company providing their own adjustments. The *Contractor* shall be responsible to contact the appropriate utility company with in minimum of seventy-two (72) hours of the work. No adjustment shall be made without the written approval of the utility company. <u>All manholes must be vertically adjusted a minimum of twenty-four (24) hours prior to paving.</u> The use of riser rings for adjusting manhole frames and value boxes will not be permitted.
3.7	**Joints**	Delete 3.7.5 and replace with the following	Construct lap joints at locations as shown on the *Contract Drawings* and as directed in the field by the *Contract Administrator* and the City.

END OF SECTION

1.0 GENERAL

1.2	**Scope**	Delete 1.2.1 and replace with the following	Pavement Markings: Miscellaneous taped temporary and permanent pavement paint markings including pedestrian crosswalk, merge and diverge markings, stop lines, solid and broken line road lane markings including edge lines of merge and diverge markings, bike symbols, etc. to be provided as shown on the *Contract Drawing*.
1.5	**Measurement and Payment**	Delete 1.5.2 and replace with the following	All permanent markings shall be marked with thermoplastic road markings as specified under Section 32 17 23S, 2.1 Materials, unless shown otherwise in the Schedule of Quantities and Prices.
		Delete 1.5.3 and replace with the following	The lump sum payment for permanent thermoplastic pavement markings includes eradication of existing pavement markings as shown on the Contract Drawings, and covers supplying all materials and completing all the permanent thermoplastic pavement markings necessary to provide markings as shown on the Contract Drawings. NOTE: PAYMENT FOR PERMANENT THERMPOPLASTIC PAVEMENT MARKINGS WILL NOT BE MADE UNTIL ALL TEMPORARY PAVEMENT MARKINGS AND REFLECTIVE DEVICES HAVE BEEN REMOVED.
		Delete 1.5.4 and replace with the following	Payment for signage includes all sign poles, bases, sleeves, sign relocations and sign installations (complete). The City will supply all sign tabs as required. .1 Installation of each new sign pole, cap, sleeve and trapezoidal base includes all costs to supply all materials, labour and equipment and incidentals necessary to the sign structure as shown on the Contract Drawings and as directed by the Contract Administrator. .2 Installation of each sign City supplied aluminum sign on a lamp standard pole or sign pole includes sign mount clamps and all costs to supply all materials, labour and equipment and incidentals necessary to install each sign as directed by the Contract Administrator. .3 Installation of each new City supplied aluminum sign installed on an existing sign pole includes sign mount clamps and all costs to supply all materials, labour and equipment and incidentals necessary to install each sign as directed by the Contract Administrator.

2.0 PRODUCTS

2.1	**Materials**	Delete 2.1.1 and replace with the following	All permanent paint markings shall be marked with thermoplastic manufactured by LAFRENTZ Road Markings, HITEX North America (HiBrite Extrude Thermoplastic), or ENNIS-FLINT (Extruded Thermoplastic).
		Delete 2.1.6 and replace with the following	Pavement Markings:
		Delete 2.1.7 and replace with the following	Thermoplastic material .1 Material composition shall be at the discretion of the manufacturer subject to the approval of the Contract

Administrator and the City. Each formulation shall be identified by a code number.

.2 No retained water when tested by ASTM D-570.

.3 Specific gravity of the supplied product shall be within 3 % of that specified for the selected formulation.

.4 Material shall not deteriorate upon contact with deicing chemicals, gasoline, diesel fuel or grease dropped by traffic.

.5 Material shall not break down, deteriorate, scorch or discolour, if held within the application temperature range specified by the manufacturer for a period of four hours and it must be able to be reheated from room temperature to the application temperature four (4) times without showing any of these detrimental effects.

.6 When applied at the temperature recommended by the manufacturer and at a film thickness of 2 to 4 mm, the material shall set solid and show no tracking under traffic after elapsed times as follows:

.1 Two (2) minutes at an air temperature of 10° C, relative humidity less than 75 %, and road surface temperature from 10° C to 20° C.

.2 Five (5) minutes at an air temperature of 32° C, relative humidity less than 75 %, and road surface temperature from 35° C to 50° C.

.3 The drying time under conditions intermediate between the two air temperatures shall be interpolated using a straight line model.

.7 The quantity, type, and gradation of the component reflecting glass spheres premixed in the thermoplastic material shall be at the discretion of the manufacturer, but shall provide retroreflection levels specified below.

Add 2.1.10

Snowplowable Raised Pavement Markers (RPMs) shall be Stimsonite (Ennis) model# 101PL series marker. Install per manufacturers procedures.

Add 2.1.11

Green Surface Treatment:

.1 Material approved shall be “Traffic Patterns” thermoplastic by Ennis-Flint or MMA (Methyl Methacrylate).

.2 The MMA Skid Resistant Material shall meet the following requirements:

.1 Be Ultra-Violet Stable.

.2 Be ISO Certified Durable Road Marking Material.

.3 Utilize 0.5mm – 1mm aggregate within the MMA to create skid resistance of 49 BPN.

.4 Green Colour (Pantone #) to be approved prior to application.

.3 Product details and specification to be submitted to *Owner* for Final Approval.

3.0 EXECUTION

3.3 Application

Add to 3.3.1.3

Temporary raised pavement markings (TRPMs) are to be provided on all collector and arterial roadways as directed by the *Contract Administrator* and the City.

Delete 3.3.3.3 and replace with the following	Thermoplastic material shall be heated in the melter to a temperature of 382 °F.

END OF SECTION

1.5	**Measurement and Payment**	Delete 1.5.4 and replace with the following	Payment for the installation of handrails includes excavation of existing posts, offsite disposal of existing materials and all materials, labour and incidentals required as shown in MMCD C14 to install new handrails. Measurement will be made along the surface of the ground for length of each item of handrail installed.

END OF SECTION

1.0 GENERAL

1.0	**General Requirements**	Delete 1.0.1 and replace with the following	.1	Section 32 91 21 refers to those portions of the Works that are unique to the supply, placement and finish grading of Growing Medium. This section must be referenced to and interpreted simultaneously with all other sections pertinent to the Works described herein. For the purpose of this specification, the term "Growing Medium" shall mean a soil produced offsite by homogeneous blending of mineral particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth and the term “Topsoil” shall mean on-site native or surface soil material which may be used as Growing Medium provided it meets standards set for imported material Growing Medium and can be modified to meet the requirements set out for specified Growing Medium.
		Add 1.0.3	.3	For the purpose of this specification, the term ‘Soil-Testing Laboratory’ shall mean an independent laboratory, recognized by the landscape nursery industry, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
1.4	**Measurement and Payment**	Delete 1.4.1 and replace with the following	.1	Payment for growing/planting medium, top soil and bark mulch will be made separately for each type and includes supply of material, on-site handling, preparing the landscape area subgrade, placing, grading, raking, compacting (top soil), application of fertilizers complete with filter fabric where specified. Payment for growing medium will be for actual volume placed onsite.
1.5	**Inspection and Testing**	Delete 1.5 and replace with the following	.1	The Contractor is responsible for testing imported Growing Medium and all related cost incurred. Testing shall be carried out by an approved Soil Testing Laboratory.
			.2	The sample analysis shall be of tests done on the proposed Growing Medium from samples taken at the supply source within a minimum of 14 days in advance of Growing Medium placement. Allow 7 days for soil testing by the laboratory for each sample. The sample shall be picked up by the Soil Testing Laboratory from the supply source. The Growing Medium sample shall be a composite of at least three (3) samplings for the proposed source and shall be at least one (1) litre in volume.
			.3	Forward a copy of all test results directly to the Contract Administrator and the City for review. The analysis shall outline the testing laboratory’s required amendments such as sand, organic matter, fertilizers and lime to achieve adequate growing conditions.
			.4	The Contractor shall not deliver any Growing Medium to the site until the test results have been reviewed and approved by the Contract Administrator and the City.
			.5	All submitted soil analysis must be dated and include supplier name and phone number, project location and submitted to Contract Administrator and the City for approval prior to commencing work. Soil analysis shall include measurements of: .1 Percent sand, fines, silt and clay .2 Organic matter to 100%

.3 pH, acidifying additive required to achieve noted herein
.4 Water soluble salts
.5 Total carbon to nitrogen ration
.6 Total nitrogen and available levels of phosphorus, potassium, calcium & magnesium

.6 At the discretion of the Contract Administrator and the City submit up to two (2) additional samples, at intervals outlined by the Contract Administrator and the City, of Growing Medium taken from material delivered to the site. Samples shall be taken form a minimum of three (3) random locations and mixed to create a single uniform sample of testing. Results of these tests shall be forwarded to the Contract Administrator and the City for review.

.7 The Contractor is responsible for soil analysis and requirements for amendments to supply Growing Medium as specified. Failure to satisfy these contractual requirements could result in the Contractor being required to remove unacceptable Growing Medium at their expense.

.8 Notify the Contract Administrator at least forty-eight (48) hours prior to Growing Medium placement for inspection.

.9 Refer to General Conditions, Clause 4.12 Tests and Inspections.

1.6 Product Handling — Add 1.6

.1 All materials to be handled and adequately protected to prevent damage. Do not handle Growing Medium in an excessively wet, extremely dry, frozen condition or in any manner in which structure may be adversely affected. Growing Medium whose structure has been damaged by handling under these conditions shall be rejected and shall be replaced by the Contractor at their expense.

.2 Stockpile materials in bulk form in paved areas or in pre-approved areas of the site. Provide additional protection of storage under roof or tarpaulins.

.3 Take all precautions to prevent contamination of Growing Medium and amendments from wind blown soil particles, weed seeds and from insects. Contamination of the Growing Medium and amendments may result in their rejection for use.

.4 Store fertilizer and chemical amendments in the manufacturer's original containers.

.5 All Growing Medium shall be delivered to site premixed from a recognized Growing Medium source ensuring consistency throughout the mix.

2.0 PRODUCTS — Delete 2.0 and replace with the following

2.1 Materials

.1 Growing Medium Preparation

.1 Shall be prepared from Compost Material with Sand and other Soil Amendments as required to meet the specifications herein.

.2 Ensure commercial processing and mixing of Growing Medium components are done thoroughly by a mechanized screening process. Do not mix the components by hand. Ensure the resulting product is a homogeneous mixture having the required properties throughout free of stones 25 mm or larger in any dimension, woody plant parts, toxic materials, foreign object and other extraneous materials harmful to plant growth. Provide composted soil free from crabgrass,

couch grass, equisetum, convolvulus, or other noxious weeds or seed or parts thereof.

.2 Inorganic Soil Amendments

.1 Sand: Imported pit sand or river pump sand, free of impurities, chemicals, horsetails, and other noxious weeds. The saturation extract electrical conductivity of salinity shall not be greater than 3.0 millimhos/cm at 25 degrees C.

Sieve Size (mm)	Percent passing (%)
4.75	95-100
0.50	0-40
0.050	0-5

.2 Fertilizers: Uniform in composition, free flowing and dry, granular, pill form, or pelleted commercial product with 50% of total nitrogen (if applicable) derived from natural organic material in a slowly available form delivered in unopened water proof containers with the manufacturer's guaranteed N-P-K analysis, type and trade name attached to each container. The planting soil test results will specify a formulation and application rate to achieve the levels of nitrogen, phosphorous and potassium required. Fertilizer to meet the requirements of the Canada Fertilizer Act.

.1 Lime: ASTM C 602, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent and as follows:

.1 Class: Class T, with a minimum 99 percent passing through No. 8 (2.36 mm) sieve and a minimum 75 percent passing through No. 60 (0.25 mm) sieve.

.2 Provide lime in form of dolomitic limestone.

.3 Perlite: Horticultural perlite, soil amendment grade.

.3 Organic Soil Amendments

.1 Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 25 mm sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:

.1 Organic Matter Content: 50 to 60 percent of dry weight containing no cedar, redwood, wood or bark.

.2 Colour: dark brown to black in colour.

.2 Peat:

.1 Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.

.3 Wood Residual

.1 Content of wood residuals such as Fir or Hemlock sawdust present in the Growing Medium shall not cause the total carbon to total Nitrogen ration to exceed 40:1.

.2 Cedar or redwood sawdust shall not be present in Growing Medium.

.4 Manure
- .1 Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth and free from salt or other harmful chemicals, such as any used to artificially hasten decomposition.
- .2 All particles in manure to pass a 6.35 mmm sieve.
- .3 Salt content shall give a reading of less than 0.5 millimhos/cm at 25 degrees C.

2.2 Nutrient Requirements

.1 Nutrient requirements shall meet the BCSLA/BCNTA Landscape Standard Growing Medium requirements for nitrogen, phosphorus, potassium, calcium, magnesium, boron, sodium cation exchange capacity, carbon to nitrogen ratio.
- .1 Boron: not to exceed 1.0ppm
- .2 Sodium: Sodium absorption ratio(SAR) not to exceed 8.0
- .3 Total Nitrogen: to be 0.2-0.4% by weight
- .4 Available Phosphorous: to be 50-100 ppm
- .5 Available Potassium: to be 50-70 ppm
- .6 Cation Exchange Capacity: to be 30 to 50 meq.
- .7 Carbon to nitrogen ratio: Maximum 40:1.

2.3 Salinity

.1 The electrical conductivity of the liquid taken from the soil pH evaluation shall not exceed 3.0 millimhos/cm at 25 degrees C before additions of fertilizers and/or liming agents.

2.4 Drainage Rate

.1 Percolation shall be such that mixing, handling and placement to be done in such a manner that the minimum saturated hydraulic conductivity show on Table – 'Growing Medium Properties for Different Applications' (found herein these specifications) is achieved and no standing water is visible 60 minutes after at least 10 minutes of moderate to heavy rain or irrigation.

2.5 Growing Medium Source

.1 Import planting medium or manufactured planting medium from off-site sources. Do not obtain from agricultural land, bogs or marshes.

.2 Supplier of Growing Medium shall be as per the Coquitlam Approved Products List.

2.6 Bark Mulch

.1 Mulch backfilled surfaces of planting beds and other areas indicated on drawings.
- .1 Organic Mulch: Apply 50 mm average thickness of organic mulch, and finish level with adjacent Finish Grades. Do not place mulch against plant stems.

.2 Supplier of Bark Mulch shall be as per the Coquitlam Approved Products List.

.3 Dark brown in colour and free of all soil, stones, roots or other extraneous matter, and free of weeds, seeds and spores.

2.7 Growing Medium Properties for Different Applications

Properties	Low Traffic Lawn Areas, Trees and Large Shrubs	High Traffic Lawn Areas	Planting Areas, Planters Shrubs & Groundcover
Texture: Particle size classes by Canadian System of Soil Classification	Percent of Dry Weight Mineral Fraction (%)		
Gravel (greater than 2 mm less than 75 mm)	0-10	0	0
Sand (greater than 0.05 mm and less than 2 mm)	50-70	80-90	50-70
Silt (larger than 0.002 mm and less than 0.5 mm)	10-30	5-20	10-30
Clay (less than 0.002 mm)	7-20	2-5	7-20
Organic Content Percent of Dry Weight	5-10	3-5	25-30
Drainage Minimum saturated hydraulic conductivity (cm/hr) in place	2.0	7.0	2.0
Acidity (pH)	6.0-6.5	6.0-6.5	5.0-6.0

2.8 Miscellaneous Products

.1 Root Barrier: 400x610 mm linear root barrier, copolymer polypropylene, 50% recycled plastic, black in colour. Supplier of Root Barrier shall be as per the Coquitlam Approved Products List.

.2 Construction Adhesive shall be as per the Coquitlam Approved Products List.

.3 Drain Mat: Light duty, uv stable, impermeable cuspated core bonded to a layer of non-woven filter fabric with the following minimum properties:

.1 Compressive Strength -718 kN/m2 as per ASTM D-1621
.2 Flow Rate – 188 l/min/Metre as per ASTM D-4716
.3 Approximate profile thickness of 10 mm.
.4 Supplier of Drain Mat shall be as per the Coquitlam Approved Products List.

.4 Filter Fabric: Install root barriers in accordance with manufacturer's reviewed installation instructions where indicated on reviewed drawings with vertical root directing ribs facing inwards towards trees or plants; connect panels together as required.

1. Supplier of Filter Fabric shall be as per the Coquitlam Approved Products List.

.5 Drain Rock: Shall consist of clean round stone or crushed rock. Acceptable material includes 19 mm drain rock or torpedo gravel conforming to the following gradations.

Percent Passing		
Sieve Designation	Coarse	Fine (Torpedo gravel)
25 mm	100	
19 mm	0-100	
9.5 mm	0-5	100
4.75 mm	0	50-100
2.36 mm		10-35
1.18 mm		5-15
0.60 mm		0-8
0.30 mm		0-5
0.15 mm		0-2

2.9 Structural Soil

.1 Soil stabilizer shall be friable, containing a minimum of 4% and maximum of 6% organic matter by dry weight, free from stones and debris over 30 mm. Acidity (ph) shall be in the range 5.5-7.5. Carbon to nitrogen ratio shall not exceed 40:1, and salinity shall not exceed 3.0 milliohms at 25 deg C. Gravel greater than 2 mm shall not exceed 10% of total weight.

.2 Supplier of Structural Soil shall be as per the Coquitlam Approved Products List.

.3 Growing Medium to be a gap-graded mixture.

.4

Texture of Growing Media	Percentage of mixture
Gravel: greater than 2 mm-less than 75 mm	0%
Sand: greater than 0.0 5mm-less than 2 mm	max 60%
Silt: greater than 0.002-less than 0.0 5mm	max 35%
Clay: less than 0.002mm	max 15%
Clay and silt combined	max 40%
Acidity (pH)	6.0-7.0
Drainage: minimum saturated hydraulic Conductivity (cm/hr) in place	3.0
Salinity: saturated extract conductivity shall not exceed	3.0 milliohms/cm at 25 degC
Organic content: percent of dry weight	8-12%

.5 Stone ballast: Clean inert stone of high angularity is preferred over washed gravel. Stone dimension aspect ratio should be 1:1:1 with a maximum 2:1:1 length:width:depth. Single size stone, 60 mm-75 mm clear sieve designation: Blasted Quarry Rock. Aggregate to be used for structural soil shall be free of any foreign elements or material.

.6 Structural Geotextile
Shall be installed as a structural filter layer directly above the compacted structural soil mixture. Do not install fabric until adequate compaction of the structural soil mixture has been confirmed. Filter fabric shall be selected and deigned to withstand wear and tear during construction without deterioration of its strength and filtering properties.

.1 Supplier of Geotextile shall be as per the Coquitlam Approved Products List.

.7 Ground dolomite limestone containing no less than 85% of its total weight as calcium carbonate and magnesium carbonate shall be used to control ph level. The degree of grind for the limestone shall allow 100% of the total weight to pass a #10 (2 mm) sieve, 90% to pass a #18 (1 mm) sieve and 20% to pass a #40 (0.105 mm) sieve. Spread-easy fertilizer shall be used as a slow release fertilizer source of calcium and magnesium.

.8 Mixing of structural soil:
Blend as per following ratios:
.1 5 metric tones (MT) of aggregate
.2 1 cubic meter of growing media
.3 2 kg soil stabilizer

.9 Moisten mixture with fine spray of clean potable water while mixing to activate soil stabilizer product. Do not over mix. Place mixture in 300 mm lifts through entire area of structural soil mixture. Compact each lift to 95% MPD prior to placement of next lift. Install filter fabric such to ensure a minimum of 60 cm overlap of all fabric seams and beyond edge of structural soil.

2.10	**Growing Medium**	Add 2.10.18	Growing medium to be planter blend equivalent to "Level 2P" planter mix and complaint with Canadian Landscape Standards. Refer to "Level 2P Groomed" properties as per Table 6.3.5.3 "Properties of growing media for Level 2 Groomed and Level 3 Moderate Areas" of the Canadian Landscape Standard, page 83 complete).
		Add 2.10.19	All preparation and installations of growing medium to comply with Canadian Landscape Standards (typical).
3.0	**EXECUTION**		
3.2	**Preparation of Subgrade**	Delete 3.2.4 and replace with the following	Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials, soil contaminated with calcium chloride, toxic materials and petroleum products, and debris which protrudes more than 25 mm above the surface. Dispose of all removed material off site to approved offsite disposal area at no additional cost to the Owner.
		Delete 3.2.5 and replace with the following	Course cultivate entire area which is to receive Growing Medium to depth of 250mm. Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.
		Add 3.2.6	Grade transitions shall be smooth and even and shall blend into surrounding areas as determined by the Contract Administrator and the City.
		Add 3.2.7	Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
3.3	**Processing Growing Medium**	Add 3.3.4	Growing Medium shall be imported and stockpiled on site in a location approved by the Contract Administrator and the City.

.1 Carry out stock piling operation such that the Growing Medium structure is not compromised through compaction, vibration or other actions.

.2 Stock piled Growing Medium shall be protected from rain, drying and contaminants.

.3 Growing Medium shall be free of subsoil, pests, roots, wood, construction debris, undesirable grasses including crabgrass or couch grass, noxious or weeds and weed seeds or parts thereof foreign objects and toxic materials. Presence of these contaminates shall be grounds for rejection of Growing Medium and replacement at no cost to the Owner.

3.4	**Placing Growing Medium**	Delete 3.4.2 and replace with the following	Place Growing Medium to the required finished grades with adequate moisture, in uniform lifts of 100 mm to 150 mm compacted

			to 80 MPD during dry weather, over dry, unfrozen Sub Grade where planting is indicated free of any standing water.
		Delete 3.4.5 and replace with the following	Minimum depths after settlement and 80% compaction: .1 Trees pits: 900 mm .2 Shrub beds: 450 mm .3 Ground cover areas: 300 mm .4 Lawn areas: 300 mm .5 Blvd. areas: 150 mm
		Add 3.4.6	Increase sand content to 90% in the planting soil below lawns where heavy wear by pedestrians or maintenance equipment is anticipated. Increase sand content in a 1.5m wide strip at the bottom of swales, banks or other wet areas and as directed by the Landscape Architect. On steep south or west facing banks, reduce sand content in lawns and planting beds to 50 - 60% for better moisture retention.
3.5	**Applying Fertilizers**	Delete 3.5 and replace with the following	.1 Addition of amendment components shall be at the rates indicated in the Growing Medium analysis recommendations via the following methods: .1 Lime: Applied with mechanical spreaders over entire planting areas and contained planters. .1 Do not apply by hand. .2 Mix thoroughly into the top 100 mm of Growing Medium. .3 Do not allow lime to come into direct contact with nitrogen - phosphate - potash fertilizers. .2. Fertilizer: Applied with mechanical spreaders over entire planting areas and contained planters. Do not apply by hand. Do not mix into Growing Medium.
3.6	**Finish Grading**	Delete 3.6.1 and replace with the following	Manually fine grade Growing Medium installation to contours and elevations shown on drawings or as directed by Contract Administrator and the City. Eliminate rough spots and low areas to ensure positive drainage.
		Add 3.6.3	Finish Grade of Growing Medium shall be 25 mm from finished elevation of adjacent curb or planter wall unless otherwise noted on drawings.
3.9	**Clean-up**	Delete 3.9 and add the following	.1 Ensure all paved areas, tops of planters, adjacent surfaces have been thoroughly cleaned. Ensure all discoloration of adjacent surfaces as a result of Growing Medium installation have been removed. .2 Dispose of materials not required and repair any damage to adjacent surfaces (as determined by the Contract Administrator and the City) off site at no additional cost to the Owner.
3.10	**Weed Control**	Add 3.10	.1 Ensure all weeds and weed roots that have germinated during the course of work of this section have been eliminated from Growing Medium. .2 Provide the City Representative and Consultant with a written outline of weed removal methodology seven (7) days prior to starting weed removal operations.

3.11	**Structural Soil**	Add 3.11	.1	Refer to 2.9 in this specification and as shown on the Contract Drawings.

END OF SECTION

1.0 GENERAL

1.5 Drainage Control — Delete 1.5.1 and replace with the following

Provide for proper water management and drainage at *Place of Work*. Water management shall include silt traps, erosion control measures, temporary water collection ditches, as well as their adequate maintenance to ensure that storm water which may become laden with soil or growing medium is detained and cleaned prior to discharge from *Place of Work*.

1.7 Site Examation — Delete 1.7.1 and replace with the following

Examine *Place of Work* prior to the commencement of work to verify surface preparation is complete and has been accepted by the *Contract Administrator* and the City.

1.10 Quality Assurance — Add 1.10

.1 Contractor to provide seed analysis that will include but is not limited to:
- .1 Name and address of supplier
- .2 Analysis of seed mixture
- .3 Percentage of pure seed
- .4 Year of production
- .5 Date and location of bagging
- .6 Percentage germination

.2 The sample accepted by the review will form the standard by which the project will be supplied.

.3 Should the Contractor require the source of seed supply to change during the construction a written request must be provided to the Contract Administrator and the City 48 hours in advance. The request shall be followed up by submission of proposed seed supplier and substitution seed analyses for Contract Administrator and the City review prior to the delivery.

.4 All seed shall be delivered and stored in original containers in enclosed storage facility protected from the damage, weather, insects and rodents.

2.0 PRODUCTS

2.1 Grass Seed — Delete 2.1 and replace with the following

.1 Grass seed shall be Certified Canada No. 1 Grade to Government of Canada, Seeds Regulations and having minimum germination of 75% and minimum purity of 95%.

.2 Seed mixtures shall be approved by the Contract Administrator and the City in the original packaging. The Seed mixture for boulevards and landscaped areas shall be made up from a minimum of three (3) varieties of Perennial Rye, one (1) of Kentucky Bluegrass and three (3) varieties of Fescue from the list of approved varieties shown below:

- .1 Seed Mix shall comprise of:
  50% Perennial Rye: Elka II, Gator 3, Top Hat, Charismatic, All Star, Derby Supreme
  35% Fescues: Cindy, Longfellow II, Cindy Lou, Quatro, Shademaster II
  15% Kentucky Bluegrass: Shamrock, Broadway, Midnight, Julius, Allure

.3 Table Guideline of Approved Seed Mix Ratios

% Seed Count	% Weight	
15%	25%	All-Star Perennial Rye Grass
5%	15%	Elka II Perennial Rye Grass

20%	15%	Cindy Creeping Red Fescue
15%	15%	Shamrock Kentuck Bluegrass
20%	10%	Cindy Lou Creeping Red Fescue
15%	10%	Longfellow II Chewing Fescue
10%	10%	Gator 3 Perennial Rye Grass
Seed Rate: 50g per square metre		
Acceptable products shall be an all purpose sun / shade mix conforming to the above mix ratios		

2.2 Water

Delete 2.2.1 and replace with the following

Water shall be potable, free of impurities that would inhibit sod growth. *Contractor* to ensure adequate water is available to maintain seeded areas during germination and in a vigorously growing, healthy state until *Total Performance* of work of this section.

2.3 Fertilizer

Delete 2.3.1 and replace with the following

Fertilize shall be complete synthetic slow release fertilizer. Type and application shall be as required by the growing medium analysis report.

2.4 Wooden Posts

Add 2.4

.1 Wooden Posts shall be 38 mm x38 mm x 1500 mm long No. 1 grade or better Hem/fir, untreated wood.

2.5 Binder Twine

Add 2.5

.1 Binder Twine shall be hemp based multiple strand string.

2.6 Flagging Tape

Add 2.6

.1 Flagging Tape shall be 30 mm wide, biodegradable ribbon tape made of non woven cellulosic material, and red color, or an approved equivalent.

3.0 EXECUTION

3.1 Finish Grade Preparation

Delete 3.1.2 and replace with the following

Prior to the broadcast of seed *Contract Administrator* and the City to review fine grading of growing medium. Review includes grades, growing medium depth and condition of finished surface. Subsequent to the *Contract Administrator* and the City review the *Contractor* shall re-grade, add growing medium and make adjustments as directed by *Contract Administrator* and the City.

Delete 3.1.5 and replace with the following

Finish grade smooth to extent required for class of seeding carried out, firm against footprints, textured and free loose of all stones, roads, branches, etc. larger than 25 mm or required for removal for class of seeding to be carried out.

3.2 Seeding - General

Delete 3.2.1 and replace with the following

Seeding operations shall be carried out in the following calendar seasons;

.1 Spring (April 1st to June 15th)
.2 Fall (August 15th to September 30th)
.3 Seeding shall not take place during periods of rain, freezing and/or abnormally hot and dry weather.

Delete 3.2.2 and replace with the following

Application Methods: Apply seed by Method A – Mechanical Dry Seeding or Method B – Hydraulic Seeding unless otherwise specified. Ensure Hydraulic Seeding in accordance with Section 32 92 19 – Hydraulic Seeding. Hand seeding is not recommended. Hand seed only when site conditions preclude above two methods. Do not use hand seed method unless approved by the *Contract Administrator*.

Delete 3.2.3 and replace with the following

Seed Application: Seed rates as per seed manufacturers' recommendations and table 2.1.3.

.1 Sow seed during calm weather with wind speeds less than 8 kph, using wheeled or hand held rotary broadcaster.
.2 Sow half of required amount of seed in one direction and remainder at right angles.
.3 Carefully incorporate seed into top of growing medium with light chain harrow or wire rakes to a minimum depth of 6 mm as seeding operation progresses or within one (1) hour after seeding.
.4 Immediately after seed application roll seeded area with 90kg water ballast type lawn or agricultural roller. If seeded area becomes wet due to rain suspend rolling operations until area has dried to the point where growing medium will not adhere to the surface of the roller.

Add 3.2.4

Watering Operation: Apply water with fine spray to avoid seed wash out. Watering procedure shall ensure penetration of minimum 50mm into growing medium and be at sufficient duration and intervals to keep growing medium evenly moist during germination and grow in period.

Add 3.2.5

The *Contractor* shall carry out at no cost to the *Owner*, reseed operations at two (2) week intervals where germination has failed or wash outs have occurred.

Add 3.2.6

Perimeter Protection: All seeded areas shall be surrounded by a 900 mm high barrier made up of the following components:

.1 Wood posts placed at 1.8 metres on centre.
.2 Wood Posts shall be driven to a depth of 300mm
.3 String two (2) strands of hemp based binder twine (or equal product) between posts. Insure one full wrap of twine around each post.
.4 Tie 300 mm strands of 'red' flagging tape at 450 mm intervals along the entire length of both strands of twine.
.5 Maintain perimeter protection until issued *Total Performance* of seeded area by *Contract Administrator*. Upon acceptance remove perimeter fence and dispose of off site.

Add 3.2.7

Seeded areas that have been damaged by construction operation, construction/ site personnel or construction traffic shall be replaced at no cost to the *Owner*s. Replacement shall include removal of growing medium, regarding of sub grade, replacing growing medium and reseeding as required.

3.6 Grass Maintenace

Delete 3.6 and replace with the following

.1 Maintenance of seeded areas shall begin immediately after seeding operation and shall continue until all deficiencies noted in the Substantial Performance review have been rectified to the satisfaction of the Contract Administrator and the City and conditions for Total Performance been achieved. The Contractor shall notify the Contract Administrator and the City in writing forty eight hours (48) prior to stopping maintenance operations.

.2 Maintenance shall follow the BC Landscape Standard, current edition, Level 2 'Groomed'. Over and above this maintenance protocol the Contractor shall monitor the application of water to the seeded areas and ensure that watering procedures are continuous.

.1 Apply water with fine spray to avoid seed wash out. Watering procedure shall ensure penetration of minimum 50mm into growing medium and be at sufficient duration and intervals to keep growing medium evenly moist during germination and grow in period.
.2 Monitor watering on a regular interval to ensure that watering operations are not causing wash out of seeded area. Should wash outs occur as a result of watering or rain fall related wash out, reseed and continue maintenance and watering procedures.

.3 Grass Cutting: After the 'first' cut of seeded areas grass cutting operations shall be carried out on a weekly (seven day) basis until *Total Performance* by *Contract Administrator* and the City.
.1 First cut of seeded areas shall occur when a uniform grass height of 75 mm has been attained. First cut shall be to a height of 64 mm
.2 Continue regular weekly cutting at a height of 50 mm until Total Performance.
.3 Cutting operations shall be such that each cut is at right angles to the previous cut.
.4 Contractor to remove grass clippings after each cut and dispose of off site.
.5 Roll when required to remove any minor depressions or irregularities.
.6 Immediately repair seeded areas that show deterioration or bare spots. Top-dress all areas showing shrinkage due to lack of watering and seed with seed mix that matches the original seed mix.

.4 Fertilizer analysis shall conform to recommendations provided with growing medium analysis. Application of fertilizer shall follow manufacturers' recommendations noting that after October 1 lawn areas shall not be fertilized until April 15th of the following spring.

.5 Seeded lawn areas shall be kept free of invasive and/or noxious broadleaf weeds, grasses including but not limited to poa annua, disease, fungi, detrimental nematodes and detrimental insects.

3.7 Conditions for Total Performance

Delete 3.7 and replace with the following

.1 Conditions for *Total Performance* of Seeded areas:
.1 Seeded areas are vigorously growing, well established with a thick, dense and healthy green appearance.

.2 Seeded areas shall not have any eroded or wash out areas, bare or dead spots and are free of invasive and/or noxious broadleaf weeds and grasses.
.3 No surface growing medium is visible when established seeded areas have been cut to height of 38 mm
.4 Seeded areas have been cut at least two (2) times, to a height of 38 mm a minimum of (7) days apart.
.5 Grass shall be free of grass varieties other than those specified.
.6 Grass shall be sufficiently established that its roots are growing into underlying growing medium.
.7 Specified maintenance procedures have been carried out.

.8 Areas seeded after September 30th will be not be reviewed for *Total Performance* until April 30th the following year.

END OF SECTION

1.0 GENERAL

1.1	**Related Work**	Add 1.1.6	Hot Mix Asphalt Concrete Pavement Section 32 12 16
		Add 1.1.7	Portland Cement Concrete Paving Section 32 13 13
1.5	**Measurement and Payment**	Delete 1.5.2 and replace with the following	Catchbasin and lawn basin installation will be defined as supplying and installing a new catch basin or lawn basin for each type specified and setting to the finished grade. Payment includes excavation, disposal of surplus excavated material, supply of all units, cast-in-place concrete, pipes, fittings and related materials together with all labour, materials and equipment required. Lead work and tie-ins are considered incidental to the work as described above.
		Delete 1.5.3 and replace with the following	Adjustment & Replacements of tops of existing units will be measured in units adjusted as defined below and paid for under their respective Items in the Schedule of Quantities. No payment will be made under these items for cleaning Valve Boxes, Monument Boxes, Frames, Covers and Lids of Castings as part of the operation for asphaltic concrete paving. No Payment will be made for Monument Boxes, Lawn Drains, Cleanouts and Inspection Chambers, these adjustments will be treated as incidental work. All manholes and valve boxes must be vertically adjusted a minimum of twenty-four (24) hours prior to paving. The use of Steel/Metal Casting Risers Rings will not be accepted to adjust manholes or water valves to the final elevation (finish grade). .1 Manhole frames and lids replacement and adjustment will be defined as supplying and installing a new manhole frame and lid and setting to the finished grade. Replacements shall include jackhammering, removal and disposal of the existing frame and lid, replacement, removal or addition of concrete brick (maximum of 3 or minimum of 1) or precast concrete riser rings, cement mortar, supply and installation of new manhole frame and lid set to finish grade, temporary asphalt ramping or patching and all other incidental work. Unit Price for adjustments to each manhole includes adjusting manholes to the asphalt base lift and then to the asphalt final lift (finish grade) – No additional payment will be made for adjusting manholes to the final lift. Adjustment ONLY will be defined as re-using the fames, lids, grates or valve boxes to complete the work as described above. .2 Water Valve, Communication Box and junction box replacements will be defined as supplying and installing a new Nelson Type Terminal City Water Valve Box or 5686 service box frame and lid and setting to the finished grade. Replacements shall include jackhammering, removal and disposal of the existing frame and lid and all other incidental work.

			.3 Catchbasins frame and grate replacement will be defined as setting as supplying and installing a new catchbasin frame & lid to the correct elevation. Adjustments shall include jackhammering, removal of the existing grating and frame and all other incidental work. Payment includes excavation, disposal, removal of concrete bricks, removal or addition of precast concrete riser rings, cement mortar, disposal of surplus excavated material, cast-in-place concrete, pipes, fittings and related materials together with all labour, materials and equipment required. Catch basin lead work is considered to be incidental to payment for catch basin lead work described in other sections .4 Adjustment ONLY will be defined as re-using the frames, lids, grates, or valve boxes to complete the Work as described above.
2.0	**PRODUCTS**		
2.1	**Materials**	Add 2.1.7.3	Any frame and cover assembly creating a point load on the concrete riser rings will not be permitted.
		Delete 2.1.12 and replace with the following	Catchbasin lids manufactured to ASTM C478M.
		Delete 2.1.16.2	
		Delete 2.1.17	
3.0	**EXECUTION**		
3.1	**Excavation and Backfill**	Add 3.1.2	For manholes, when base gravels are complete, excavate for grade rings and manhole frame assembly. Do not disturb the compacted road base beyond the excavation requirement.
3.3	**Manhole Installation**	Delete 3.3.12.2 and replace with the following	Allowable products are precast concrete risers and cast-in-place form system. Individual riser heights shall be 50mm, 75mm, or 100mm.
		Delete 3.3.12.5 and replace with the following	Proper layer of grout between the spacers, covering the entire surface of the rings, should be utilized.
		Delete 3.3.15 and replace with the following	Install drop structures as shown on the contract drawings to Coquitlam Standard Detail Drawing COQ-S4 and Standard Detail Drawing S3. Maximum allowable inside ramp shall be 250 mm invert to invert.
		Delete 3.3.17 and replace with the following	Ensure frames conform to design contour of pavement or existing surface. Manhole lids left raised in preparation for overlay paving shall have a rubberized protector ring or asphalt ramp. The use of riser rings for adjusting manhole frames will not be permitted.

END OF SECTION

Appendix A -
Traffic Management Detail Specifications

1.0 GENERAL

.1 This Traffic Management detail specification refers to the Contractor's specific plans to identify project traffic risks affecting the *Work*, provide Traffic Control Plans, and to implement the traffic control for the safe passage of vehicles and pedestrian through the work zone.

1.1 Related Works

.1 Traffic Regulation MMCD Section 01 55 00S.

1.2 References

.1 WorkSafe BC, Occupational Health and Safety (OHS) Regulation, Section 18 – Traffic Control.

.2 B.C. Ministry of Transportation (MOT) Traffic Control Manual for Work on Roadways.

1.3 Project Requirements

.1 A Road and Sidewalk Closure Permit is required by Coquitlam for all work affecting traffic flow related to construction. A permit is required for each specific construction interference with traffic flow. A digital copy of the Road and Sidewalk Closure Permit form can be obtained for use during the contract from the City's website at www.coquitlam.ca/closure.

.2 A Road and Sidewalk Closure Permit form application must be submitted to City's Traffic Operation Division 5 working days prior to start of work.

1.4 Measurement and Payment

.1 For this Contract, payment for all work performed under this section, unless included in the Schedule of Quantities and Prices shall be treated as incidental work, including a Traffic Management Plan (TMP), Traffic Control Persons (TMP), traffic markings & all temporary traffic signs, devices as required for traffic & pedestrian safety; and all other items described in the Section 01 55 00S.

2.0 PRODUCTS

2.1 Traffic Management Plan

.1 The Contractor is required to assign a Traffic Manager for the Contract with the responsibility of preparing the Traffic Management Plan and the Traffic Control Plans, as well as the responsibility for continuing implementation of traffic control for the Work.

.2 The Traffic Management Plan (TMP) will consist of the following components:

.1 Identification of risks to traffic during the Work

.2 Traffic Control Plans for individual stages of the construction

.3 Incident Management Plan for the response to an unplanned event and recording of incident information.

.3 Submission of the TMP is to be made to the *Contract Administrator* within five (5) days of the *Notice of Award* of the *Contract*, and must be approved by the *Contract Administrator* prior to start of the *Work*.

.4 Review of the TMP will be performed by the Contract Administrator. Comments for revisions to the TMP will be returned to the *Traffic Manager* for implementations.

.5 The Contractor shall comply with all the requirements of applicable laws, rules, regulations, codes and orders of the municipal and other appropriate authorities concerned with work on streets or highways and shall post proper notices and/or signals, and provide necessary barriers, guards, lights, flagmen or watchmen as may be necessary for proper maintenance of traffic and protection of persons and property from injury or damage. All costs involved in respect to the above requirements will be deemed to be included in the Contract Price.

.6 The Contractor shall give due notice to local police and fire departments prior to beginning construction and shall comply in all respects with their requirements.

.7 The Contractor, during the progress of the work, shall make adequate provision to accommodate the normal traffic along streets and highways immediately adjacent to or crossing the work so as to cause the minimum of inconvenience to the general public.

.8 The Contractor is required to maintain local traffic and driveway access during all stages of construction. This includes maintaining a 1.5m width walkway or pathway through the construction site for pedestrians.

.9 Where existing streets or roads are not available as detours, all traffic shall be permitted to pass through the work with as little inconvenience and delay as possible unless otherwise provided or authorized by the Contract Administrator. If half the street only is under improvement, the other half shall be conditioned and maintained as detour.

2.2 Incident Management and Reporting

.1 The Contractor shall facilitate incident response vehicles and staff and move traffic safely and expeditiously through or around an incident on site and provide assistance to emergency response personnel as required. An incident includes, but is not limited to, motor vehicle accidents, emergency road repairs, disabled vehicles, and debris on the road. The immediate response to an emergency shall by necessity make use of available devices and equipment.

.2 If an incident occurs on site, the Contractor will be required to submit a report to the Contract Administrator documenting details of the incident including event, location, date, time, action taken, duration and restoration of site.

2.3 Traffic Control Plans

.1 The Contractor shall designate a qualified Traffic Control Supervisor for the works, per the requirements of WCB regulations Section 18.

The designated Traffic Control Supervisor may be the same individual that is designated as the Traffic Manager, or may be a separate individual qualified for the responsibilities of this function.

.2 The Contractor shall prepare weekly the anticipated traffic control activities, locations, and durations for the upcoming week.

.3 Permissible delays shall only be considered outside Peak Hours. Permissible delays are categorized as follows:

a) Minor Delays - Less than two (2) minutes in duration; for occasional interruption due to construction activities. These delays shall be coordinated with available breaks in the traffic flow.
b) Major Delays - Maximum five (5) minutes in duration; for occasional interruption of traffic for construction activities if traffic volumes permit. These delays shall be coordinated with available breaks in the traffic flow.

.4 The Contractor is responsible for ensuring that the flow of traffic is unimpeded by construction-related activities.

3.0 EXECUTION

3.1	Traffic Control Plan	.1	A copy of the approved current Traffic Plan must be held on site by both the Site Superintendent as well as the person/company responsible for the traffic control implementation.
		.2	Failure to produce a valid approved Traffic Plan on site, or having work not follow the Traffic Control Plan will result in immediate shut-down of the work. The Contractor will be required to safely restore facility conditions to allow traffic flow at their expense. The Contractor must take all steps to acquire an approved Traffic Control Plan before work can re-start on site. No claim will be accepted by the Owner for costs associated with this work shut-down.
3.2	Road and Sidewalk Closure Permits	.1	The Contractor must have, on-site, a copy of an approved Road and Sidewalk Closure Permit valid for the work being done. Failure to produce a valid Road and Sidewalk Closure Permit on-site will result in shut-down of the work. Failure to comply on what is stated on the approved permit will result in shut-down of the work. The Contractor will be required to safely restore facility conditions to allow traffic flow at their expense. The Contractor must take all steps to acquire a Road and Sidewalk Closure Permit before work can re-start on site. No claim will be accepted by the Owner for costs associated with this work shut-down.
3.3	Traffic Control Personnel & Equipment	.1	The Contractor shall supply all necessary traffic control devices required to perform traffic control services for the project. Signs and traffic control devices not applying to existing conditions shall be removed. Where operations are carried out in stages, only those traffic control devices that apply to the current stage are to be left in place.
		.2	There must be sufficient Traffic Control Persons (TCPs) on site to appropriately and safely direct traffic in all sections of the Work.
3.4	Signage	.1	Supply, installation, maintenance and removal of all works-related signs shall be the responsibility of the Contractor. The location and type of each sign shall be indicated on the approved Traffic Control Plan, for each stage of the works.

Traffic control signs and devices must be positioned and used as specified in the Traffic Control Plan and signs and devices must be located so as to allow traffic to move by or through the work area in a controlled manner and, if necessary, to come to a controlled stop with due regard for the prevailing weather and road conditions.

Signs shall be checked daily for legibility, damage, suitability and location. Signs and delineators shall be cleaned as frequently as necessary to ensure full legibility and reflectance.

3.5 Detours .1 Any proposed detours must be approved by the Contract Administrator and conducted in accordance with the approved Traffic Plan and the Traffic Control Manual for Work on Roadways.

3.6 Abrupt Changes in Surface Elevations .1 The Contractor shall minimize any abrupt changes in roadway elevation left exposed to traffic during both working and non-working hours.

A wedge of asphalt must be used as a transition to vertical differences in travelled areas and have a slope of 4:1 or less.

3.7 Cyclist and Pedestrian Access .1 The Contractor shall make provision for pedestrians, wheel chairs and bicycles to have safe access across the work zone at all times. If this cannot be readily accommodated, then acceptable detours and appropriate signs shall be provided.

3.8 Temporary Pavement Markings .1 The Contractor shall be responsible for the application and removal of all temporary pavement markings and reflective devices.

All temporary markings must be removed after installation of permanent markings.

4.0 TRAFFIC RESTRICTIONS

4.1 Road and Sidewalk Closure Permits .1 A City of Coquitlam Road and Sidewalk Closure Permit is required for each instance of closure and will be valid for a maximum period of one (1) week and, if still necessary, re-submittal of a Road and Sidewalk Closure Request is required.

A copy of the approved Road and Sidewalk Closure and Lane Closure Permit must be held on site by both the Site

Superintendent and the person/company responsible for the traffic control implementation.

.2 **Total Road Closure Is Not Permitted**

.3 Traffic cross over will only be permitted as approved by the Contract Administrator and must have a complete Traffic Control Plan indicating the cross over, signing, and delineation.

.4 Minimum single lane on each direction must be accommodated at all times, and is subject to restrictions as per Clause 4.2, and approval of Traffic Department

4.2 Lane Closure Restrictions

.1 **For each of the road sections affected:**
- Road and Sidewalk Closures will be reviewed for appropriateness during the allowable hours of work.
- Access to properties to be maintained
- Sufficient Traffic Control Persons are required for each Road and Sidewalk Closure (or any work activities), including side street intersections, to safely guide traffic through the work site.

.2 **Due to the area's significant high volumes of commuter traffic, construction activities shall be restricted to the following unless specified otherwise and must be clearly identified in Traffic Management Plan.**

Schoolhouse Street
Minimum single lane on each direction with cross over traffic through the work zone area must be maintained at all times.

All City Traffic Counts are available on the City's web site at:
http://www.coquitlam.ca/city-services/roads-and-transportation/traffic-operations-construction/traffic-data.aspx

5.0 HOURS OF WORK

5.1 Allowable Hours of Work

.1 **The hours of work shall be from 0700h to 1900h inclusive Monday to Friday and 0900h to 1800h inclusive Saturdays, unless noted otherwise.**

.2 Some allowances may be made for paving operations, depending on a proposal acceptable to the Contract Administrator.

.3 Line Marking work may be performed at night, (2100h to 0500h).

No work is allowed on Sundays without specific written permission from Contract Administrator.

6.0 CONSTRUCTION OPERATIONS

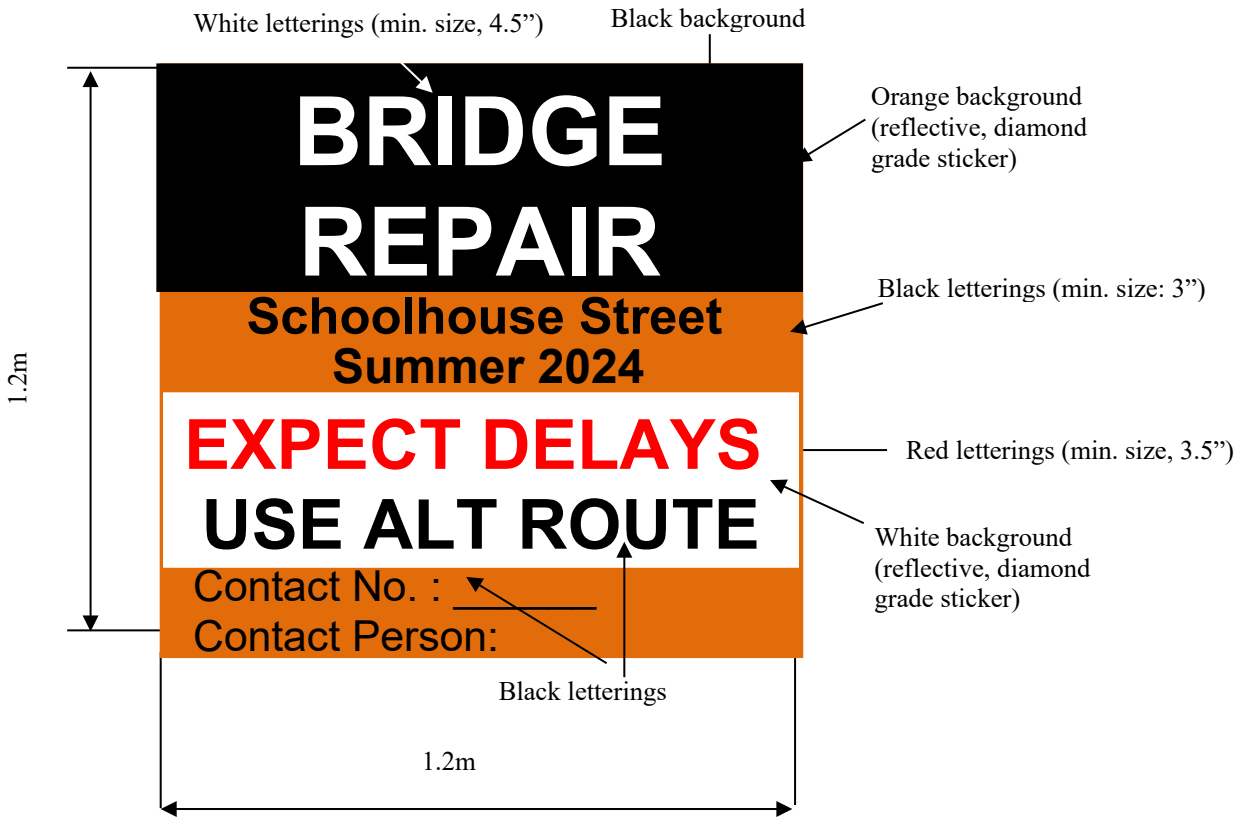
6.1	Truck Routes	.1	The Contractor is restricted to the City's designated Truck Routes. The current Truck Route Map is available on the City's website at www.coquitlam.ca and can be found under **Residents, Transit & Transportation, Trucking Routes**.
6.2	Road Specific Considerations	.1	Ensure that Traffic Management Plan accommodates City Pump Station access, businesses and residences during construction activities.
		.2	Suggested construction staging was provided for guide and reference only. Contractor is responsible to make the appropriate plan to accommodate the pedestrian and vehicular traffic as per the requirements of the contract.
6.3	Work Stoppage Due to Traffic	.1	The City will not control or direct traffic control activities of the Contractor, but may require an immediate stop to any work where, in the sole opinion of the Contract Administrator, the provided traffic management plan is ineffective or creating unreasonable delays. Contractor is responsible for the costs associated with this work shut-down.
6.4	Construction Activity and Signage	.1	The Contractor will be responsible to place other construction information signs as required to inform the public of construction activities, and ensure safe travel through the work site.
6.5	Construction Zone Information Signs	.1	The Contractor is required to provide, one week prior to start of work, nine stationary signs at intersections, one in each direction, to inform traffic of existing and anticipated conditions at entry points of the street to be worked on, locations for these signs will be provided by the Contract Administrator.

Ensure that signs and locations are addressed in the Traffic Management Plan. All signs are to be removed at the end of the construction period.

Exact locations to be determined on site by Contract Administrator.

- Northbound, NE corner of Lougheed Hwy and Schoolhouse St
- Eastbound, SW corner of Seguin St and Schoolhouse St
- Southbound, SW corner of Schoolhouse St and Lucille Starr Dr
- Westbound, NE corner of Lucille Starr Dr and Schoolhouse St

Construction Zone Information Signs to follow specifications below. Draft must be submitted to Contract Administrator prior to sending to production:



APPENDIX 1

Coquitlam

City of Coquitlam

Road and Sidewalk Closure Permit Request

Traffic Operations Division
3000 Guildford Way, Coquitlam BC V3B 7N2
Phone: 604-927-6250 Fax: 604-927-6255
Email: trafficoperations@coquitlam.ca

Submit to the Traffic Operations Division a minimum of 5 business days prior to the intended closure date.

Permit Fee - ~~$75.00 (Effective February 1, 2019)~~ **Payment Methods –** After review, and if approved, payment options will be emailed to the applicant.

Application Date: _____ **City Project Number** (if applicable): **78029**

Contact Information

Company Name: _____

Applicant Name: _____

Name of Contractor doing work for Company/Applicant: _____

Phone: _____ **Fax:** _____

24 Hour Emergency Phone: _____ **Email:** _____

Location, date and time, and traffic control plan information

I request approval to close (check all that apply): Direction: ☐ Northbound ☐ Southbound ☐ Eastbound ☐ Westbound

☐ Curb/Outside Lane ☐ Centre/Inside Lane ☐ Right Turn Lane ☐ Left Turn Lane ☐ Cycling Lane ☐ Sidewalk

☐ Single Lane Alternating Traffic ☐ Full Closure

Road/Street Name: _____

Location Description: _____

_____

Date & Time Information: **Dates:** _____ *Starting* _____ *Ending*

Hours: _____ *Starting* _____ *Ending*

Purpose: _____

_____

Will this closure disrupt: Bus Routes or Stops? ☐ Yes ☐ No If yes, the Applicant will need to contact Coast Mountain Bus Company regarding disruptions.

Will this closure disrupt: Garbage/Recycling Routes or Pick Up? ☐ Yes ☐ No If yes, the Applicant will need to assist the contractor and/or contact the City's Environmental Services Group. www.coquitlam.ca/trashtalk

Traffic Control Plan*:
(a) Traffic Management Manual for Work on Roadways Figure Number _____, or
(b) A Traffic Control Plan *(attach separately)* indicating signage, taper lengths, direction of traffic, work area, and north arrow

Traffic control persons (flag persons) on duty? ☐ Yes ☐ No If yes, specify how many: _____

***Important Notice:** All operations within the road right-of-way must comply with Worksafe BC regulations and BC Ministry of Transportation standards for work on roadways.*

Application Checklist

☐ Permit Fee

☐ Prime Contractor Designation Letter

☐ City of Coquitlam Certificate of Insurance

☐ Traffic Control Plan or Traffic Management Manual for Work on Roadways Figure Number

☐ Coast Mountain Bus Company (Phone: 778-593-5774 | Email: special.events@coastmountainbus.com) contacted regarding impact to bus routes and bus stops

☐ City of Coquitlam Environmental Services Group (Phone: 604-927-3500| Email: wastereduction@coquitlam.ca contacted regarding impact to garbage/recycling routes and pick up

I HEREBY AGREE to the terms stipulated herein and further agree to indemnify and save harmless the City against any and all claims, actions, or expenses whatsoever or by whomsoever brought against the City by the reason of the City granting us this Road and Sidewalk Closure Permit. I further agree to accept responsibility to ensure proper situation control and street sweeping for the duration of the road or sidewalk obstruction.

_____ _____
Date *Applicant Signature*

Office Use Only PERMIT STATUS

☐ Permit Fee	☐ Prime Contractor Letter	☐ Certificate of Insurance
☐ Traffic Control Plan	☐ Impact to bus service	☐ Impact garbage and recycling collection

☐ Request is denied for the following reason(s): _____

_____

☐ Request is approved with the following change(s): _____

_____

☐ Request is approved as submitted

_____ _____
Date *Traffic Technologist or Designate*

Appendix B -
Geotechnical Report

GEOTECHNICAL ASSESSMENT AND REPORT
City of Coquitlam – Schoolhouse Bridge and Lucille Starr Bridge
Proposed Concrete Approach Slab Replacement
Schoolhouse Street and Lucille Starr Drive, Coquitlam, BC

Document Type: Version 1, Issued for Final

Date: February 16, 2024

Project No.: **K-231474-00**

Submitted to:

R.F. Binnie & Associates Ltd.
#300 – 4940 Canada Way
Burnaby, BC
V5G 4K6

Attention: Meaghan Jorgensen, AScT, CCA, Project Manager
mjorgensen@binnie.com

Submitted by:

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EGBC Permit to Practice #1000925
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Per: J.Y. (Yoshi) Tanaka PEng
ytanaka@kontur.ca
Reviewed by: Brian L.J. Mylleville PhD PEng
bmylleville@kontur.ca

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1.0 INTRODUCTION

In accordance with the authorization received by R.F. Binnie & Associates Ltd. ("Binnie") Kontur Geotechnical Consultants Inc. ("Kontur") has completed a geotechnical assessment and report for the proposed concrete approach slab replacement of the City of Coquitlam's Schoolhouse Bridge and Lucille Starr Bridge project. The purposes of this assessment were to advance the detailed design phase of the project and characterize the site from a geotechnical point-of-view and to provide geotechnical engineering comments and recommendations with respect to the proposed replacement of the concrete approach slabs for two existing bridges. Archaeological and environmental consulting services were not part of Kontur' scope of work.

This report, which summarizes the findings of the study, has been prepared in accordance with standard and widely accepted geotechnical engineering principles and practices for similar projects in this region.

Review and use of this report should be completed in accordance with the attached *Interpretation and Use of Study and Report* document. It is included as an integral part of this report and should be read in conjunction with all parts of this report.

2.0 UNDERSTANDING OF PROJECT

It is Kontur's understanding that the City of Coquitlam (City) plan to replace the existing concrete approach slabs at the following two bridge structures:

Table 1. Summary of Project Locations

Header	Subject Road	Extent/Approximate Location	Road Classification
Schoolhouse Bridge	Schoolhouse Street	Between Seguin and Lucille Starr Drive	Arterial
Lucille Starr Bridge	Lucille Starr Drive	East of Lucille Starr Drive and Schoolhouse Street Intersection	Local

It is Kontur's understanding that the existing concrete approach slabs for both bridge structures have experienced significant settlement and require replacement. Preliminary discussions with Binnie indicate that the proposed remedial strategy will involve removing a portion of the existing fills near the approach ends of each bridge and replacing it with lightweight fills. A geotechnical exploration program was completed by SNC Lavalin ("SNC") in 2021. This geotechnical assessment was completed based on available geotechnical information from the SNC 2021 exploration provided to Kontur by Binnie. As such, a project specific geotechnical exploration program was not completed by Kontur as part of Kontur's assessment.

This geotechnical report only considers the geotechnical aspects for the proposed replacement of the approach slabs. Geotechnical review of the foundations for the existing bridge structure is not part of Kontur's current scope of work.

3.0 SOURCES OF INFORMATION

The following sources of information were reviewed as part of the desktop component of this study:

- Information obtained from Kontur's in-house geotechnical database of nearby projects;
- Kontur's nearby experience in the area;
- Published surficial geology maps of the area specifically *MAP1484A Surficial Geology New Westminster* published by the Geological Survey of Canada;
- Geotechnical site reconnaissance completed by Kontur on November 23, 2023;
- Draft Geotechnical Report titled, "Booth Creek Bridges – Coquitlam, B.C.", dated June 11, 2021, and prepared by SNC; and,
- Review of available conceptual design drawings provided by Binnie.

4.0 SITE DESCRIPTION

4.1 General

Schoolhouse Bridge. Schoolhouse Bridge is located about 85m north of the intersection of Seguin Drive and Schoolhouse Street in Coquitlam, BC. Based on a review of the SNC Report, it is understood that Schoolhouse Bridge was designed/constructed circa 1990 and consists of a single-span reinforced concrete bridge. This bridge spans about 7.5m over Booth Creek and is about 20m wide. It is understood that the bridge is supported on a deep foundation system consisting of steel pipe-piles. SNC's report indicated that the piles were driven to a depth of about 42.5m or about elevation -38.0m; however, actual as-built pile length information was not available for review at the time this report was prepared.

Furthermore, Schoolhouse Street was preloaded from Lougheed Highway to Lucille Starr Way during road widening and construction between 1988 and 1991. However, it is reported that no fill or preloading was undertaken within 10m of Booth Creek. It was also reported that within 10m to 15m of the bridge deck, there is a 500mm thick lightweight fill layer below the pavement structure.

Booth Creek runs along an east to west direction below Schoolhouse Bridge. At the time of the site visit the Creek was noted be about 3m below the bridge structure. The existing ravine slopes surrounding the bridge structure support trees and/or light vegetation along the west side and grassed surface along the east side.

Lucille Starr Bridge. Lucille Starr Bridge is located about 50m to the west of the intersection at Schoolhouse Street and Lucille Starr Drive and was designed/constructed circa 1999. This bridge spans about 8m over Booth Creek and is about 8m wide. Similar to Schoolhouse Bridge, this bridge is a single span, reinforced concrete bridge founded on concrete filled steel pipe piles. Details with respect to the pile driving records and construction of Lucille Starr Drive were not available to Kontur at the time this report was prepared.

Booth Creek runs along a north to south direction below Lucille Starr Bridge. At the time of the site visit, the Creek was noted be about 2 to 3m below the bridge structure. The existing ravine slopes surrounding the bridge structure support trees and/or light vegetation.

Visual observations made during the site reconnaissance indicated potential signs of significant ground settlements within the areas supporting the concrete approach slabs at each bridge structure. These observations included separation of flexible utility couplings (Photograph 1) at Schoolhouse Bridge, as well as 'gaps' between the existing approach slab and bridge structure at Lucille Starr Bridge (Photograph

2). SNC's report also noted that the City has not monitored ground settlement for both bridge structures since construction.

4.2 Surface Conditions

Schoolhouse Bridge. In general, the north and south approaches at Schoolhouse Street are located north of Seguin Drive along Schoolhouse Street. The road alignment is generally flat and is located at a Geodetic Elevation (El.) of about 4m. Where Schoolhouse Street approaches the bridge crossing, the ground surface gradually increases to about El. 4.6m.

Based on visual observations, the topography of the ravine slopes along the east side of the bridge, the north and south ravine slopes were noted to be about 2m in height. These ravine slopes were noted to be sloped at an average inclination of about 2.5H:1V (Horizontal:Vertical). Along the west side of the bridge, the north and south ravine slopes were noted to be about 3m in height. These ravine slopes were noted to be sloped at an average inclination of about 1.5H:1V to 2H:1V. However, along the north ravine slope, localized over steepened areas near the lower portion of the slope were also noted, but could not be readily confirmed due to being obscured by heavy brush. A 900mm Stormwater outlet was also observed near the northwest corner of the bridge structure.

Lucille Starr Bridge. In general, the west and east approaches at Lucille Starr Bridge are located east of Lucille Starr Drive and Schoolhouse Street. From the intersection of Lucille Starr Drive and Schoolhouse Street, the ground surface is noted to be at about El. 3.5m and gradually increases to about El. 5.0m at the west approach of the bridge over a horizontal distance of about 45m. From the east end of the bridge, the ground surface gradually decreases to about El. 4.0m over a horizontal distance of about 35m.

Based on visual observations, the topography of the ravine slopes along the north and south sides of the Lucille Starr Bridge, the west and east ravine slopes were noted to be about 1 to 2m in height. These ravine slopes were noted to be sloped at an average inclination of about 2.5H:1V (Horizontal:Vertical).

4.3 Soil Conditions

According to surficial geology maps of the area, the subject bridge crossings are underlain by *Bog, Swamp, and Shallow Lake Deposits (SAb)* geological Unit (Surficial Geology Map 1484A published by the Geological Survey of Canada). The SAb unit is described as lowland peat up to 15m thick overlying *Fraser River sediments*, which comprise of overbank silty to silty clay loam normally up to 2m thick overlying 15m or more of deltaic and distributary channel fills of alluvial sands and silt deposits. In 2021, a geotechnical exploration program was completed by SNC Lavalin. The geotechnical exploration consisted of advancing a series of electronic Cone Penetration Test (CPT) probes (with and without shear wave velocity measurements) and augered testholes. Thes testholes were completed near the ends of the existing bridges approach areas. The exploration completed by SNC is summarized in the following table as follows:

Table 2: Summary of Geotechnical Exploration Completed by SNC Lavalin

Location	Machine-Augered Testholes	Cone Penetration Test Probe	Seismic Cone Penetration Test Probe
Schoolhouse Bridge	BH21-01 and BH21-03	CPT21-01	SCPT21-03
Lucille Starr Bridge	BH21-02	CPT21-02	SCPT21-02

The findings of the exploration program completed by SNC Lavalin as described in the following sections are generally considered to be consistent with the published surficial geology maps of the area.

Based on the findings of the geotechnical testholes completed by SNC Lavalin, a generalized profile of the soil conditions is summarized below for each site, with soil units in general order of increasing depths of occurrence. Inferences pertaining to soil relative density or consistency, strength and the like are based on information recorded on SNC's Record of Borehole sheets and the CPT log sheets prepared by Schwartz Soil Technical Inc.

Schoolhouse Bridge (BH21-01, BH21-03, SCPT21-03, and CPT21-01)

- **Unit A1 – ASPHALT.** The measured asphalt thickness along north and south asphalt approaches ranged between about 150mm and 175mm.
- **Unit A2 – SAND and GRAVEL, trace silt (FILL).** This unit was encountered below Unit A1. Based on the available testhole information, this unit was about 400mm to 700mm thick. In general, the fill material consisted of a grey 19mm crushed Sand and Gravel and considered to be in a compact to dense state.
- **Unit B1 – PEAT.** At BH21-01, this unit was encountered below Unit A2 at about 3.6m depth. At BH21-03, this unit was encountered below Unit C at about 3.6m depth. In general, this unit was about 600mm thick and moisture content was noted to be about 339%.
- **Unit C – Clayey SILT to silty CLAY, some organics.** This unit was encountered below BH21-01 and BH21-03 and extended to the terminus of the completed augered testholes. Moisture content typically ranged from about 72% and 103%. Based on an interpretation of the deep SCPT21-03 and CPT21-01, this unit extends to about 35m depths. A localized silty sand zone was noted at about 9m depth. Based on the SCPT and CPT probe resistance, the unit is inferred to have a soft to firm with occasional 1m to 2m thick stiff zones at about 3m, 9m, and 12m depths.

Lucille Starr Bridge (BH21-02, SCPT21-02, and CPT21-02)

- **Unit A1 – ASPHALT.** The measured asphalt thickness along east asphalt approach was noted to be about 100mm.
- **Unit A2 – SAND and GRAVEL, some silt (FILL). Based on BH21-02,** this unit was encountered below Unit A1 and was about 700mm thick. In general, the fill material consisted of a brown well graded Sand and Gravel and considered to be in a compact to dense state.
- **Unit B1 – PEAT.** At BH21-02, this unit was encountered below Unit A2 at about 2.1m depth. In general, this unit was about 3m thick and moisture content was noted range between about 237% and 324%.

- **Unit B2 – Organic SILT.** At BH21-02, this unit was encountered below Unit B1 at about 5.1m depth. In general, this unit was at least 2.4m thick and extended to the terminus of the auger hole (i.e., 7.5m depth). Based on an interpretation of the deep SCPT21-02 and CPT21-02, this unit extends to about 8.0m depth. Moisture content was noted to be about 101%.
- **Unit C – Clayey SILT to silty CLAY, some organics.** Based on an interpretation of the deep SCPT21-02 and CPT21-02, this unit was encountered below Unit B2 and extended to about 35m depths. A localized silty sand zone was noted at about 9m depth. Based on the SCPT and CPT probe resistance, the unit is inferred to have a soft to firm; however, a firm to stiff zone is interpreted to be present between about 8m and 10m depth.

Based on Kontur's experience, Unit C is anticipated to be underlain by the dense to very dense *Vashon Drift & Capilano Sediments* at depths, which is anticipated to be in excess of about 40m below the existing ground surface.

4.4 Groundwater Conditions

Based on the findings of the completed exploration program, the groundwater levels at Schoolhouse Bridge and Lucille Starr Bridge were inferred to be encountered at about 2.6m and 2m below the existing bridge deck, respectively. Kontur notes that the groundwater levels are expected to vary (fluctuate) and are generally influenced by the variation in groundwater levels in Booth Creek, periods of prolonged or intense rainfall, rapid snowmelt and/or nearby land uses. Perched or localized groundwater levels should be anticipated to occur at the interface between granular materials or topsoil layers and the underlying *Units B/C.*

4.5 Interpretation and Variability

It is important to note that the soil and groundwater conditions described above and encountered in the specific testholes are representative of the soil conditions in the immediate vicinity of each testholes. Extrapolation and interpretation of the soil profile and groundwater is formulated based on an assumed horizontal continuity of subsurface conditions across the site. Therefore, the soil units described above are generalized and based on the available test hole information only. Variation in stratigraphic conditions should always be expected.

5.0 GEOTECHNICAL ENGINEERING COMMENTS AND RECOMMENDATION

5.1 General

Based on the observations, information, and findings presented above, the following geotechnical engineering comments and recommendations are provided with respect to the proposed replacement of the approach slabs for the two existing bridges.

Based on a review of available geotechnical information, the proposed concrete approach slabs at both bridge locations are anticipated to be underlain by fills underlain by highly compressible peat (Unit B1) and a deep compressible clayey silt layer (Unit C). Testhole information at Lucille Starr also noted a compressible organic silt layer (Unit B2) present between Soil Units A2 and C. The observed and reported ground settlement is likely due to the placement of past fills (as part of original bridge and road

construction) and decomposition of organics resulting in consolidation of the underlying compressible soils. Any increase in finished grades should be kept to a minimum to avoid triggering additional post-construction settlement as a result of consolidation of the underlying compressible soils.

Kontur considers that the proposed approach of sub-excavating and removing of a portion of the existing fills below these approach slab areas and replacing with lightweight fills as a suitable mitigative measure to reduce potential ground settlement.

The following sections provide Kontur's geotechnical engineering comments and recommendations as input to mitigation of settlement of the proposed new approach slab for the two existing bridges.

5.2 Settlement Considerations

The site is underlain by fills and compressible soils at depth. Where these materials are not removed, long-term ground settlement should be expected. As noted in **Section 5.1**, any increase in finished grades should be kept to a minimum (300mm or less) to avoid triggering additional post-construction settlements as a result of consolidation of the underlying compressible soils under additional fill loading.

To mitigate and reduce the potential for ground settlements, mitigation measures may include the use of lightweight fill. The use of lightweight fill will create a partial 'unloading' effect and will reduce post-construction settlements; however, they will not completely eliminate settlement. *It must be recognized that this approach will reduce but not eliminate post-construction settlements as there will remain the underlying organic material that will consolidate and decay as well as a deep deposit of very soft to soft clayey silt beneath the concrete approaches that will continue to consolidate slowly over time. Some additional efforts, over and above regularly scheduled maintenance, are likely to be required over time even with the mitigative measures in place.*

It is difficult to predict the amount of post-construction settlement due to consolidation of the deep clay and decomposition of organics. Assuming no change to grade, the highly compressible peat/organics are not removed beneath the footprint of the proposed concrete approach slabs, and lightweight fills are provided as discussed in this report, the additional long-term ground settlements due to ongoing consolidation and/or slow decomposition of organic materials is estimated to be in the order of about 50mm to 150mm and possibly more over a duration of about 25 years. Differential settlement should be taken as about 150mm over a horizontal distance of about 10m.

Existing services that may be influenced by this project would also be expected to undergo similar total and differential settlement as described above. In view of expected long-term settlement within the two bridge approaches, Kontur recommends that adequate flexible couplings be provided where deemed necessary by the Civil consultant for underground services. Kontur recommends that as-built surveys of the installed underground services be carried out to establish a baseline from which long-term settlement performance can be assessed and future remediation, if any, can be planned.

Kontur notes in addition to the above discussed long-term settlement, the existing services may also be subjected to ground settlement as a result of raising site grades, dewatering works, long-term decomposition of organics and or relaxation of soils during excavation. Additional commentary is provided in **Section 5.7**.

In all cases, the Owner, Binnie, and the design team should review the above settlement estimates and assess the potential implications as they relate to the project.

5.3 Mitigative Approach

For each approach area, the existing fill (Unit A2) should be removed to allow for replacement with a 'mattress' of lightweight pumice fill (red vesicular basalt). The red vesicular basalt should be completely encapsulated in a non-woven geotextile (such as, *TEXEL 80C* or approved equivalent) to prevent migration of surrounding soils into the open void spaces within the lightweight fill and to act as reinforcement to help 'bridge over localized soft spots. The thickness of the lightweight fill mattress at Schoolhouse Bridge and Lucille Starr Bridge should be 1.5m and 2m thick below the pavement structure, respectively. For Schoolhouse Bridge and Lucille Starr Bridge, this mattress of lightweight fill should extend at least 12m and 24m beyond the edge of the bridge deck, respectively.

Further, the excavation should be fully unwatered prior to placing and compacting the lightweight fill material. The lightweight fill should be placed and compacted in lifts having a thickness of approximately 300mm to 500mm, which should be confirmed by the Geotechnical Engineer at time of construction. The lightweight fill should be compacted using hand operated vibratory compaction equipment taking care not to crush this material. Adjacent geotextile panels should be overlapped in accordance with the manufacturer's recommendations. The contractor must take extra care to avoid damaging the geotextile (i.e., tearing, ripping, puncturing) during installation and fill placement.

5.4 Pavement Restoration

Based on the findings of the geotechnical information, Kontur recommends the minimum pavement / road structure in the following table. Hot-mix asphaltic concrete, road base gravels, and road subbase gravels should mee the minimum requirements of the latest version of the Master Municipal Construction Document (MMCD) specifications.

Table 3. Minimum Recommended Pavement Structure

Road Structure Type	Material Description – Full-Depth Road Reconstruction
Superpave Hot-Mix Asphalt Pavement	150mm placed in two lifts: (75mm TOP COURSE 12.5mm Superpave in one lift) (75mm thick BASE Course 19mm Superpave in one lift)
Road Base	150mm of 19mm minus crushed base gravel (per MMCD)
Subbase	300mm of 75mm minus well-graded crushed sand and gravel (per MMCD)
Approved Subgrade Surface	Lightweight Fill encapsulated in geotextile

In all cases, where the thickness of the existing asphalt surface permits, a minimum 300mm wide strip should be grinded and tack-coated to allow a minimum 75mm thick overlay to tie-in existing pavement to the new pavement structure. Superpave Hot-mix asphaltic concrete (pavement) should be compacted, in-place, to an average density of at least 93% of the Superpave Maximum Theoretical Density (MTD) with no individual tests less than 91% of MTD in accordance with ASTM D-6925. All hot-mix asphaltic concrete pavement mix designs should meet the minimum requirements detailed in the current edition of the Master Municipal Construction Documents (MMCD) Section 32 12 17. Aggregates and granular materials

should meet the minimum requirements of MMCD – Section 31 05 17. All work should be completed in accordance with the latest edition of the City of Coquitlam Design Criteria.

5.5 Approach Slab

For the concrete approach slabs, a 150mm layer of 19mm clear crushed gravel should be placed to provide a working surface. As per the Structural drawings, a vapour barrier consisting of polyethylene sheeting should be placed between the bedding and underside of concrete slab to reduce migration of moisture and protect the bedding layer from concrete contamination.

5.6 Permanent Slopes and Retaining Wall

Permanent slopes should be sloped no steeper than 2.5H:1V (Horizontal:Vertical) and be protected against erosion by establishing a cover of suitable vegetation.

Where steeper slopes are required, permanent retaining walls or engineered slopes will be required. Acceptable retaining wall solutions may consist of segmental-blocks, mechanically stabilized earth systems, or reinforced concrete. Permanent retaining walls should be properly designed and constructed and built on an approved subgrade surface. Upon request, Kontur can provide detailed retaining wall design.

5.7 General Constructability Considerations

5.7.1 Temporary Excavation and Groundwater Control

All WorkSafeBC Regulations, Guidelines, and Best Practices, for safe and stable excavations should be implemented by the Contractor. An initial review by the Geotechnical Engineer should be completed for any excavation deeper than 1.2m below the surrounding ground surface. For planning purposes, unsupported temporary excavated slopes may be inclined no steeper than about 1 Horizontal to 1 Vertical (1H:1V). Where seepage is encountered, unsupported excavated slopes should be inclined no steeper than about 2H:1V. Where these slopes cannot be achieved, temporary shoring support may be required. Temporary shoring may be in the form of conventional trench boxes or shoring cages.

Where the above-noted unsupported temporary excavated slopes cannot be achieved, temporary shoring support may be required. Temporary shoring may be in the form of conventional trench boxes and/or shoring cages. Other methods (i.e., Sheet piles, slide-rail, soldier piles with timber lagging, anchor tiebacks with shotcrete, etc.) may be required for deeper excavations. In addition, temporary shoring cages should be installed 'tight' against the excavated surface to minimize potential sloughing and/or raveling ('relaxation') of the excavated slope. An Excavation Plan and/or Shoring System should be reviewed in advance of excavation by the Geotechnical Engineer. *Existing buried utility services that cross, intersect, or are located near/within the proposed excavation, must be properly supported during excavation, or they may need to be temporarily relocated.*

Excavated surfaces must be protected and kept dry during construction. Depending on the time of year the construction takes place, it should be expected that some groundwater (perched and/static) may be encountered within the anticipated excavation depths. Granular fill zones (or trenches) that intersect the proposed excavation may also act as conduits for significant groundwater seepage or inflows.

Furthermore, static groundwater levels may occur at a depth of about 2m below the existing surface. The Contractor should be prepared to address and manage potential groundwater seepage from granular zones quickly to avoid significant soil loss and/or excavation instability.

Assuming the lightweight fill excavation depth ranging in the order of about 2m to 2.5m below the existing ground surface, the proposed excavation may be at/near or slightly below the estimated groundwater level. On this basis, groundwater seepage into the excavation may be encountered and depending on the volume of seepage groundwater encountered, conventional sump and pump method may not be feasible to control the seepage volumes.

In the event the seepage volume cannot be accommodated via 'sump and pump method', unwatering/dewatering measures may be required to allow structure installation and backfill placement to occur in dry conditions. The actual dewatering/unwatering method would need to be selected in response to the actual groundwater conditions encountered during the earthworks. A dewatering system (e.g., well-point dewatering) will likely result in the drawdown of the groundwater table and may trigger settlements to the existing ground surface and nearby buried services. An unwatering system (e.g., cutoff wall system, sheet piles) would partially cut off groundwater flow to prevent water from discharging into the excavation. An unwatering system would have less of an impact in terms of drawdown effect of the groundwater table as opposed to a dewatering system. It may be prudent for settlement sensitive structures/buildings be monitored/surveyed prior to and during construction in order to assess the degree of settlement experienced at these locations. In all cases, it is the responsibility of the contractor to protect and provide a dry environment for the placement and compaction of all fill materials. Contractors should make their own assessments and are responsible for selecting the appropriate methods to control groundwater during construction at this site.

5.7.2 Site Preparation

Site preparation for the proposed approach areas should extend down as required to provide the recommended lightweight fill mattress layer as described in **Section 5.3**. The excavated and prepared surface should be reviewed and approved by the Geotechnical Engineer prior to placement of any *Engineered Fill* and/or geosynthetic fabric reinforcement panels.

The excavation as well as additional fill required to restore the excavation up to the underside of the pavement section should consist of either *Engineered Fill/Light-Weight Fill* (where applicable), compacted to at least 95% of Modified Proctor maximum dry density (MPMDD) as per ASTM D-1557.

5.7.3 Engineered Fills

All *Engineered Fill* materials should meet the minimum requirements specified in the latest version of the MMCD Specifications document. Road Base gravels should meet MMCD Specifications for 19mm Crushed Granular Base materials. Road Subbase gravels should meet MMCD specifications for 75mm Crushed Granular Subbase materials.

Where *Engineered Fill* is required as subgrade fills or fills beyond the footprint of the 'approach slabs', the material should consist of an approved granular soil such as a 75mm minus well graded pit run sand and gravel with no more than 5% fines passing the USS #200 sieve by dry weight or approved equivalent.

Where light-weight fills are required, this material should consist of lightweight pumice fill (i.e., red vesicular basalt) that will not break down or degrade during placement and compaction. The material should have a dry density of between 750 and 850 kg/m^3, and a maximum moist dry density of 1,000 kg/m^3.

All *Engineered Fill* materials must be placed and compacted in loose lifts no thicker than 300mm. The material should be near its optimum moisture content and be compacted to at least 95% of the *material's Modified Proctor Maximum Dry Density* (MPMDD) value. Field Density Test reports should be forwarded to the Geotechnical Engineer for review and approval of compacted fill zones.

The existing on-site granular fill soils should not be considered suitable for re-use as *Engineered* Fill (e.g., sub-base material).

6.0 ADDITIONAL STUDY AND FIELD REVIEWS

To sign-off on the work, Kontur must complete the necessary field reviews during the construction stage of the project. Field reviews may be required, but are not limited to, the following stages:

- Review of detailed design details and preferred mitigation ground improvement option;
- Bulk excavation, stripping and final excavation;
- Subgrade and bearing surface review and approvals;
- Placement and compaction of fills, geotextiles, geogrid reinforcements; and/or,
- Placement and compaction of asphaltic pavement.

7.0 CLOSURE

The comments and recommendations presented in this report are based on the referenced information and Kontur's understanding of the project as described herein. If site conditions or project parameters differ from those described in this report, Kontur should be notified promptly to review geotechnical aspects of the project and provide additional or modified comments and recommendations, as deemed appropriate. Contractors should make their own assessments of subsurface conditions at this site and select the construction means and methods that are most appropriate for encountered site conditions.

This report has been prepared for the exclusive use of R.F. Binnie & Associates Ltd. and/or their designated agents or consultants. Any use of the information contained in this report for other than its intended purpose or by any other party must first be verified in writing by Kontur. Kontur does not accept any responsibility or damages because of any other party relying on or using the information, interpretations, opinions, comments, and/or recommendations that are contained in this report.

Kontur trusts that the information described above meets your current requirements. If you should have any concerns or questions, please do not hesitate to contact the undersigned.

Sincerely,

Kontur Geotechnical Consultants Inc.
EGBC Permit to Practice #1000925

Per:

2024-02-16

J.Y. (Yoshi) Tanaka PEng
Principal | Geotechnical Engineer

Reviewed by:

2024-02-16

Brian L.J. Mylleville PhD PEng
Senior Geotechnical Engineer

APPENDIX A

Interpretation and Use of Study and Report Document

INTERPRETATION AND USE OF STUDY AND REPORT DOCUMENT

1.0 STANDARD OF CARE

This study and Report have been prepared in accordance with generally accepted engineering consulting practices in this area. No other warranty, expressed or implied, is made. Engineering studies and reports do not include environmental engineering or consulting.

2.0 COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report which is of a summary nature and is not intended to stand alone without reference to the instructions given to us by the Client, communications between us and the Client, and to any other reports, writings, proposals or documents prepared by us for the Client relative to the specific site described herein, all of which constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WE CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3.0 BASIS OF THE REPORT

The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose that were described to us by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document are only valid to the extent that there has been no material alteration to or variation from any of the said descriptions provided to us unless we are specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4.0 USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT OUR WRITTEN CONSENT. WE WILL CONSENT TO ANY REASONABLE REQUEST BY THE CLIENT TO APPROVE THE USE OF THIS REPORT BY OTHER PARTIES AS "APPROVED USERS". The contents of the Report remain our copyright property and we authorise only the Client and Approved Users to make copies of the Report only in such quantities as are reasonably necessary for the use of the Report by those parties. The Client and Approved Users may not give, lend, sell or otherwise make the Report, or any portion thereof, available to any party without our written permission. Any use which a third party makes of the Report, or any portion of the Report, are the sole responsibility of such third parties. We accept no responsibility for damages suffered by any third party resulting from unauthorised use of the Report.

5.0 INTERPRETATION OF THE REPORT

Nature and Exactness of Descriptions: Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel, may fail to locate some conditions. All investigations, or building envelope descriptions, utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarising such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

Reliance on Provided information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

To avoid misunderstandings, KONTUR should be retained to work with the other design professionals to explain relevant engineering findings and to review their plans, drawings, and specifications relative to engineering issues pertaining to consulting services provided by KONTUR. Further, KONTUR should be retained to provide field reviews during the construction, consistent with building codes guidelines and generally accepted practices. Where applicable, the field services recommended for the project are the minimum necessary to ascertain that the Contractor's work is being carried out in general conformity with KONTUR's recommendations. Any reduction from the level of services normally recommended will result in KONTUR providing qualified opinions regarding adequacy of the work.

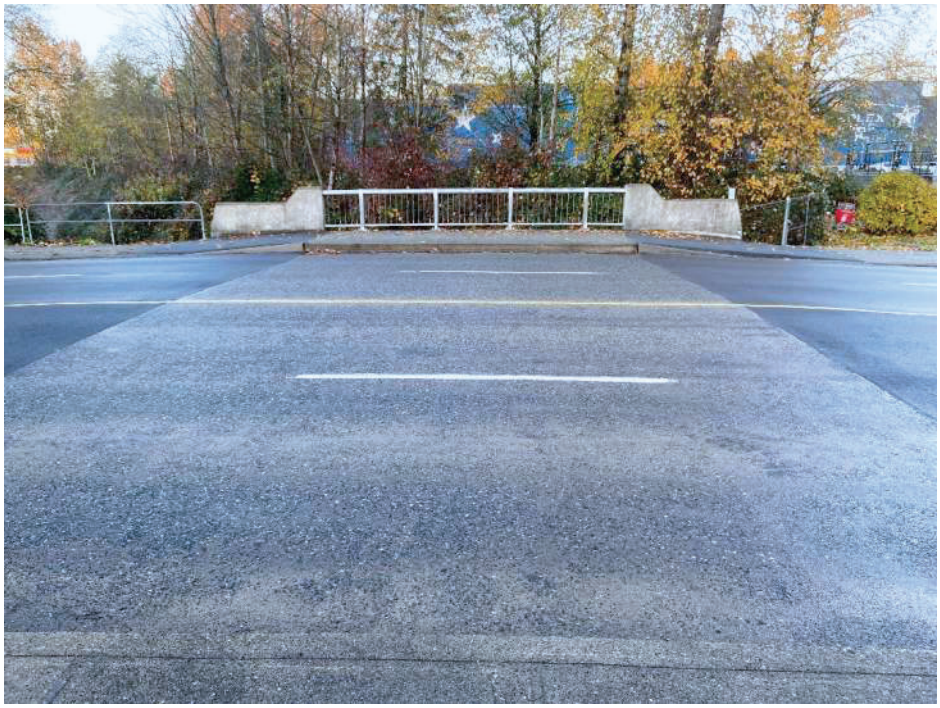
6.0 ALTERNATE REPORT FORMAT

When KONTUR submits both electronic file and hard copies of reports, drawings and other documents and deliverables (KONTUR's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by KONTUR shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by KONTUR shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of KONTUR's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except KONTUR. The Client warrants that KONTUR's instruments of professional service will be used only and exactly as submitted by KONTUR.

The Client recognizes and agrees that electronic files submitted by KONTUR have been prepared and submitted using specific software and hardware systems. KONTUR makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

APPENDIX B
Photographs



Photograph 1 – East edge of Schoolhouse Bridge (looking west).

Photograph 2 –Schoolhouse Bridge facing west.

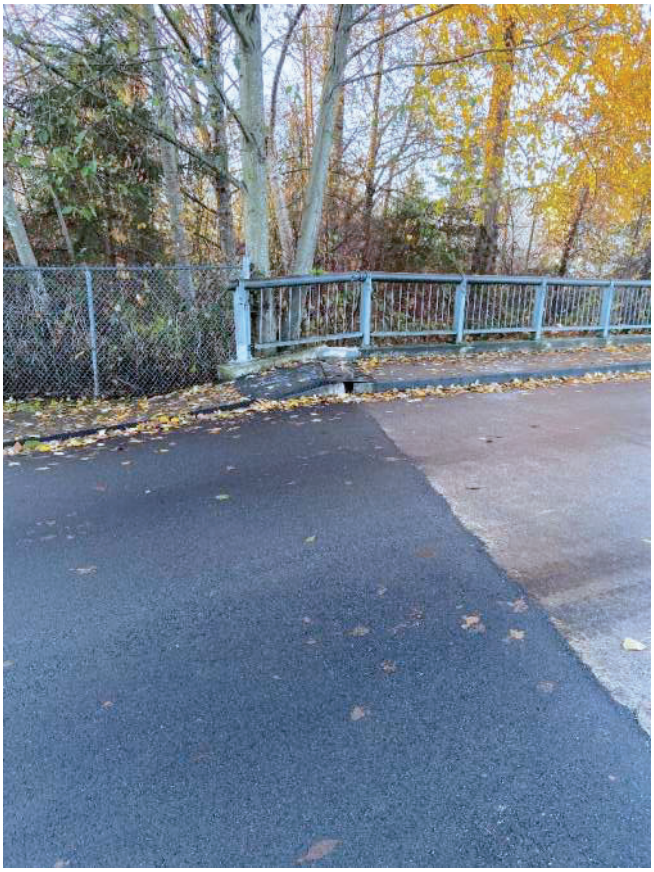
Photograph 3 –Booth Creek looking downstream (west) from Schoolhouse Bridge.

Photograph 4 – Booth Creek looking upstream (east) from Schoolhouse Bridge.

Photograph 5 – Schoolhouse Bridge – City Facility located immediately southwest from bridge.

Photograph 6 – Lucille Starr Bridge – looking west towards approach slab.

Photograph 7 – Lucille Starr Bridge – Looking east from west side of bridge.

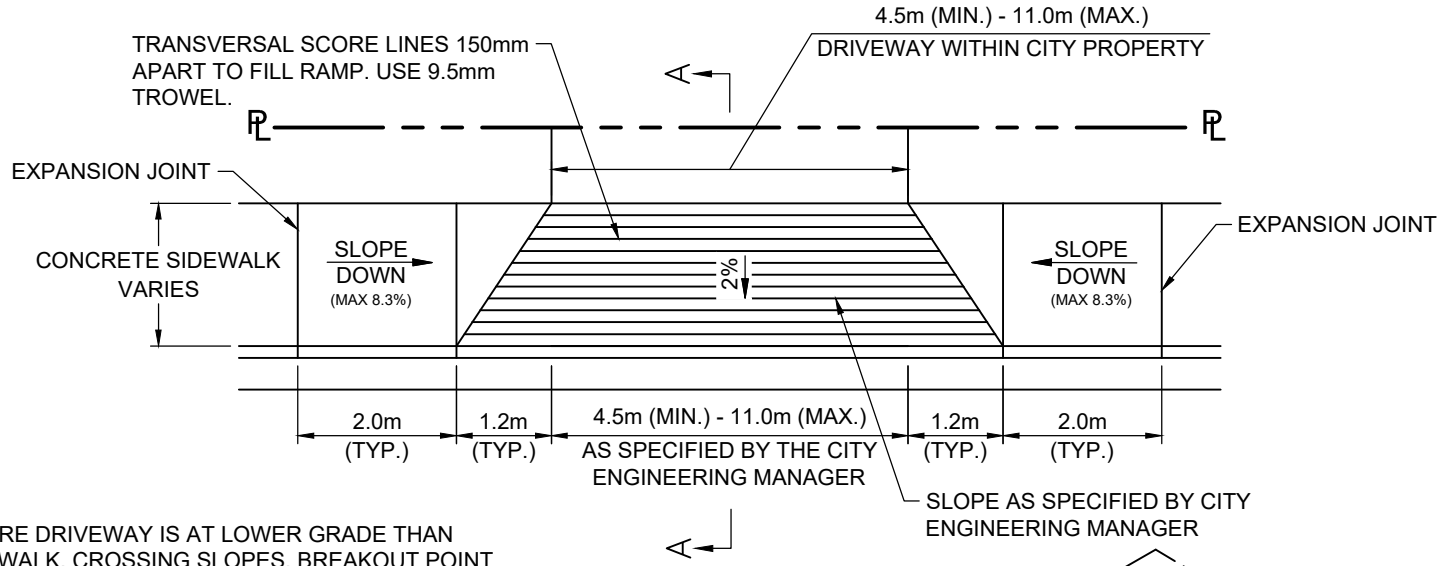


Photograph 8 – Lucille Starr Bridge – west end of bridge looking south; notable separation between bridge and sidewalk.

Photograph 9 – Booth Creek looking upstream (north) from Lucille Starr Bridge.

Photograph 10 – Booth Creek looking down below bridge (south) from Lucille Starr Bridge.

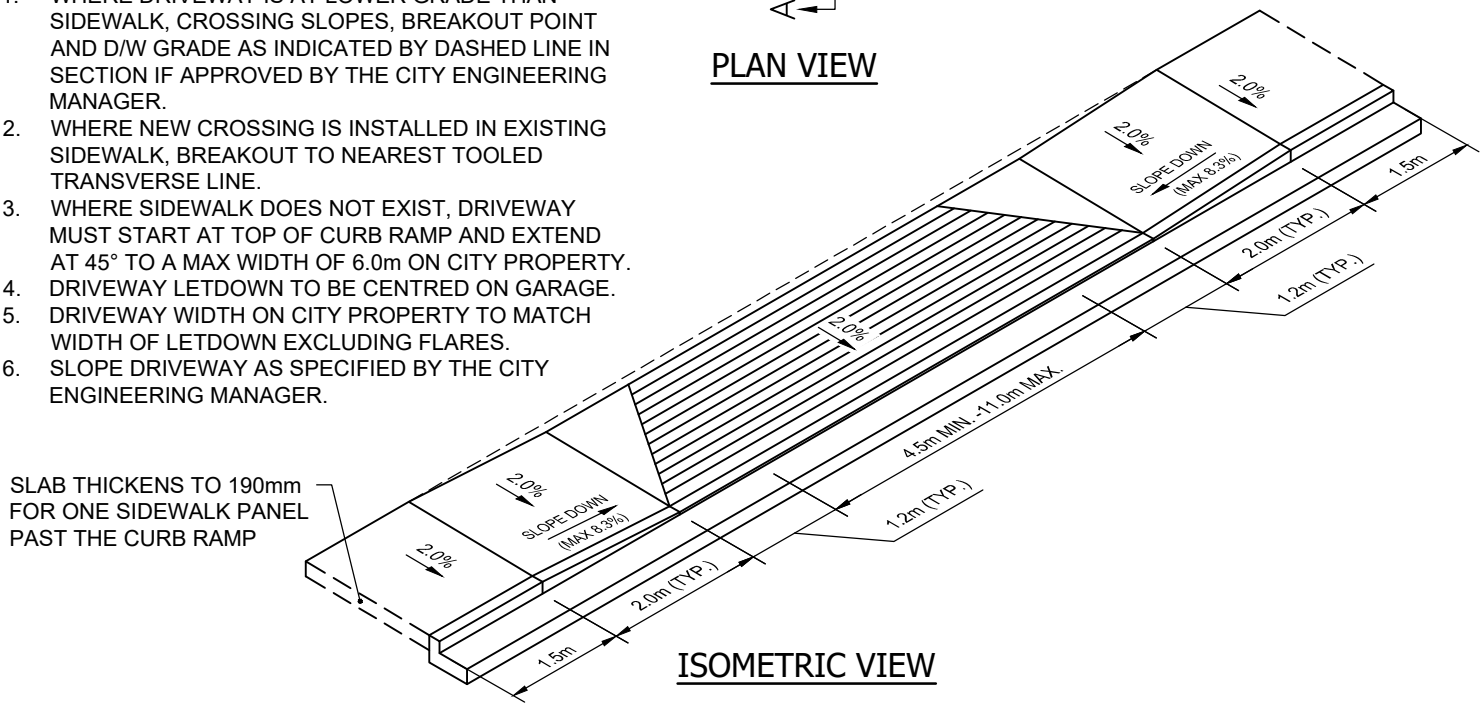
Appendix C -
Additional Information



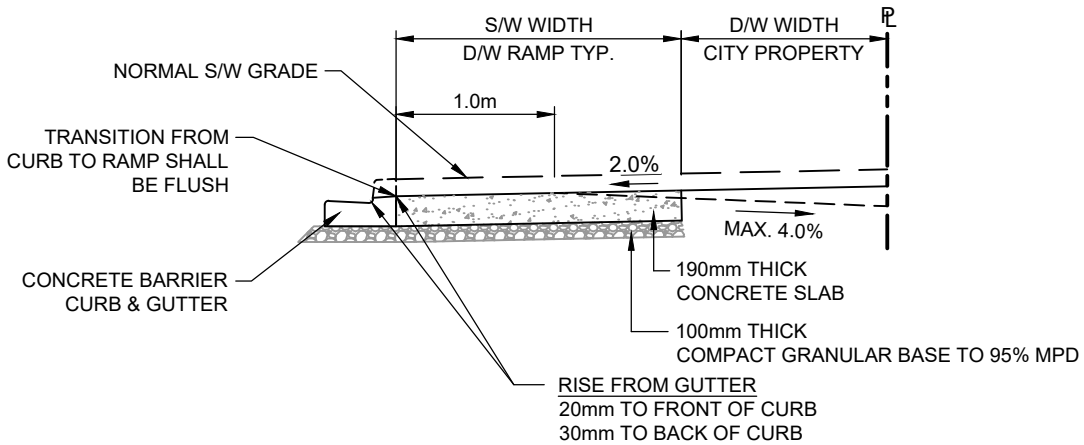
PLAN VIEW

NOTES:

1. WHERE DRIVEWAY IS AT LOWER GRADE THAN SIDEWALK, CROSSING SLOPES, BREAKOUT POINT AND D/W GRADE AS INDICATED BY DASHED LINE IN SECTION IF APPROVED BY THE CITY ENGINEERING MANAGER.
2. WHERE NEW CROSSING IS INSTALLED IN EXISTING SIDEWALK, BREAKOUT TO NEAREST TOOLED TRANSVERSE LINE.
3. WHERE SIDEWALK DOES NOT EXIST, DRIVEWAY MUST START AT TOP OF CURB RAMP AND EXTEND AT 45° TO A MAX WIDTH OF 6.0m ON CITY PROPERTY.
4. DRIVEWAY LETDOWN TO BE CENTRED ON GARAGE.
5. DRIVEWAY WIDTH ON CITY PROPERTY TO MATCH WIDTH OF LETDOWN EXCLUDING FLARES.
6. SLOPE DRIVEWAY AS SPECIFIED BY THE CITY ENGINEERING MANAGER.



ISOMETRIC VIEW



SECTION A-A CURB RAMP

PLOTTED: 19–NOV–20

INDUSTRIAL, COMMERCIAL DRIVEWAY CROSSING OF CURB, GUTTER AND SIDEWALK	DATE:	NOV/2020	DRAWING NUMBER: COQ-C7A
	DRAWN:	GA	
	SCALE:	N.T.S.	

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Booth Creek Bridges - Coquitlam, B.C.

Geotechnical Investigation and Remediation Report

For Bridges Crossing Booth Creek As A Part Of Schoolhouse Street and Lucille Starr Way

Prepared for:

Binnie

Attn: Meaghan Jorgenson

June 11, 2021

Internal Ref: 680844 › Draft › V1

Signature Page

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III: Laboratory Testing Results
IV: Cone Penetration Testing Data
V: Seismic Hazard Parameters

1 Introduction

As requested, SNC-Lavalin Inc. (SNC-Lavalin) has carried out a geotechnical investigation on behalf of Binnie (The Client) to support the remediation of two bridges that cross Booth Creek in Coquitlam, B.C. The first bridge is located on Schoolhouse Street while the second bridge is a part of Lucille Starr Way. Both bridges are located roughly 300 m north of the intersection of Schoolhouse Street and BC Highway 7.

The purpose of the investigation was to determine the subsurface soil and groundwater conditions at the two bridges, and, based on our interpretations of the information, provide an assessment of geotechnical, and construction risks, along with mitigation recommendations to control the identified risks going forward.

It is our understanding that differential settlement of the bridge approaches has caused some serviceability issues (including jacking and excess settlement) for the nearby sidewalks and that regular repairs have been required.

Additionally, SNC-Lavalin was provided with several historical reports that detail some subsurface information along Schoolhouse Street, including near the bridges in question. These reports mention a desire by the City of Coquitlam to increase the elevation of Schoolhouse Street to reduce flooding of the roadway and potential methodologies to do so. This report will not readdress the roads specifically but will instead focus on the two bridges mentioned above.

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2 Background

As mentioned previously, several historical geotechnical reports and bridge construction drawings were provided to SNC-Lavalin to aid in the planning and execution of the field investigation. The list of historical reports can be found below.

- Golder Associates Ltd. (December 22, 2008). Geotechnical Investigation - *Proposed Road Improvement Options Schoolhouse Street*, *Coquitlam, B.C.*;
- Golder Associates Ltd. (February 1, 2010). *Geotechnical Review and Recommendations - Site Preparation and Design of Retaining Walls, Schoolhouse Street Improvements, Coquitlam, B.C.*;
- Golder Associates Ltd. (February 1, 2010). *Recommended Load Compensation and Pavement Structure - Schoolhouse Street Road Improvements, Coquitlam, B.C.*;
- B6920 Series of Drawings, R.F. Binnie and Associates Engineering, 20 January 1999; and
- V249 Series of Drawings, Schoolhouse Street Bridge Booth Creek, R.R. Williams and Associates Engineering Ltd, June 1990.

According to the construction drawings provided, The Schoolhouse Street Bridge was designed around June of 1990 as a reinforced concrete, multi-span bridge that is founded on several sets of steel pipe piles. As there was no report provided that details the driving of these piles, it has been assumed that they were driven to their anticipated design elevation of -38 m. This would be a total pile length of roughly 41.5 m.

The Lucille Starr Bridge appears to be slightly newer, as the provided construction drawings for this bridge are dated January of 1999. Similar to the Schoolhouse Street Bridge, this bridge is a single span, reinforced concrete bridge founded on concrete filled steel pipe piles. There were no pile driving reports provided to SNC-Lavalin as a part of this report.

The Golder reports, mentioned above, reference settlement issues that have historically occurred in the project area and potential remediation options for the nearby roadways. These reports also include design parameters for the new roads, retaining walls, and general construction recommendations. As this report focuses on the bridges and their abutments, please consult the cited reports for more information on other elements.

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3 Investigation Methodology

The investigation of the two Booth Creek bridges consisted of advancing three solid stem auger boreholes, two Cone Penetration Tests (CPT), and two Seismic Cone Penetration Test (SCPT) near the bridge abutments. The locations of these holes can be found in Appendix I.

This section describes the methodology of advancing the boreholes and cones. The geotechnical investigation of this bridge occurred between April 5 and 7, 2021 and then finished on the night of May 19, 2021.

Permits for lane closures and borehole drilling were requested and provided prior to the start of work by representatives of the City of Coquitlam.

3.1 Borehole Location and Underground Utility Sweep

On both drilling occasions SNC-Lavalin arrived at the Site with traffic control personnel and an underground utility locator technician from Quadra Utility Locating Ltd. (Quadra). Once appropriate traffic control measures had been set, utility sweeps were performed at all the proposed borehole and (S)CPT locations. These sweeps were performed prior to the start of work to confirm the locations of buried utilities that were known to be nearby. Both the City of Coquitlam and other utility owners, via BC One Call, provided approximate utility locations and, in some cases, as built drawings of buried utilities in the area.

Both electromagnetic (EM) and ground penetrating radar (GPR) scanning were performed at each location. The approximate locations of the buried utilities were identified and boreholes were located at least 1.5 m away from any identified locations. Other abnormalities noted during the GPR scans were also avoided to minimize the risk of encountering unidentified underground utilities or other buried elements.

3.2 Drilling and SCPT Advance

The drilling portion of the field investigation was conducted between April 5 and 7, 2021 inclusive and then finished on May 19, 2021. During the April program, one 10 m CPT, one 35 m SCPT, one 10 m borehole and one 5 m borehole were advanced at the Schoolhouse Street location. An additional 7.5 m borehole, 12 m CPT and 30 m SCPT were advanced at the Lucille Starr Way locations. The CPT/sCPT were advanced by Schwartz Soil Technical Ltd. (Schwartz) with help from Southland Drilling Co. Ltd (Southland). Six dissipation tests were performed within these CPTs. All of the dissipation tests were truncated in the interest of time due to the fine grained nature of the soils. Graphs of the dissipation tests and the results of the (S)CPTs can be found in Appendix IV.

All boreholes were advanced using a combination of solid and hollow stem auger drilling using a truck mounted rig from Southland Drilling Co. Ltd. of Delta, B.C. The drilling was supervised by a full-time member of SNC-Lavalin geotechnical staff. Detailed records of borehole logs are available in Appendix II. One Standard Penetration Test (SPT), and three Shelby tube samples were taken during the drilling of the boreholes near the Schoolhouse Street bridge. (S)CPTs were advanced within 2 m of the corresponding borehole.

Select samples from each of the boreholes were shipped to SNC-Lavalin's CCIL accredited Soil Laboratory in Fort St. John, B.C. for a variety of testing including, grain size analyses, moisture content testing and Atterberg Limit testing.

4 Geotechnical Laboratory Results

In total, 10 samples were selected for moisture content testing, eight (8) samples for both Atterberg limits and grain size analysis, and two (2) samples for only sieve analysis. These tests were completed in SNC-Lavalin's Canadian Council of Independent Laboratories (CCIL) certified laboratory.

Table 4-1 provides a summary of the particle size distributions, Atterberg limits and moisture contents for samples tested. Full lab testing sheets can be found in Appendix III and contain additional testing information. Select laboratory testing data is also visualized on the borehole logs contained in Appendix II.

It is noted that high moisture contents and Atterberg plasticity and liquid limits are largely due to the presence of organic materials in many of the samples. Further information can be found in Section 5.

Table 4-1: Select Laboratory Testing Data.

Sample Number	Sample Depth Range (mbgs)	Moisture (%)	Grain Size Distribution (%)				Atterberg Limits	
			Gravel	Sand	Silt	Clay	P_W*	L_W*
01-01	0.9-1.1	6	40.7	47.4	11.9			
01-02	3.7-3.9	33	4.3	88.5	7.2		111	113
01-03	4.2-4.4	112	0	36.5	63.5		60	81
01-05	7.5-7.7	71	0.6	6.9	78.9	13.6	30	44
02-02	2.8-3.0	236	1.6	27.0	71.4		72	84
02-03	4.0-4.2	323	3.6	79.0	17.4		116	117
02-05	5.8-6.0	10	1.2	40.5	58.3		51	55
03-01	0.6-0.8	3	33.3	52.0	14.8		--	--
03-04	3.5-3.7	67	5.5	80.0	14.5		42	47
03-05	4.3-4.5	102	0.9	22.1	77.0		30	44

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5 Subsurface Conditions

The soil descriptions discussed herein are based on commonly accepted methods of classification and identification in geotechnical engineering practice and in general accordance with the Unified Soil Classification System (USCS). Classification and identification of soils involves judgement and interpretation and SNC-Lavalin does not guarantee that descriptions are exact but infers accuracy to the extent that is common in geotechnical engineering practice. The depths of stratigraphic changes are generally approximate and inferred since there is often a gradual change between soil types. The following presents a brief description of the subsurface conditions encountered at the site in general.

Detailed descriptions of the conditions encountered in the boreholes during the investigation are summarized on the attached borehole logs in Appendix II. A record of the sCPT logs can also be found in Appendix IV. It should be noted that there will be some variation in the depths of the encountered soil strata over the project area. The following descriptions are based on the field investigation and information available in the reference documents, which are available in Appendix VII.

5.1 Schoolhouse Bridge Stratigraphy

5.1.1 Surface Asphalt

All boreholes and (S)CPTs (BH21-01/CPT21-01, BH21-03 and sCPT21-03) were advanced within the west curb lane of Schoolhouse Street in Coquitlam, B.C. The asphalt in this lane was measured as approximately 150 mm thick in both of the advanced boreholes. Overall, the asphalt condition near the borehole areas was fair, with minimal evidence of transverse cracking in the area near the bridge abutments.

5.1.2 Gravelly Sand Road Base Fill

A layer of grey, well graded, dense, moist, angular, gravelly SAND fill was encountered below the asphalt in both boreholes advanced near the Schoolhouse Bridge approaches. This SAND appeared to be a processed 25 mm minus road base fill that extended from the surface asphalt to 0.9 and 0.6 metres below ground surface (mbgs) in BH21-01 and BH21-03 respectively. This SAND appeared to be well drained.

5.1.3 Gravelly Sand Fill

A layer of brown, well graded, dense, moist, subrounded, gravelly SAND fill was encountered just below the road base fill, described above, in both boreholes. Samples of this fill were subjected to grain size analyses and returned percent fines values of 11.9 and 14.8 percent for BH21-01 and BH21-03 respectively. Moisture contents in this layer were six percent and three percent in those same boreholes. Trace cobbles were found during drilling within this layer which extended to 2.7 mbgs and 1.9 mbgs in BH21-01 and BH21-03 respectively.

5.1.4 Grey Sand Fill

A grey, well graded, compact, damp SAND containing some gravel was found below the brown SAND fill described above in BH21-01 only. This SAND contained some gravel and extended from 2.7 mbgs to approximately 3.6 mbgs.

5.1.5 Native Organic Silt

A native, mottled, grey with brown, low plasticity, moist, organic SILT containing some clay was found interbedded with the fibrous PEAT layer described below. In BH21-01 this SILT was encountered directly below the PEAT (at approximately 4.2 mbgs) and extended to the termination of the borehole at 10 mbgs. In BH21-03 however, this organic SILT was found above the fibrous PEAT and below the brown SAND fill described above (starting at approximately 2.1 mbgs and encountering the PEAT at 3.1 mbgs). At 3.7 mbgs, this organic SILT was encountered again where the layer extended to the termination of BH21-03 at 5.1 mbgs.

This SILT was selected for grains size analyses, and moisture content testing. The results of this testing shows that this organic SILT contains approximately 13.6% clay and between 63.5% and 90% fines. Moisture content results for this material show very high numbers due to the presence of organic materials while the results of Atterberg limit testing in this material show Plastic Limits between 30.43 and 60.22 and Liquid Limits between 44.30 and 81.37.

5.1.6 Fibrous Peat

A sand based, reddish brown, PEAT soil was encountered interbedded with the organic SILT described above in both BH21-01 and BH21-03. This PEAT was noted to contain a large amount of wood fibres and wood chips within these boreholes. Several samples of this PEAT were submitted for grain size analysis testing, Atterberg Limit testing and moisture content testing. Generally, this soil returned very high values of moisture content, plastic limit, and liquid limit due to the high presence of organics.

This PEAT was encountered between 2.6 mbgs and 4.2 mbgs in BH21-01 and between 3.1 mbgs and 3.7 mbgs in BH21-03.

5.2 Lucille Starr Way Stratigraphy

5.2.1 Surface Asphalt

Both the one borehole and (S)CPTs (sCPT21-02, BH21-02/CPT21-02) were advanced within the roadway of Lucille Starr Way in Coquitlam, B.C. The asphalt in this lane was measured as approximately 100 mm thick in the advanced borehole near the east abutment of the bridge. Overall, the asphalt condition near the borehole areas was fair, with minimal evidence of transverse cracking in the area near the bridge abutments.

5.2.2 Gravelly Sand Road Base Fill

Similar to the soil found at Schoolhouse Street, a layer of brown to grey, well graded, dense, moist, angular, gravelly SAND fill was encountered below the asphalt in the borehole advanced near the Lucille Starr Bridge approach. This SAND appeared to be a processed 25 mm minus road base fill that extended from the surface asphalt to approximately 2.0 metres below ground surface (mbgs) in BH21-02. This SAND appeared to be well drained as a perched water table was encountered near the bottom of this soil layer.

5.2.3 Fibrous Peat

Similar to at the Schoolhouse Bridge location, a sand and organics based, reddish brown, PEAT soil was encountered above the organic SILT described above in both of the Schoolhouse boreholes. This PEAT was noted to contain a large amount of wood fibres and wood chips within the Lucille Starr borehole. Unlike the Schoolhouse boreholes, the PEAT at the Lucille Starr borehole was not found with any significant interbedding with the below organic silt.

This PEAT was encountered between 2.1 mbgs and 5.1 mbgs in BH21-02.

5.2.4 Native Organic Silt

A native, mottled, grey with brown, low plasticity, moist, organic sandy SILT containing some clay was found below the fibrous PEAT layer described above. In BH21-02 this SILT was encountered directly below the PEAT (at approximately 5.1 mbgs) and extended to the termination of the borehole at 7.5 mbgs.

As stated above, this SILT was selected for grains size analyses, and moisture content testing. At the Lucille Starr location the results of this testing shows that this organic SILT contains approximately 58% fines and 40% sand. Moisture content results for this material show very high numbers due to the presence of organic materials while the results of Atterberg limit testing in this material show Plastic Limits between approximately 50 and 100.

5.3 Groundwater

The groundwater level in these boreholes is governed by the water level in Booth Creek and likely varies seasonally and during precipitation events.

At the time of this investigation, the groundwater table was encountered at roughly 2.6 metres below the bridge deck at Schoolhouse Bridge, and roughly 2 metres below the pavement surface at the Lucille Starr Way location.

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6 Seismic Considerations

The 2015 National Building Code of Canada (2015 NBCC)[1] has adopted the use of foundation factors that are dependent on local site soils condition, shaking level, and site period for structural design considerations. The effects of local site conditions are characterized based on the average shear wave velocity or SPT N value of the soils or rock within the upper 30 m of the Site.

SNC-Lavalin has obtained site specific hazard predictions for the site from the National Resources Canada website[2]; a copy of the results is provided in Appendix V. It should be noted that National Resources Canada provides values for Site Class C soils. Correction factors are then applied to alter these values for the specified site class.

The seismic site classification for the Lucille Star bridge is considered to be Class F due to presence of peat and highly organic material of more than 3 m.

For Schoolhouse Bridge, the selection of Seismic Site Class was made by SNC-Lavalin based on the following soil parameters noted in the top 30 m of the site.

- An average undrained shear strength of < 50 kPa; and
- An average shear wave velocity (Vs) of < 150 m/sec.

Considering these soil parameters, the predicted peak firm-ground horizontal accelerations, and spectral accelerations for the design return period for, this site is considered to be Seismic Site Class E.

SNC-Lavalin used seismic hazard data from the nearest NBCC seismic data location for these parameters.

Table 6-1: Seismic Hazard Parameters for Site Class E

Seismic Return Period	PGA (g)	Sa (0.2s)	Sa (0.5s)	Sa (1.0s)	Sa (2.0s)
1:2475	0.315	0.796	0.987	0.659	0.447

Although currently being developed, an update to these seismic hazard parameters is expected in NBCC 2021 or another similar building code. SNC-Lavalin can provide updated seismic hazard parameters once the new code is in circulation.

The same hazard parameters can be used for the two bridges due to their proximity and similar subsurface conditions.

It should be noted that the seismic design was not within the scope of this project and hence, the recommendations above, should be verified with appropriate in-situ testing tailored for the specific seismic design purposes.

[1] National Research Council of Canada. (2015). *2015 National Building Code of Canada*. Ottawa: Associate Committee on the National Building Code, National Research Council.

[2] Natural Resources Canada (2016). *Seismic Hazard Calculator.* Retrieved from http://www.earthquakescanada.nrcan.gc.ca/hazard-alea/interpolat/index-en.php.

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7 Recommendations

7.1 Construction Recommendations

7.1.1 Temporary Excavations

Although not anticipated or recommended for this project due to the ground conditions encountered, cut slopes which are intended to be exposed/open for less than seven (7) days are considered to be temporary. Those which are intended to remain open for greater than seven (7) days are considered to be permanent and should be designed accordingly.

Temporary cut slopes in native organic SILT and FILL soils similar to those encountered during the investigation under dry conditions should be developed at angles no steeper than 1 Horizontal:1 Vertical (1H:1V) for excavation depths up to 2.0 m. Oversize particles (greater than 150 mm nominal diameter) exposed during excavation should be removed from cut slopes prior to worker entry into the excavation. Excavations greater than 2.0 m should developed at angles no steeper than 2H:1V.

Excavations should not be opened within the PEAT soils without adequate and engineered shoring systems in place. These soils are unstable when disturbed and do not provide an adequate work platform.

Should any excavations remain open for a duration longer than 7 days, they should be inspected and approved by a qualified geotechnical engineer on no less than a weekly basis, with scheduled follow-up inspections thereafter, or if any changes in slope or slope performance occurs. It should be noted that drying and potential ravelling of the cut slopes during dry weather, as well as potential erosion during wet weather, should be expected and as such it is recommended that the slopes be protected from weather by covering them with either tarps or poly. A full time Geotechnical Engineer should supervise the excavation considering the variable ground conditions that can be different than what observed here.

Groundwater seepage was encountered at varying depths during the investigation. Monitoring of groundwater levels during excavation should be performed and any loss in stability due to groundwater seepage should be remediated.

7.1.2 Permanent Excavations

Based on the proposed development plan, permanent cut slopes are not expected to be required. However, if permanent cut slopes are advanced, they will likely expose FILL soils and native organic SILT. Permanent cut slopes in these deposit types should be developed at 2H:1V or shallower; final slope designs should be reviewed by the Geotechnical Engineer. Slopes should be smoothed and re-vegetated with grasses and/or native vegetation to prevent erosion; a 100 mm thick layer of topsoil should be placed on the smoothed subgrade to provide a growing medium for vegetation. Slope crests should be rounded and smoothed as a gradual transition to shed surface run off.

7.1.3 Drainage and Dewatering

As the water table in the areas surrounding these bridges is influenced heavily by the nearby creek, it is not recommended that any excavations be advanced below 2 m without a proper dewatering and care of water plan. Any seepage within planned excavations will cause instability in the FILL, PEAT and organic SILT

soils that may be exposed. A drainage sump located at the low point of the excavation should be used as a collection area to ensure a relatively stable work platform within the excavation, if required.

7.1.4 Placement of Fill Material

Prior to placement of structural fill material, representative bulk samples (about 25 kg) should be taken of the proposed fill soils and laboratory tests should be conducted to determine natural moisture content, grain size distribution, and Proctor moisture density relationship. These tests should be conducted as part of proper control of construction for the engineered fill.

The placement of the recommended lightweight fill at the bridge locations should follow the manufacturers specification to maximize performance without increasing the density of the fill.

Structural fills, such as road base and subbase soils, will be composed of well graded, crushed, sand and gravel mixtures. The location and thickness of structural fills will be determined by the road designer and approved by the Site geotechnical engineer. All structural fills will be tested and approved prior to site delivery. Structural fills will be hydrated and compacted to achieve the required density as determined from laboratory testing.

7.2 Settlement Analysis and Remediation Options

7.3 Schoolhouse Bridge

Based on the information provided to us in the historical reports, it is understood that the Schoolhouse Street bridge was built in 1990 and was founded on steel pipe piles. Schoolhouse Street was preloaded from Lougheed Hwy to Lucille Starr Way during road widening and construction between 1988 and 1991. However, as reported, no fill or preload was placed within 10 m of Booth Creek. Golder reported (dated December 22, 2008) a layer of lightweight pumice fill up to 500 mm thick beneath the pavement base layer at both the south and north sides of the bridge, within 10 m to 15 m of the bridge deck. However, this layer was not observed during our recent filed investigation in 2021.

Based on available subsurface information, soil stratigraphy under the north and south approaches are slightly different. An “Organic Silt” layer was observed beneath fill within the south area, while it was not spotted under the north approach. In addition, thickness of the existing fill varies from 2.2 m to 3.6 m under the south approach and the north approach, respectively. For the purpose of settlement analysis, a general stratigraphy which contains more compressible soil layers (relatively between north and south test hole) was considered for the analysis. Recent ground exploration was completed to 35 m depth; however, a test hole was drilled to depth of about 47 m in 1990, and its factual data below 35 m depth was used for settlement analysis. This test hole log was included in the Golder report dated December 22, 2008.

The primary soil parameters for settlement analysis were interpreted using available (S)CPT raw data and laboratory test results. Furthermore, empirical correlations such as Mesri and Godlewski (1977) were used to derive soil parameters like secondary settlement. Due to a lack of post-construction settlement monitoring data, back-calculation of soil parameters was not feasible, however, the reported total settlement information was used to adjust soil parameters. The generalized soil profiles and parameters used for settlement analysis are presented in Table 7-1.

Table 7-1: Initial Soil Stratigraphy and Parameters used for Settlement Analysis at Schoolhouse Bridge

Soil Type	Thickness (m) Varies	Unit Weight (kN/m3)	Es (kPa)	C_c	C_r	OCR	e_0	C_v (cm^2/s)	K (cm/s)	Ca/Cc
Fill (Sand and Gravel)	2.7	19	62500							
Organic Silt, some Clay	1.2	17		0.6	0.06	1	1.6	0.002		0.04
Peat	0.6	12		2.8	0.28	1	4	0.003		0.06
Organic Silt, some Clay, interbedded Peat	1.5	16		1.1	0.11	1	1.1	0.003		0.047
Silt, some Clay	3.5	17.5		0.65	0.065	1.4	1.9		2e-7	0.035
Silty Sand/Sand	1	18	35000							
Silt, some Clay	1.7	17.5		0.65	0.065	1.4	1.9		2e-7	0.035
Silty Sand/Sand	2.4	18	35000							
Clay, silty Clay	22	17.5		0.42	0.05	1	1.1		1e-7	0.03
Sand and Gravel	14	19	120000							

Settlement analyses were conducted using commercially available computer software Settle3, version 5.007 (Rocscience 2020). The settlement analysis was completed using a traffic load of about 12 kPa as the service load, assuming a permanent fill (conventional mineral fill) will be placed to raise the road to the design grade (maximum 500 mm).

It should be noted that estimation of future settlements with confidence are difficult due to lake of advance soil laboratory testing, variations in soil condition and stratigraphy, and complex loading history of the site.

In order to assist the Client on planning the next phase of the project, two set of analyses were completed:

a) To provide an estimation for the anticipated settlement of the site under current ground conditions, a set of analysis was completed for existing ground conditions.

For initial planning purposes, it was assumed no remediation will be conducted to reduce the rate of settlement, however, the existing pavement will be repaired and rehabilitated to keep it serviceable for less than 5 years. It was assumed additional fill up to 0.5 m will be required for this purpose. Settlement magnitudes were estimated for a maximum grade increase of 0.5 m (equivalent load of 10 kN/m^3), as summarized inTable 7-2.

Table 7-2: Estimated Total Settlement for 0.5 m New Fill.

Timeline	Estimated Total settlement (mm)
2 Years	70 to 120
5 Years	90 to 200

The above estimation is provided considering the service loads (traffic loads) equivalent to 12 kPa, however, if future service loads are different, the above provided number may vary.

a) A remediation option was evaluated to minimize the long-term settlement of the ground adjacent to the bridge.

Different remediation options were assessed to minimize long-term settlement of the ground adjacent to the bridge approaches. These options consist of preloading, incorporating of lightweight materials, overbuilding or a combination of these options. Preloading in the vicinity of the bridge is not practical as it will impact serviceability of the road and disrupts the traffic flow. Additionally, there would be an impact on existing buried structures and utility lines in the preloaded areas. The Impact of preload on the pile foundation also needs a detailed assessment and may produce bridge settlement.

As discussed above, repair and overbuilding of the road may not be a long-term resolution to minimize future settlement due to placement of additional fill.

It is recommended that a lightweight material to replace the existing mineral fill should be considered to minimize long-term settlement of the ground adjacent to the bridge deck. Replacing mineral fill with lightweight materials will decrease effective stress on the underlaying compressible soils and accordingly decrease the current rate of settlement. Different lightweight materials such as Expanded Polystyrene (EPS), manufactured expanded shale, pumice and cellular concrete were evaluated. Use of EPS is not feasible due to minimum required road structure thickness above EPS and floating and buoyancy issues. Cellular concrete may not be suitable due to the need to accommodate ongoing long-term differential settlement. Thus, pumice was considered as a lightweight option to replace the mineral fill. It is anticipated the final selection of the proper material will be done by others or under separate scope that evaluates the impact to the project costs.

Settlement analysis were completed for different depths of lightweight replacement to achieve a load compensation to minimize long-term total and differential settlement. The analyses indicated if a thickness of 1.5 m of existing mineral fill under the road structure (i.e. underside of sub-base) is replaced by a lightweight material the following long-term settlement is anticipated, as shown in Table 7-3.

Table 7-3.Estimated Total Settlement when 1.5 m of mineral fill replaced by lightweight material at Schoolhouse Bridge

Timeline	Estimated Total Long-term settlement (mm)
10 Years	20 to 45
20 Years	35 to 85
25 Years	60 to 120

For the analysis purposes, it was assumed that the existing mineral fill has a unit weight of about 19 kN/m^3, and a typical lightweight material is considered to have a unit weight of 10 kN/m^{3}to 12 kN/m^3. It was assumed the pavement will be constructed using conventional granular fill with minimum 550 mm thickness, and will be placed on pumice. It should be noted the above recommendations should be reviewed and verified if unit weight of lightweight material is different.

For a high-level cost estimation, the following should be considered:

› Sub-excavation should extend laterally past the edge of roadways to replacement of mineral fill (including sidewalks and landscape area);

- Mineral fill replacement should be extended at least 12 m from the bridge deck to minimize longitudinal differential settlement; and
- In the areas where the excavation extends to the top of the peat layer, a layer of geotextile should be used to cover the peat layer.

It should be noted due to ongoing decomposition of organic materials and secondary consolidation of underlying silty clay and deep marine sediment, it is not practical to completely eliminate long-term and differential settlement.

The same approach is followed for settlement analysis and remediation option at Lucille Starr Bridge and the results are discussed in the following section.

7.4 Lucille Starr Way Bridge

Based on the information provided to us, it is understood that the Lucille Starr Way bridge was built in 1999 and was founded on concrete filled steel pipe piles. The approach slabs and the adjacent ground is underlain by compressible soils and has been experiencing an ongoing post-construction settlement. However, at time of this report no settlement monitoring data is available.

Recent ground exploration by SNC-Lavalin was completed to 30 m depth below the existing road surface. Based on the collected subsurface information, it is known that the soil stratigraphy under the east and west approaches are slightly different. Within the east side of the bridge a layer of peat with 3 m thickness was observed, however, the peat layer on the west side was noticed to be less than 1 m thick. Note, for the purpose of settlement analysis, a general stratigraphy which contains more compressible soil layers (i.e., relatively) was considered for the analysis.

The primary soil parameters for settlement analysis were interpreted using available CPT raw data and laboratory test results. Furthermore, empirical correlations such as Mesri and Godlewski (1977) were used to derive soil parameters like secondary settlement. The generalized soil profiles and parameters used for settlement analysis are presented in Table 7-4

Table 7-4: Initial Soil Stratigraphy and Parameters used for Settlement Analysis at Lucille Starr Bridge

	Thickness (m) Varies	Unit Weight (kN/m3)	Es (kPa)	C_c	C_r	OCR	e_0	C_v (cm^2/s)	K (cm/s)	Ca/Cc
Fill (Sand and Gravel)	2.1	19	62500							
Peat	3	12		3.3	0.33	1	4	0.003		0.06
Organic Silt, some Clay	2.4	17		1.2	0.12	1	1.1	0.002		0.05
Clay, silty Clay	2.5	17.5		0.42	0.05	1	1.1		1e-7	0.03
Organic Silt, some Clay	1	17		1.2	0.12	1	1.1	0.002		0.05
Silty Sand/Sand	1.5	18	35000							
Clay, silty Clay	17.5	17.5		0.42	0.05	1	1.1		1e-7	0.03

As discussed above for planning purposes, two set of analysis were completed:

a) A set of analysis was completed to estimate future settlement of the site under existing ground conditions assuming no remediation will be conducted to reduce the rate of settlement, however, the existing pavement will be repaired and rehabilitated to keep it serviceable for less than five years. Settlement was estimated for a maximum grade increase of 0.5 m and summarized in Table 7-5.

Table 7-5: Estimated Total Settlement for 0.5 m New Fill

Timeline	Estimated Total settlement (mm)
2 Years	120 to 240
5 Years	160 to 320

The above estimation is provided with the assumption that service loads (traffic loads) are equivalent to 12 kPa.

It should be noted that the presence and thickness of the peat layer strongly affect the magnitude of settlement. The Thickness of the peat adjacent to the bridge may vary from what is considered in this assessment, as such the above estimated settlement may differ.

a) A remediation option was evaluated to minimize the long-term settlement of the ground adjacent to the bridge.

Settlement analyses were completed for different depths of lightweight replacement to achieve a load compensation to minimize long-term total and differential settlement. The analyses indicated if a thickness of 2 m of existing mineral fill under the road structure (i.e., sub-base) is replaced by a lightweight material the following long-term settlement is anticipated, as summarized in Table 7-6.

Table 7-6: Estimated Total Settlement when 2 m of mineral fill replaced by lightweight material at Lucille Starr Bridge

Timeline	Estimated Total Long-term settlement (mm)
10 Years	35 to 60
20 Years	55 to 105
25 Years	90 to 150

For a high-level cost estimation, the following should be considered:

› Sub-excavation should extend laterally past the edge of roadways to replace nearby mineral fill (including sidewalks and landscape area);

› Mineral fill replacement may be extended to about 25 m from the bridge deck to minimize longitudinal differential settlement; and

› In areas where the excavation extends to the top of the peat layer, a layer of geotextile should be used to cover the peat layer.

As mentioned above the presence and thickness of the peat layer strongly affect the magnitude of settlement. If during construction thickness of peat noticed different than what considered in this assessment, the geotechnical engineer should be notified and the above provide numbers should be reviewed and verified.

8 Closure

SNC-Lavalin trusts that this report meets your expectations and requirements. Please do not hesitate to contact the signees of this report with any questions, comments or feedback concerning the content or presentation of this report.

Appendix I

Borehole Location Maps

CHECK PRINT

LEGEND

LOT BOUNDARY

BOREHOLE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED PRIOR TO INTRUSIVE WORK. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	2021-04-26	ESRI AERIAL IMAGERY

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	–	–	–	–

0 5 20 METRES

CLIENT NAME:
BINNIE

PROJECT LOCATION:
BOOTH CREEK, SCHOOLHOUSE BRIDGE
COQUITLAM, BC

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TITLE:

SITE PLAN

DWN BY: PES	SCALE: 1:400	DATE: 2021-04-26	DWG No: REV.: 0
CHK'D: JE	PLOT: 20210427.1120	CADFILE: 680844R00	680844-002

PATH: P:\CURRENT PROJECTS\BINNIE\680844 SCHOOLHOUSE BRIDGES\40_EXECUTION\45_GIS_DWGS\CAD\680844R00.DWG

LEGEND

LOT BOUNDARY

BOREHOLE

NOTES

1. ORIGINAL DRAWING IN COLOUR.
2. LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE ONLY AND SHOULD BE CONFIRMED PRIOR TO INTRUSIVE WORK. NOT ALL UTILITIES MAY BE SHOWN.

REFERENCE DRAWINGS

DWG. NO.	DATE	DESCRIPTION
–	2021-04-26	ESRI AERIAL IMAGERY

REVISIONS

REV.	DATE	DESCRIPTION	BY	CHK
0	–	–	–	–

0 5 20 METRES

CLIENT NAME:
BINNIE

PROJECT LOCATION:
LUCILLE STARR WAY, SCHOOLHOUSE BRIDGE, COQUITLAM, BC

SNC·LAVALIN

TITLE:

SITE PLAN

DWN BY: PRT	SCALE: 1:400	DATE: 2021-05-27	DWG No: REV.: 0
CHK'D: JE	PLOT: 20210528.0941	CADFILE: 680844R00	680844-003

PATH: P:\CURRENT PROJECTS\BINNIE\680844 SCHOOLHOUSE BRIDGES\40_EXECUTION\45_GIS_DWGS\CAD\680844R00.DWG

Appendix II

Borehole Logs

RECORD OF BOREHOLE No. BH21-01 Co-Ord. N 5453593 E 510726

Project Number:	680844	Drilling Location:	BH21-01	Logged by:	JE
Client:	Binnie	Drilling Method:	150 mm Solid Stem Augers	Compiled by:	JE
Project Name:	Coquitlam Booth Creek Bridges	Drilling Machine:	Truck Mounted Drill	Reviewed by:	MH
Location:	Coquitlam, B.C.	Date Started:	Apr 5, 2021 Date Completed: Apr 5, 2021	Revision No.:	0

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; Su: △ Intact; Vane*: ◇ Intact ◆ Remould; 0 50 100 150 200	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading △ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) ✱ Passing 75 um (%) ○ Moisture Content (%) Atterberg Limits W_P 20 40 60 80 W_L	INSTRUMENTATION INSTALLATION	COMMENTS
	ASPHALT, ~ 6" thick.										
	SAND and GRAVEL, grey, well graded, dense, moist, subangular to angular gravel, road base FILL. 0.2										
	SAND and GRAVEL, some cobbles, brown, well graded, subrounded gravels, dense, damp, FILL. 0.9	GS	01-01			1			○ 6		G 40.7% S 47.4% SI&CL 11.9%
	SAND, some gravel, grey, well graded, compact, damp, FILL. 2.7					2					
	Peat, sandy, containing wood fibres, some wood chips, trace silt, brown, damp. 3.6	GS	01-02			3			○ 113 ● 339		
	SILT, clayey, trace organics, grey with brown mottling, high plasticity, firm, moist. 4.2	GS	01-03			4			● ○ 113		G 0% S 36.5% SI&CL 63.5%
		SY	01-04			5					
	At ~ 7.5 m, some fine sand in SPT sample.	SS	01-05			6			● ○ 72		G 0.6% S 6.9% SI 78.9% CL 13.6%
		SY	01-06			7					
	EOH at ~ 10 m. Solid stem augers were used for the first 4.5 m then hollow stem was used to limit sloughing. Borehole backfilled with bentonite chips and auger cuttings with road base material near the surface along with an asphalt patch. 10.0					8					
						9					
						10					

SNC·LAVALIN

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commisioned and the accompanying 'Notes to Record of Boreholes'.

Scale: 1 : 61

RECORD OF BOREHOLE No. BH21-02 Co-Ord. N 5453724 E 510822

Project Number:	680844	Drilling Location:	BH21-02	Logged by:	JE
Client:	Binnie	Drilling Method:	150 mm Solid Stem Augers	Compiled by:	JE
Project Name:	Coquitlam Booth Creek Bridges	Drilling Machine:	Track Mounted Drill	Reviewed by:	MH
Location:	Coquitlam, B.C.	Date Started:	Apr 6, 2021	Date Completed: Apr 6, 2021	Revision No.: 0

Local Ground Surface Elevation:

Lithology Plot	DESCRIPTION	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING	LAB TESTING	INSTRUMENTATION INSTALLATION	COMMENTS
	ASPHALT, ~ 4" thick.							Penetration Testing: SPT ○ DCPT ●	★ Rinse pH Values 2 4 6 8 10 12		
	SAND and GRAVEL, brown, well graded, dense, angular gravel, moist, road base FILL. 0.1							Su: Intact △	△ Soil Vapour Reading parts per million (ppm) 100 200 300 400		
	SAND and GRAVEL, some silt, grey, well graded, subrounded to subangular gravels, dense, moist, FILL. 0.9					1		Vane*: Intact ◇ Remould ◆	▲ Lower Explosive Limit (LEL) ✱ Passing 75 um (%) ○ Moisture Content (%)		
	At ~ 2 m, saturated.	GS	02-01			2		0 50 100 150 200	Atterberg Limits W_P 20 40 60 80 W_L		
	Wood fibres and wood waste, saturated, loose. 2.1 2.2										
	PEAT, silty, sandy, some organics including branches, brown, high plasticity, moist, soft, odour of decaying organic material.	GS	02-02			3			● 237		
		GS	02-03			4			116 ○ 324		
	SILT, some clay, some sand, trace organics, grey, high plasticity, soft, moist. 5.1	GS	02-04			5					
	Organic SILT, sandy, brown with grey mottling, high plasticity, soft, moist. 5.4	GS	02-05			6			● 101		G 1.2% S 40.5% SI&CL 58.3%
		SY	02-06			7					
	EOH at ~ 7.5 m. Advanced with hollow stem auger below 6 m to reduce sloughing. Backfilled with bentonite chips and auger cuttings with road base and an asphalt patch at the surface. 7.5										

SNC·LAVALIN

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Scale: 1 : 45

RECORD OF BOREHOLE No. BH21-03 Co-Ord. N 5453566 E 510724

Project Number:	680844	Drilling Location:	BH21-03	Logged by:	JE
Client:	Binnie	Drilling Method:	150 mm Solid Stem Augers	Compiled by:	JE
Project Name:	Coquitlam Booth Creek Bridges	Drilling Machine:	Truck Mounted Drill	Reviewed by:	MH
Location:	Coquitlam, B.C.	Date Started:	Apr 7, 2021	Date Completed: Apr 7, 2021	Revision No.: 0

Lithology Plot	DESCRIPTION Local Ground Surface Elevation:		Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	FIELD TESTING Penetration Testing: ○ SPT ● DCPT Su: △ Intact; Vane*: ◇ Intact ◆ Remould 0 50 100 150 200	LAB TESTING ★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading △ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) ✱ Passing 75 um (%) ○ Moisture Content (%) Atterberg Limits W_P W_L 20 40 60 80	INSTRUMENTATION INSTALLATION	COMMENTS
	ASPHALT, ~ 7" thick.											
	SAND and GRAVEL, trace silt, brown, well graded, subangular gravel, dense, moist, road base FILL. At ~ 0.3 m, grey.	0.2										
		0.6	GS	03-01						○ 3		G 33.3% S 52.0% SI&CL 14.8%
			GS	03-02			1					
	SILT, some clay, trace organics, grey with brown mottling, low plasticity, moist.	1.9					2					
	SILT, some organic inclusions, some sand, trace gravel, dark brown, low plasticity, moist.	2.1	GS	03-03								
	PEAT, sandy, some silt, brown to reddish brown, some black layering, wood fibre inclusions.	3.1					3					
			GS	03-04						■● ○ 67		
	SILT, sandy, some organic inclusions, some clay, grey, medium to high plasticity, soft, moist. Contains interlayered PEAT similar to above.	3.7					4					
			GS	03-05						■● ○ 102		G 0.9% S 22.1% SI&CL 77.0%
			SY	03-06			5					
	EOH at ~ 5.1 m. Hollow Stem auger starting at ~ 4.5 m. Backfilled with bentonite chips and auger cuttings with road base gravel and an asphalt patch at surface.	5.1										

SNC·LAVALIN

Borehole details as presented, do not constitute a thorough understanding of all potential conditions present and requires interpretative assistance from a qualified Geotechnical Engineer. Also, borehole information should be read in conjunction with the geotechnical report for which it was commisioned and the accompanying 'Notes to Record of Boreholes'.

RECORD OF BOREHOLE No. BH21-01 Co-Ord. N 5453593 E 510726

Project Number:	680844	Drilling Location:	BH21-01	Logged by:	JE
Client:	Binnie	Drilling Method:	150 mm Solid Stem Augers	Compiled by:	JE
Project Name:	Coquitlam Booth Creek Bridges	Drilling Machine:	Truck Mounted Drill	Reviewed by:	MH
Location:	Coquitlam, B.C.	Date Started:	Apr 5, 2021 Date Completed: Apr 5, 2021	Revision No.:	0

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; Su △ Intact; Vane* ◇ Intact ◆ Remould; 0 50 100 150 200	★ Rinse pH Values 2 4 6 8 10 12; Soil Vapour Reading △ parts per million (ppm) 100 200 300 400; ▲ Lower Explosive Limit (LEL) ✱ Passing 75 um (%) ○ Moisture Content (%); Atterberg Limits W_P 20 40 60 80 W_L	INSTRUMENTATION INSTALLATION	COMMENTS
	ASPHALT, ~ 6" thick.										
	SAND and GRAVEL, grey, well graded, dense, moist, subangular to angular gravel, road base FILL. 0.2										
	SAND and GRAVEL, some cobbles, brown, well graded, subrounded gravels, dense, damp, FILL. 0.9	GS	01-01			1			6		G 40.7% S 47.4% SI&CL 11.9%
	SAND, some gravel, grey, well graded, compact, damp, FILL. 2.7					2					
	Peat, sandy, containing wood fibres, some wood chips, trace silt, brown, damp. 3.6	GS	01-02			3			113 339		
	SILT, clayey, trace organics, grey with brown mottling, high plasticity, firm, moist. 4.2	GS	01-03			4			113		G 0% S 36.5% SI&CL 63.5%
		SY	01-04			5					
	At ~ 7.5 m, some fine sand in SPT sample.	SS	01-05			6			72		G 0.6% S 6.9% SI 78.9% CL 13.6%
		SY	01-06			7					
	EOH at ~ 10 m. Solid stem augers were used for the first 4.5 m then hollow stem was used to limit sloughing. Borehole backfilled with bentonite chips and auger cuttings with road base material near the surface along with an asphalt patch. 10.0					8					
						9					
						10					

SNC·LAVALIN

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Scale: 1 : 61

RECORD OF BOREHOLE No. BH21-02 Co-Ord. N 5453724 E 510822

Project Number:	680844	Drilling Location:	BH21-02	Logged by:	JE
Client:	Binnie	Drilling Method:	150 mm Solid Stem Augers	Compiled by:	JE
Project Name:	Coquitlam Booth Creek Bridges	Drilling Machine:	Track Mounted Drill	Reviewed by:	MH
Location:	Coquitlam, B.C.	Date Started:	Apr 6, 2021	Date Completed: Apr 6, 2021	Revision No.: 0

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; Su △ Intact; Vane* ◇ Intact ◆ Remould; 0 50 100 150 200	★ Rinse pH Values 2 4 6 8 10 12 △ Soil Vapour Reading parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) ✱ Passing 75 um (%) ○ Moisture Content (%) Atterberg Limits W_P 20 40 60 80 W_L	INSTRUMENTATION INSTALLATION	COMMENTS
	ASPHALT, ~ 4" thick.										
	SAND and GRAVEL, brown, well graded, dense, angular gravel, moist, road base FILL. 0.1										
	SAND and GRAVEL, some silt, grey, well graded, subrounded to subangular gravels, dense, moist, FILL. 0.9					1					
	At ~ 2 m, saturated.	GS	02-01			2					
	Wood fibres and wood waste, saturated, loose. 2.1 2.2										
	PEAT, silty, sandy, some organics including branches, brown, high plasticity, moist, soft, odour of decaying organic material.	GS	02-02			3			237		
		GS	02-03			4			116 324		
	SILT, some clay, some sand, trace organics, grey, high plasticity, soft, moist. 5.1	GS	02-04			5					
	Organic SILT, sandy, brown with grey mottling, high plasticity, soft, moist. 5.4	GS	02-05			6			101		G 1.2% S 40.5% SI&CL 58.3%
		SY	02-06			7					
	EOH at ~ 7.5 m. Advanced with hollow stem auger below 6 m to reduce sloughing. Backfilled with bentonite chips and auger cuttings with road base and an asphalt patch at the surface. 7.5										

SNC·LAVALIN

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RECORD OF BOREHOLE No. BH21-03 Co-Ord. N 5453566 E 510724

AI 30

Project Number:	680844	Drilling Location:	BH21-03	Logged by:	JE
Client:	Binnie	Drilling Method:	150 mm Solid Stem Augers	Compiled by:	JE
Project Name:	Coquitlam Booth Creek Bridges	Drilling Machine:	Truck Mounted Drill	Reviewed by:	MH
Location:	Coquitlam, B.C.	Date Started:	Apr 7, 2021	Date Completed: Apr 7, 2021	Revision No.: 0

LITHOLOGY PROFILE		SOIL SAMPLING						FIELD TESTING	LAB TESTING		
Lithology Plot	DESCRIPTION Local Ground Surface Elevation:	Sample Type	Sample Number	Recovery (%)	SPT 'N' Value	DEPTH (m)	ELEVATION (m)	Penetration Testing: ○ SPT ● DCPT; Su: △ Intact; Vane*: ◇ Intact ◆ Remould; 0 50 100 150 200	★ Rinse pH Values 2 4 6 8 10 12 Soil Vapour Reading △ parts per million (ppm) 100 200 300 400 ▲ Lower Explosive Limit (LEL) ✱ Passing 75 um (%) ○ Moisture Content (%) Atterberg Limits W_P 20 40 60 80 W_L	INSTRUMENTATION INSTALLATION	COMMENTS
	ASPHALT, ~ 7" thick.										
	SAND and GRAVEL, trace silt, brown, well graded, subangular gravel, dense, moist, road base FILL. At ~ 0.3 m, grey. 0.2										
	SAND and GRAVEL, brown, well graded, subrounded gravels, dense, damp, FILL. 0.6	GS	03-01						○ 3		G 33.3% S 52.0% SI&CL 14.8%
						1					
		GS	03-02								
	SILT, some clay, trace organics, grey with brown mottling, low plasticity, moist. 1.9					2					
	SILT, some organic inclusions, some sand, trace gravel, dark brown, low plasticity, moist. 2.1										
		GS	03-03								
						3					
	PEAT, sandy, some silt, brown to reddish brown, some black layering, wood fibre inclusions. 3.1										
		GS	03-04						■● ○ 67		
	SILT, sandy, some organic inclusions, some clay, grey, medium to high plasticity, soft, moist. Contains interlayered PEAT similar to above. 3.7					4					
		GS	03-05						■● ○ 102		G 0.9% S 22.1% SI&CL 77.0%
		SY	03-06			5					
	EOH at ~ 5.1 m. Hollow Stem auger starting at ~ 4.5 m. Backfilled with bentonite chips and auger cuttings with road base gravel and an asphalt patch at surface. 5.1										

SNC·LAVALIN

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Scale: 1 : 30

Appendix III

Laboratory Testing Results

MECHANICAL SIEVE ANALYSIS

Sample No.	**1**	Date Sampled	**05-Apr-21**	By **JE**	of	**SNC-Lavalin Inc.**	
Borehole No.	**BH21-01**	Depth (m)	**0.9**	Sample Type	**Bag**	Natural Moisture	**6.2** %
Description	**Sand and gravel, trace silt, trace clay.**					Tech	**MK/DY**

Specifications

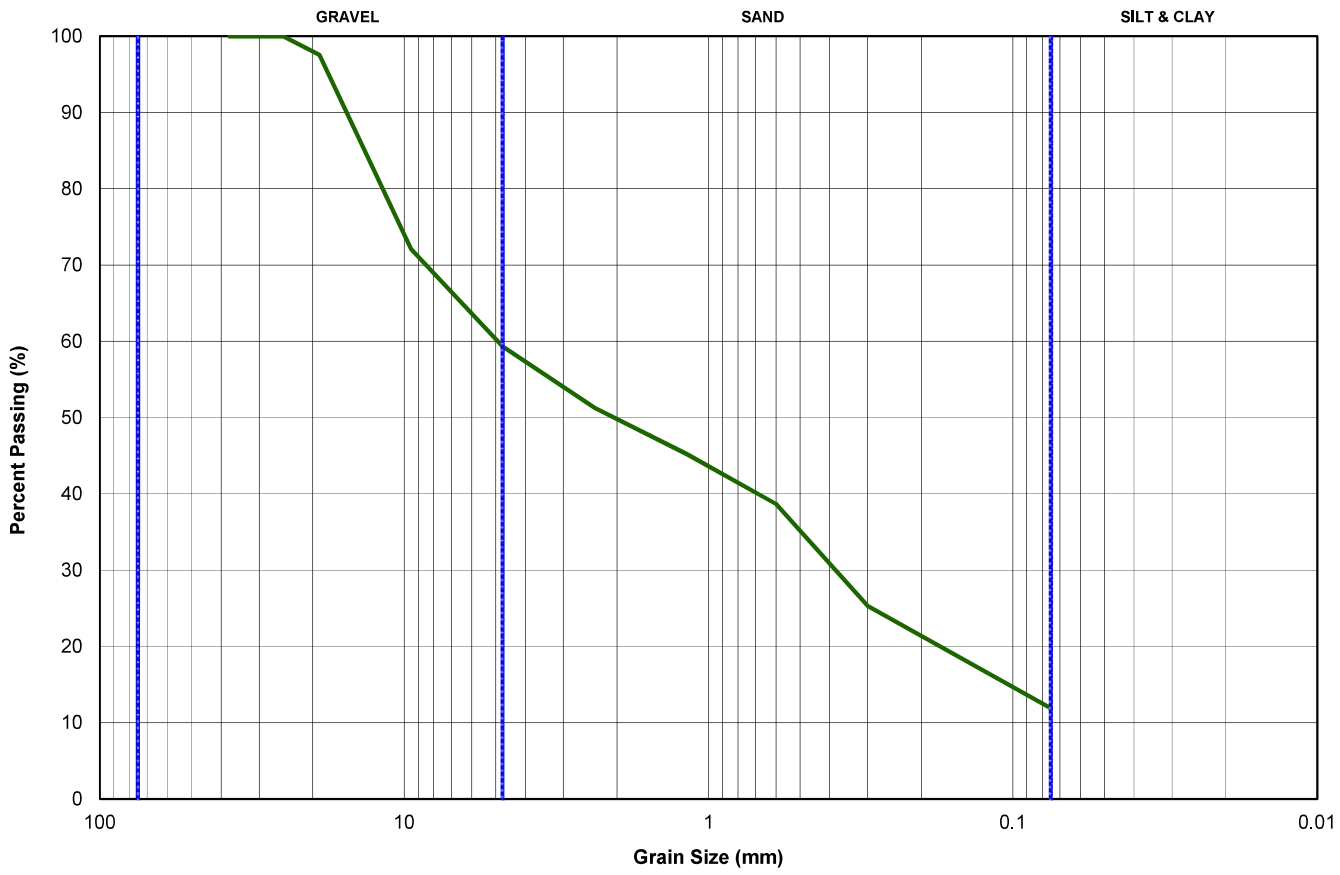
Comments

Fracture	Method
N/A	**A**

Sieve Results

Sieve mm	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.075
% Passing	100.0	100.0	97.5	82.2	72.1	59.3	51.3	45.2	38.7	25.3	11.9

By Type Gravel = **40.7%** Sand = **47.4%** Silt & Clay = **11.9%**



SNC·LAVALIN

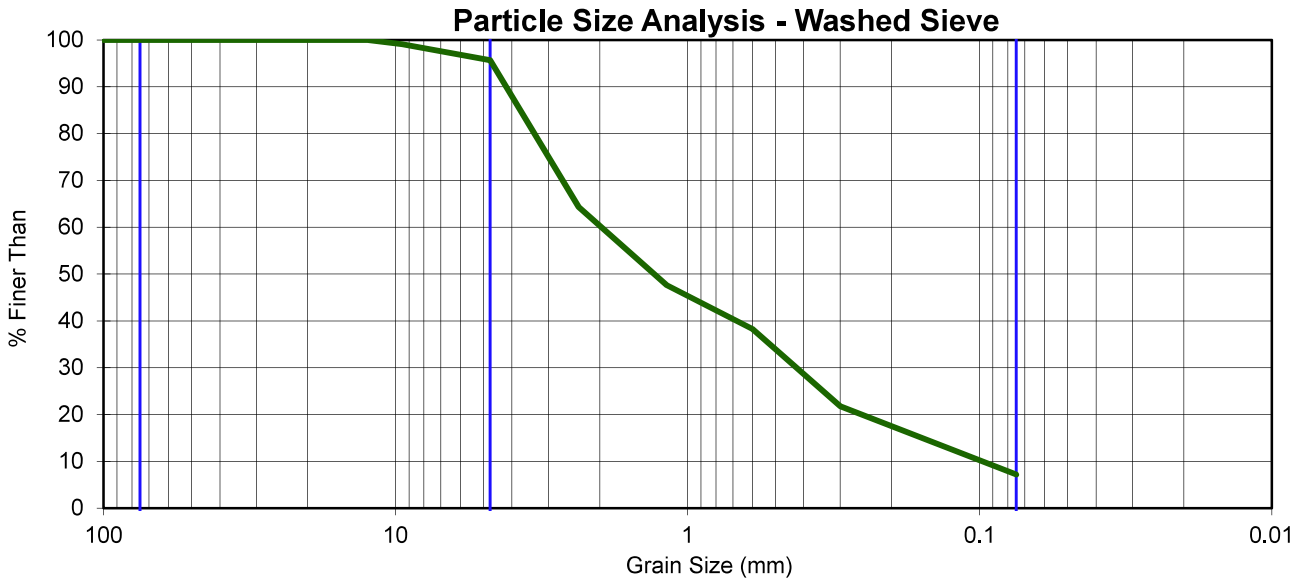
Client	**Binnie**	Date	**13-Apr-21**
Project	**Schoolhouse Bridges**	File No.	**680844**
Location	**Coquitlam, British Columbia**	Sample No.	**1**

UNIFIED SOILS CLASSIFICATION

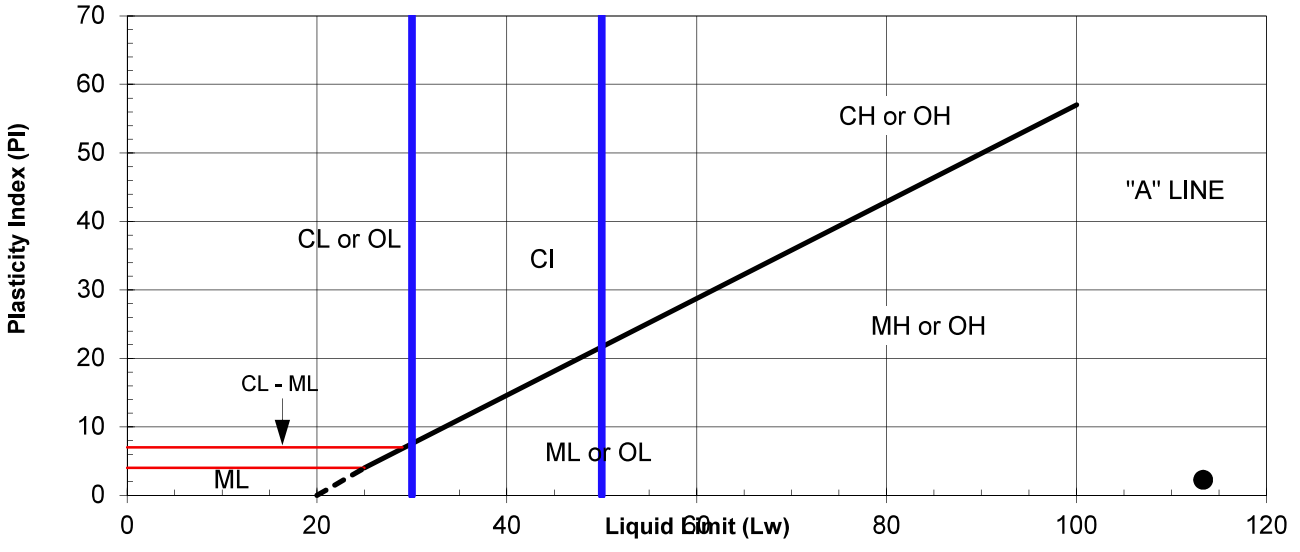
Sample No.: **2** Date Sampled: **07-Apr-21** By: **JE** of **SNC-Lavalin Inc.**

Borehole No.: **BH21-01** Depth (m) **3.70** Specification **ASTM D 2487**

Description: **Sand, trace silt, trace gravel, trace clay.** Tech./ Eng. **MK/CE**



Gravel = **4.3%** Sand = **88.5%** Silt and Clay = **7.2%**



Pw = **111.11%** Group Index: **0**

Lw = **113.36%** Soil type: **Organic**

PI = **2.25%** Fines type: **OH**

Unified Soils Classification: **SP-SM - Poorly graded sand with silt**

SNC·LAVALIN

Client: **Binnie** Date: **19-Apr-21**

Project: **Schoolhouse Bridges** File No.: **680844**

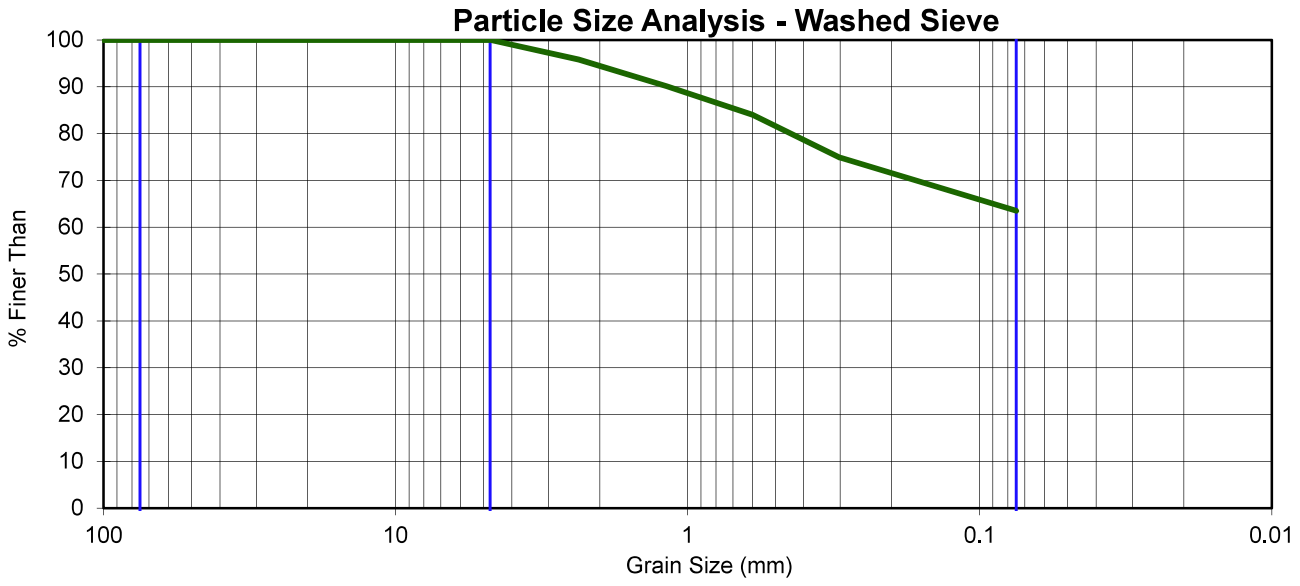
Location: **Coquitlam, British Columbia** Sample No.: **2**

UNIFIED SOILS CLASSIFICATION

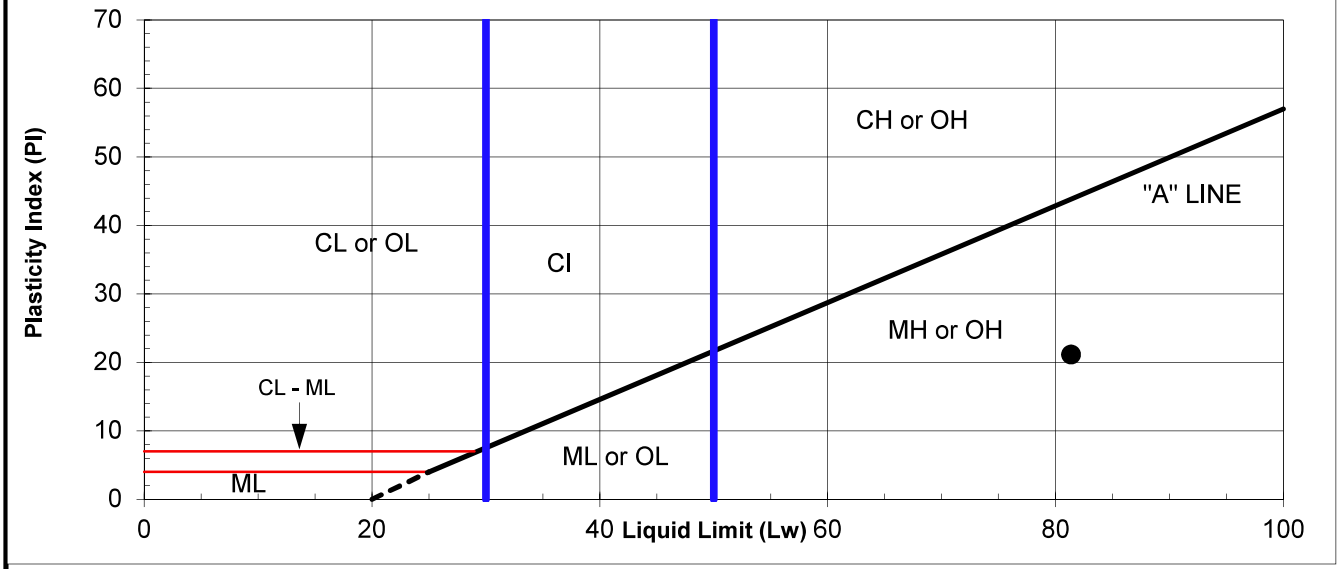
Sample No.: **3** Date Sampled: **07-Apr-21** By: **JE** of **SNC-Lavalin Inc.**

Borehole No.: **BH21-01** Depth (m) **4.30** Specification **ASTM D 2487**

Description: **Silt and sand, some clay.** Tech./ Eng. **MK/CE**



Gravel = **0.0%** Sand = **36.5%** Silt and Clay = **63.5%**



Pw = **60.22%** Group Index: **13**

Lw = **81.37%** Soil type: **Organic**

PI = **21.15%** Fines type: **MH**

Unified Soils Classification: **OH - Sandy organic silt**

SNC·LAVALIN

Client: **Binnie** Date: **19-Apr-21**

Project: **Schoolhouse Bridges** File No.: **680844**

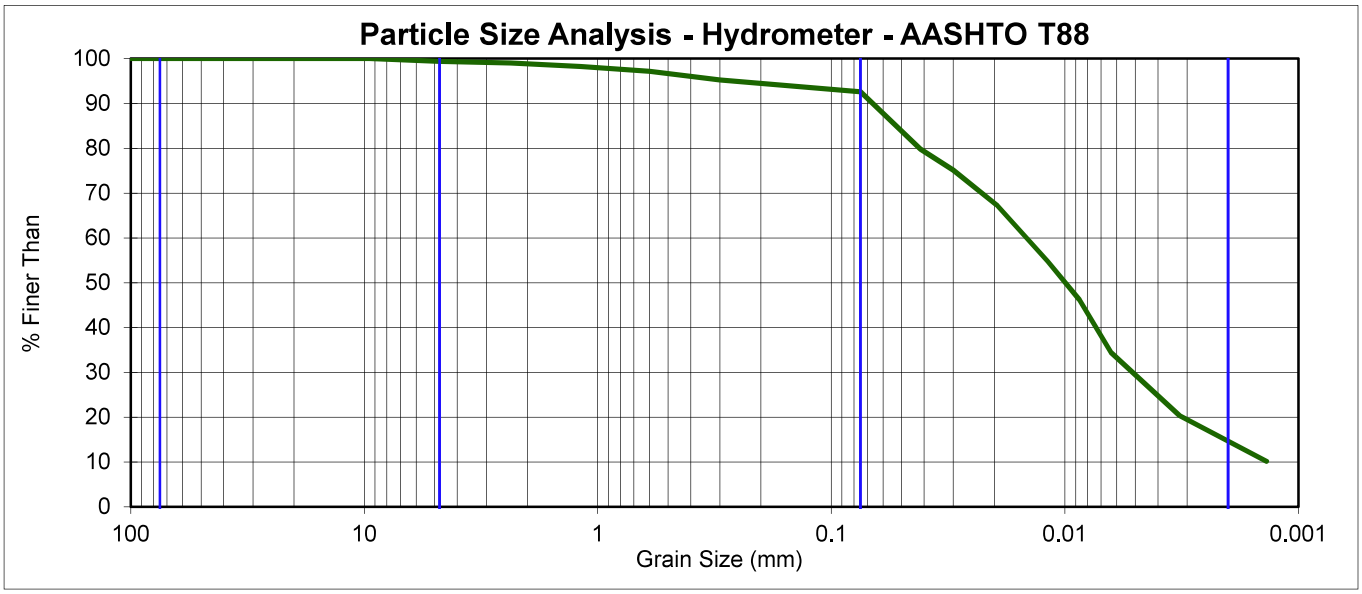
Location: **Coquitlam, British Columbia** Sample No.: **3**

UNIFIED SOILS CLASSIFICATION

Sample No. **5** Date Sampled **05-Apr-21** By **JE** of **SNC-Lavalin Inc.**

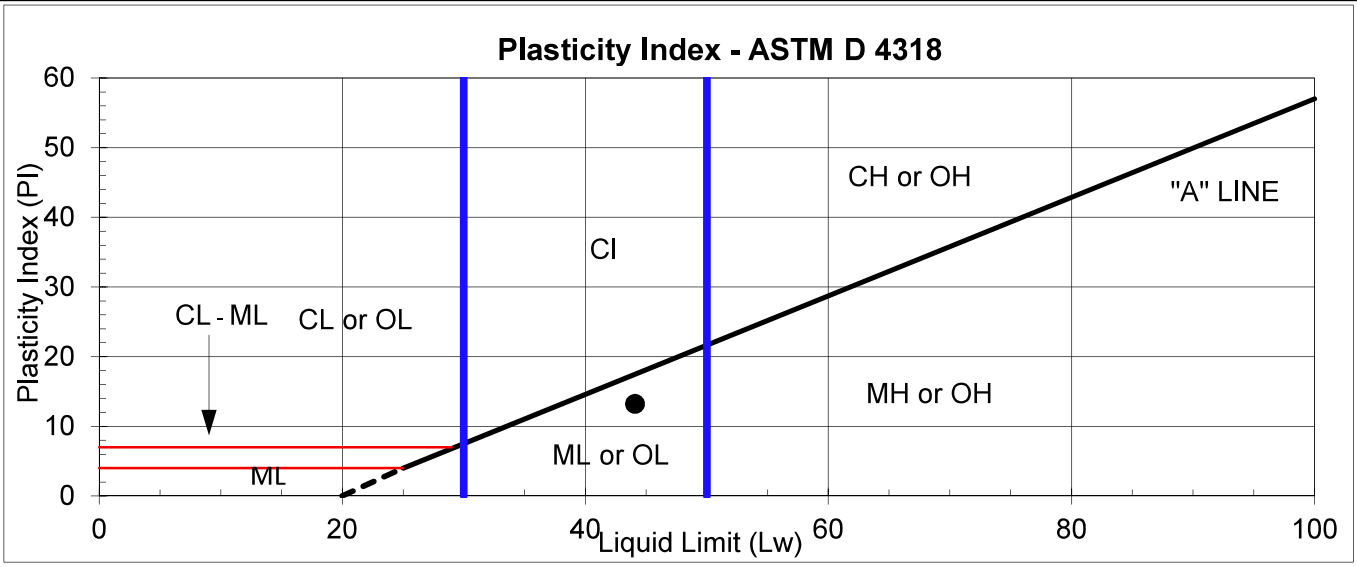
Borehole No. **BH21-01** Sample Depth (m) **7.50** Natural Moisture **71.5%**

Project No. **680844** Tech. **MK/DY**



Gravel = **0.6%** Sand = **6.9%** Silt = **78.9%** Clay = **13.6%**

Hydrometer Classification: **Silt, some clay, trace sand, trace gravel.**



Pw 30.9% Group Index: **10.1**

Lw 44.1% Soil type: **Inorganic**

PI 13.2% Fines type: **ML**

Unified Soils Classification: **ML - Silt**

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Client **Binnie** Date **15-Apr-21**

Project **Schoolhouse Bridges** Borehole No. **BH21-01**

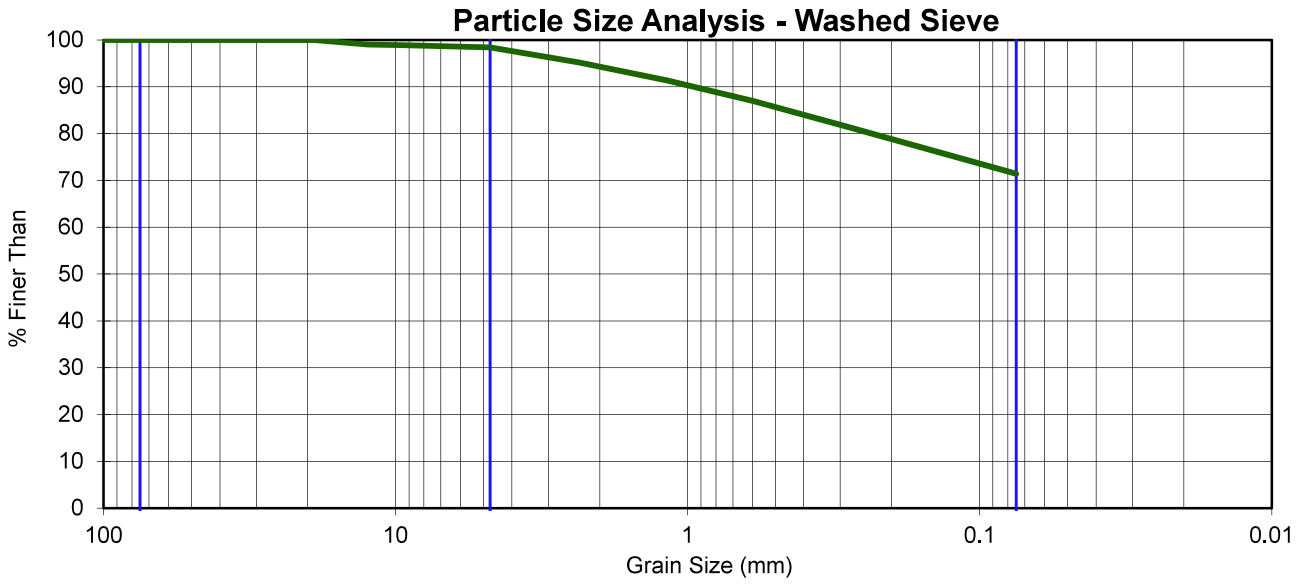
Location **Coquitlam, British Columbia** Sample No. **5**

UNIFIED SOILS CLASSIFICATION

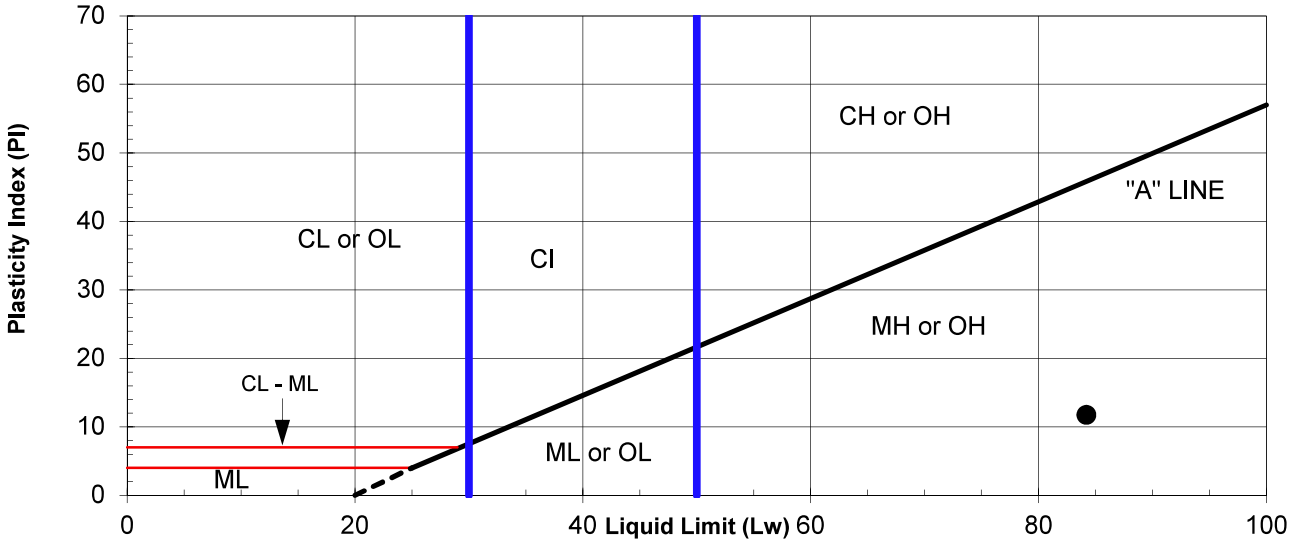
Sample No.: **2** Date Sampled: **07-Apr-21** By: **JE** of **SNC-Lavalin Inc.**

Borehole No.: **BH21-02** Depth (m) **2.80** Specification **ASTM D 2487**

Description: **Silt, sandy, some clay, trace gravel.** Tech./ Eng. **MK/CE**



Gravel = **1.6%** Sand = **27.0%** Silt and Clay = **71.4%**



Pw = **72.47%** Group Index: **12**

Lw = **84.22%** Soil type: **Organic**

PI = **11.75%** Fines type: **MH**

Unified Soils Classification: **OH - Organic silt with sand**

SNC·LAVALIN

Client: **Binnie** Date: **19-Apr-21**

Project: **Schoolhouse Bridges** File No.: **680844**

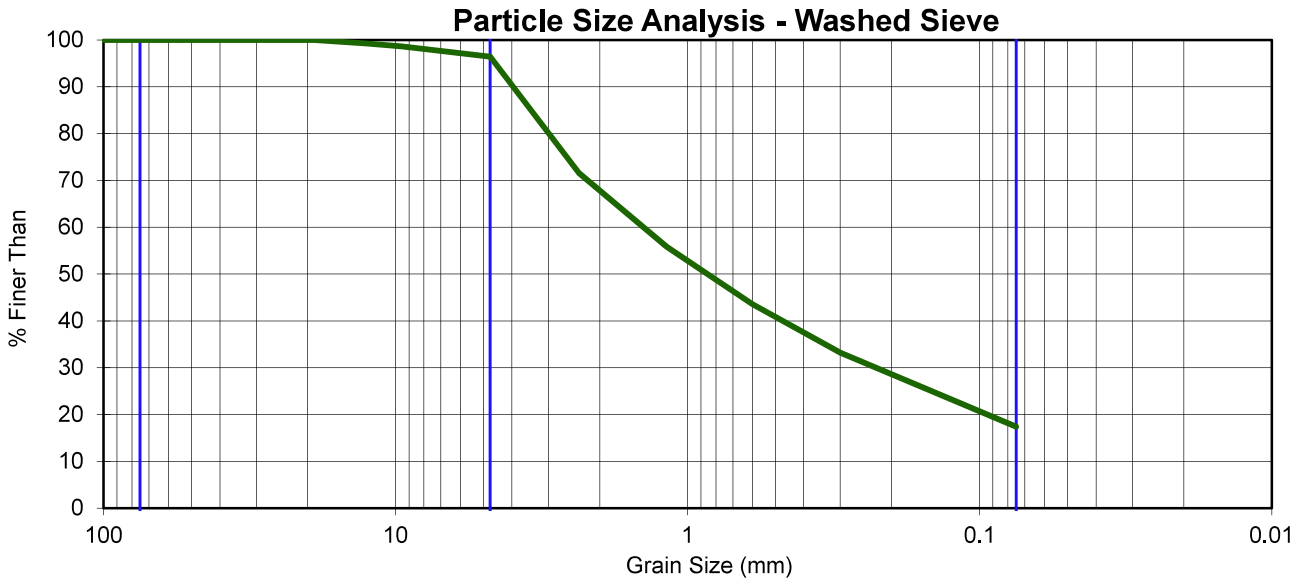
Location: **Coquitlam, British Columbia** Sample No.: **2**

UNIFIED SOILS CLASSIFICATION

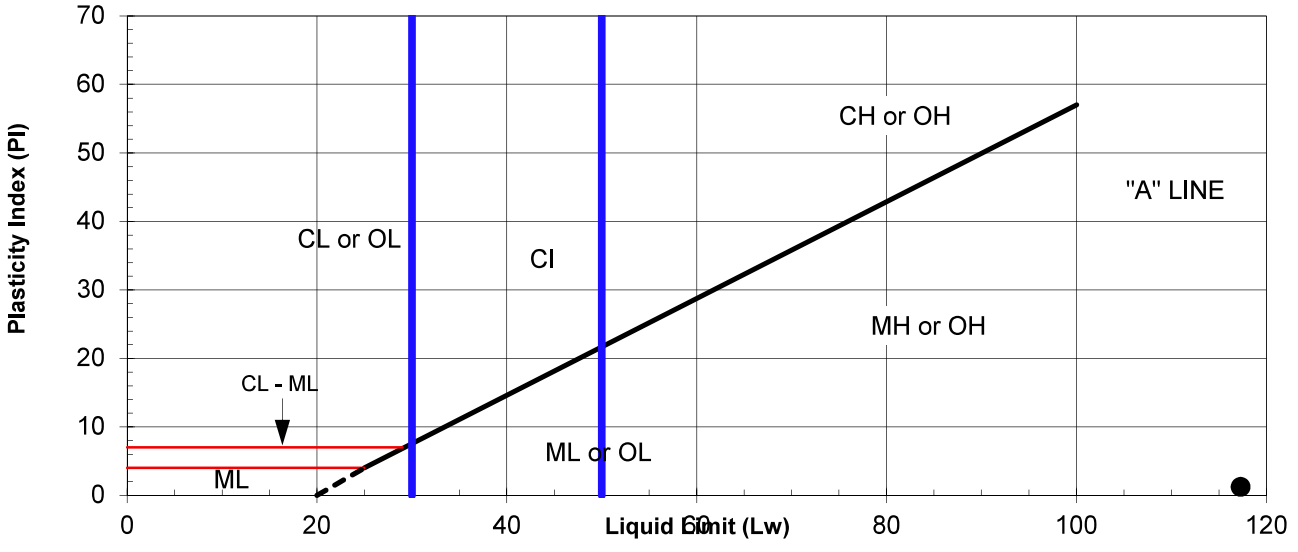
Sample No.: **3** Date Sampled: **07-Apr-21** By: **JE** of **SNC-Lavalin Inc.**

Borehole No.: **BH21-02** Depth (m) **4.00** Specification **ASTM D 2487**

Description: **Sand, some silt, trace clay, trace gravel.** Tech./ Eng. **MK/CE**



Gravel = **3.6%** Sand = **79.0%** Silt and Clay = **17.4%**



Pw = **116.03%** Group Index: **0**

Lw = **117.29%** Soil type: **Organic**

PI = **1.26%** Fines type: **OH**

Unified Soils Classification: **SM - Silty sand**

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Client: **Binnie** Date: **19-Apr-21**

Project: **Schoolhouse Bridges** File No.: **680844**

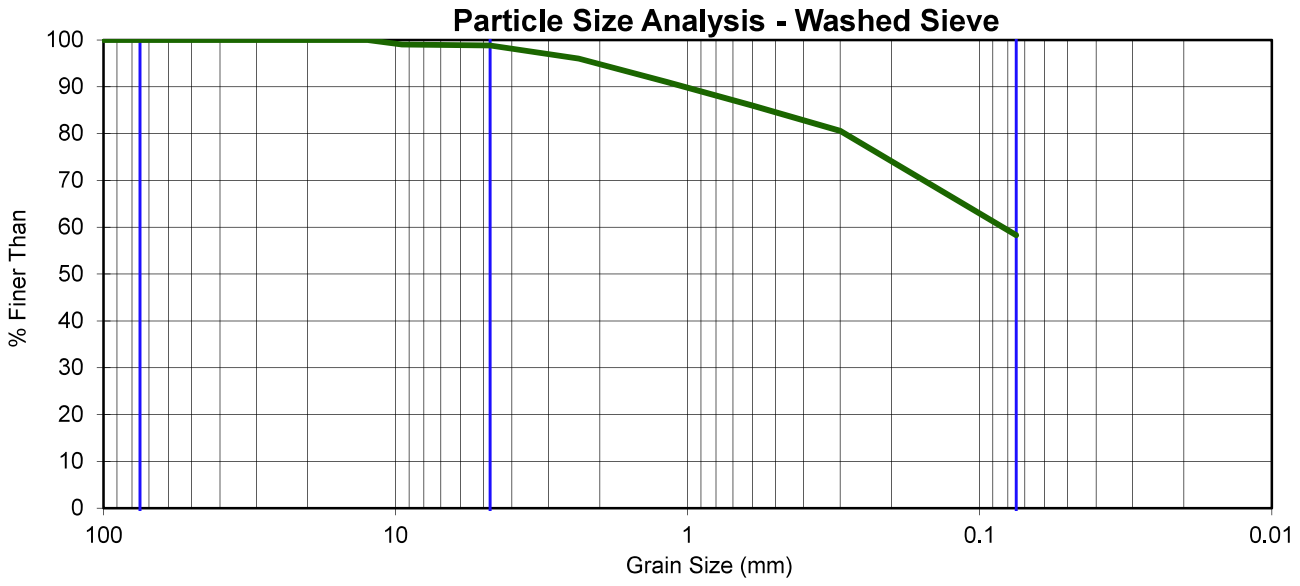
Location: **Coquitlam, British Columbia** Sample No.: **3**

UNIFIED SOILS CLASSIFICATION

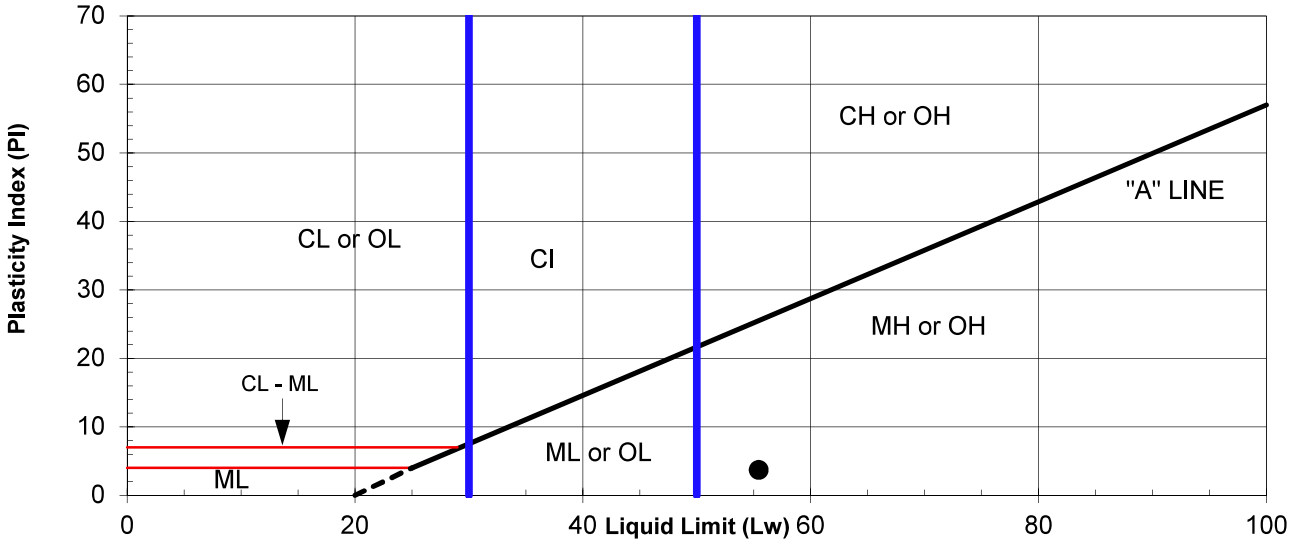
Sample No.: **5** Date Sampled: **07-Apr-21** By: **JE** of **SNC-Lavalin Inc.**

Borehole No.: **BH21-02** Depth (m) **5.80** Specification **ASTM D 2487**

Description: **Silt and sand, some clay, trace gravel.** Tech./ Eng. **MK/CE**



Gravel = **1.2%** Sand = **40.5%** Silt and Clay = **58.3%**



Pw = **51.72%** Group Index: **6**

Lw = **55.44%** Soil type: **Organic**

PI = **3.71%** Fines type: **MH**

Unified Soils Classification: **OH - Sandy organic silt**

SNC·LAVALIN

Client: **Binnie** Date: **19-Apr-21**

Project: **Schoolhouse Bridges** File No.: **680844**

Location: **Coquitlam, British Columbia** Sample No.: **5**

MECHANICAL SIEVE ANALYSIS

Sample No.	**1**	Date Sampled	**07-Apr-21**	By **JE**	of	**SNC-Lavalin Inc.**			
Borehole No.	**BH21-03**	Depth (m)	**0.6**	Sample Type	**Bag**		Natural Moisture	**3.2**	%
Description	**Sand, gravelly, trace silt, trace clay.**						Tech	**MK/DY**	

Specifications

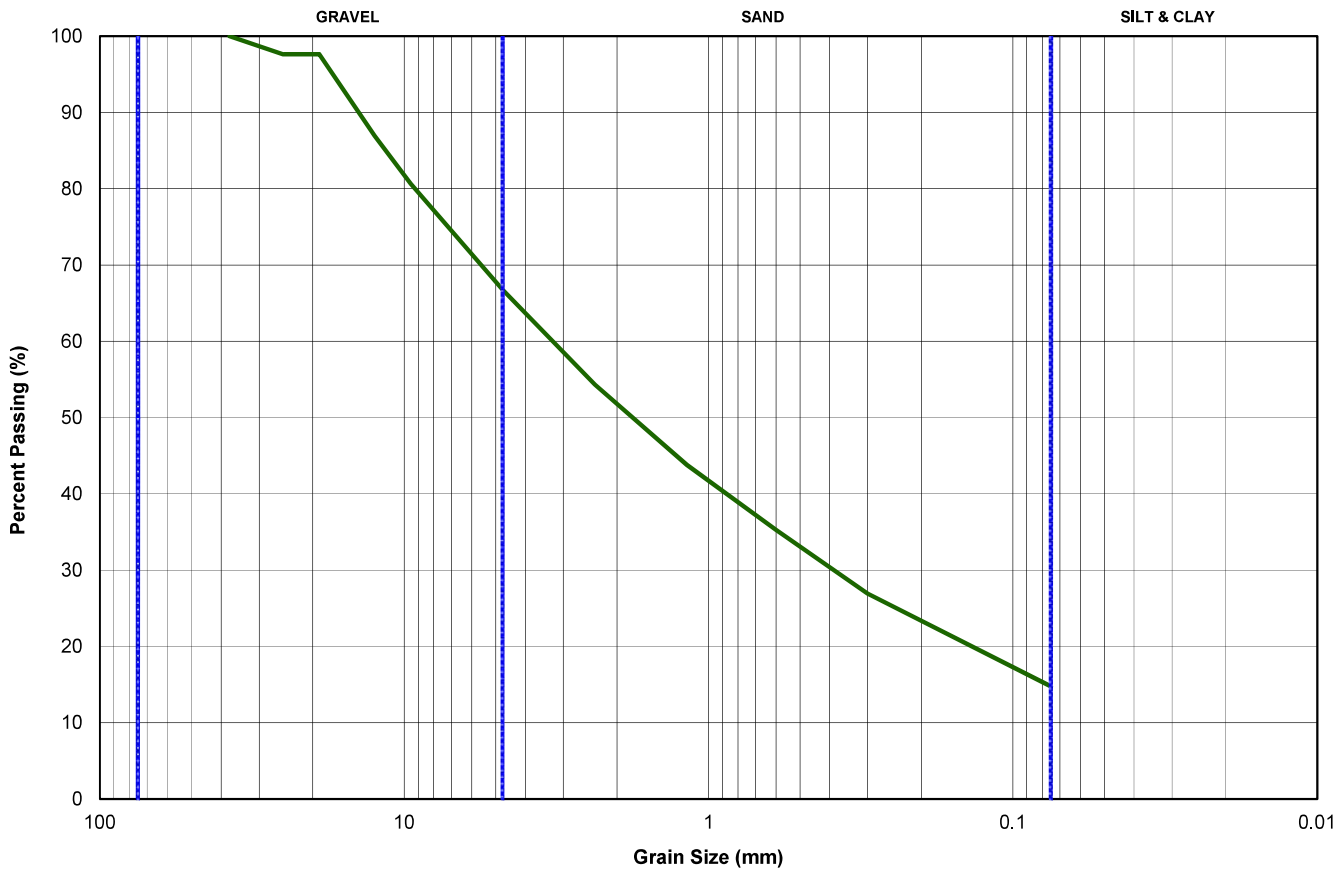
Comments

Fracture	Method
N/A	**A**

Sieve Results

Sieve mm	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.600	0.300	0.075
% Passing	100.0	97.6	97.6	86.9	80.6	66.7	54.3	43.8	35.3	26.9	14.8

By Type Gravel = **33.3%** Sand = **52.0%** Silt & Clay = **14.8%**



SNC·LAVALIN

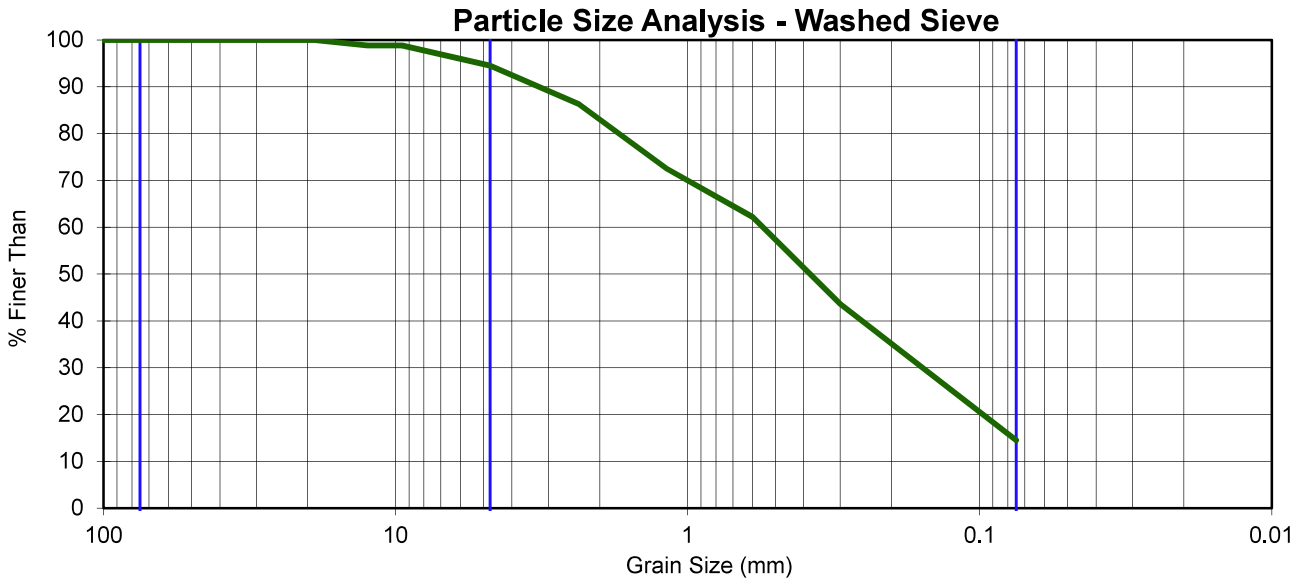
Client	**Binnie**	Date	**13-Apr-21**
Project	**Schoolhouse Bridges**	File No.	**680844**
Location	**Coquitlam, British Columbia**	Sample No.	**1**

UNIFIED SOILS CLASSIFICATION

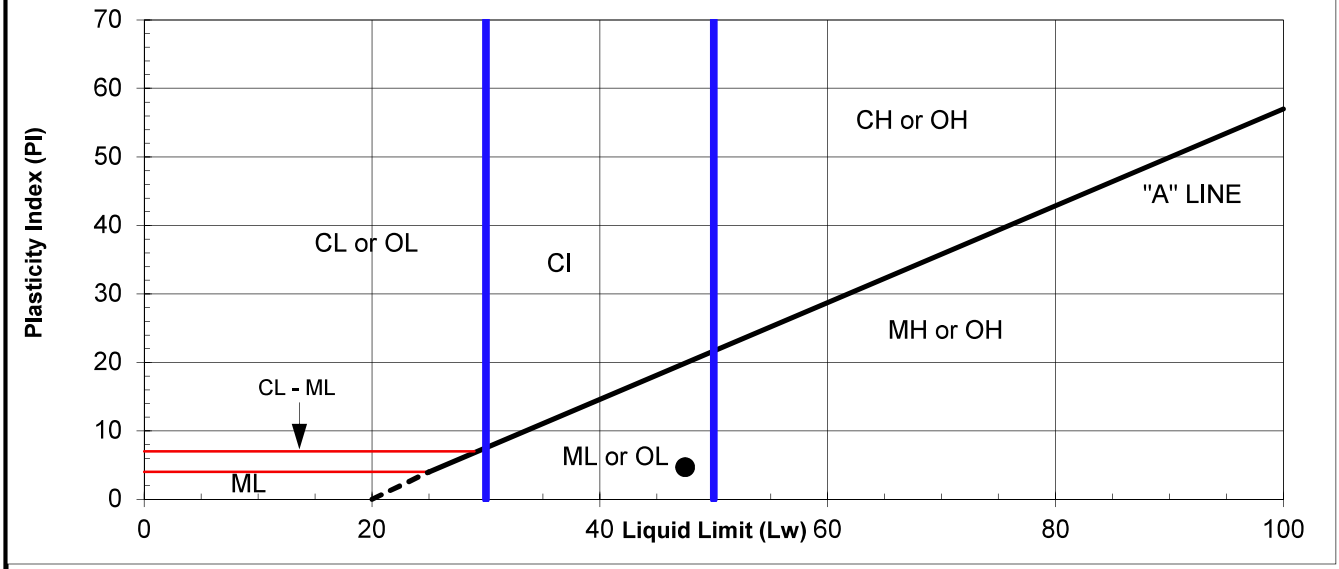
Sample No.: **4** Date Sampled: **07-Apr-21** By: **JE** of **SNC-Lavalin Inc.**

Borehole No.: **BH21-03** Depth (m) **3.40** Specification **ASTM D 2487**

Description: **Sand, trace silt, trace clay, trace gravel.** Tech./ Eng. **MK/CE**



Gravel = **5.5%** Sand = **80.0%** Silt and Clay = **14.5%**



Pw = **42.80%** Group Index: **0**

Lw = **47.49%** Soil type: **Inorganic**

PI = **4.70%** Fines type: **ML**

Unified Soils Classification: **SM - Silty sand**

SNC·LAVALIN

Client: **Binnie** Date: **19-Apr-21**

Project: **Schoolhouse Bridges** File No.: **680844**

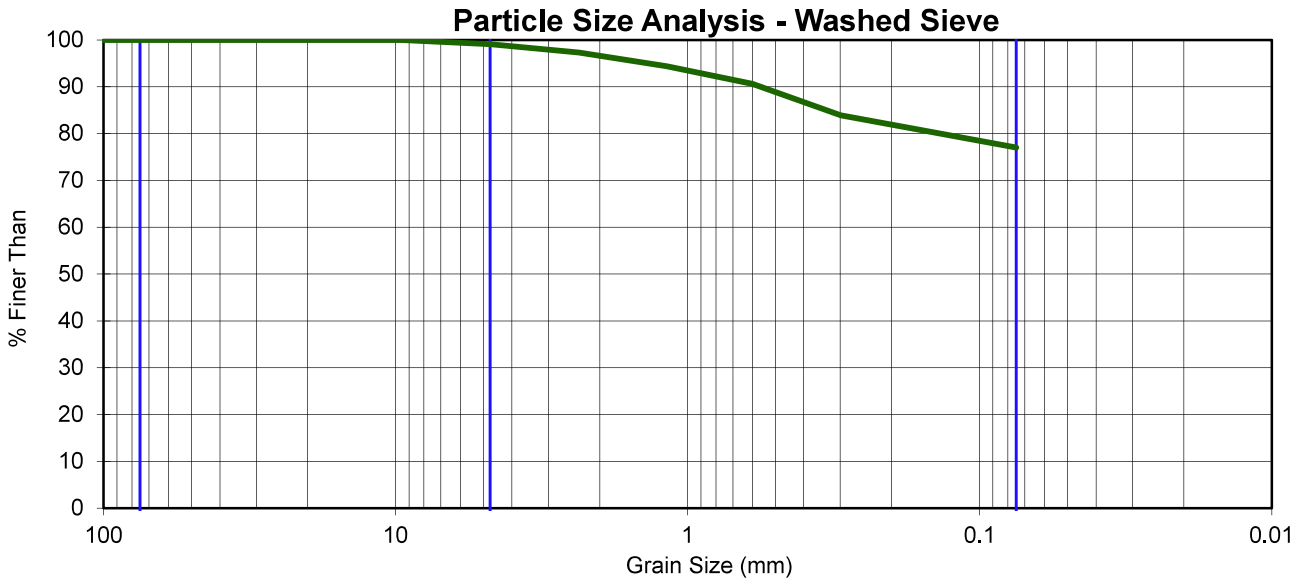
Location: **Coquitlam, British Columbia** Sample No.: **4**

UNIFIED SOILS CLASSIFICATION

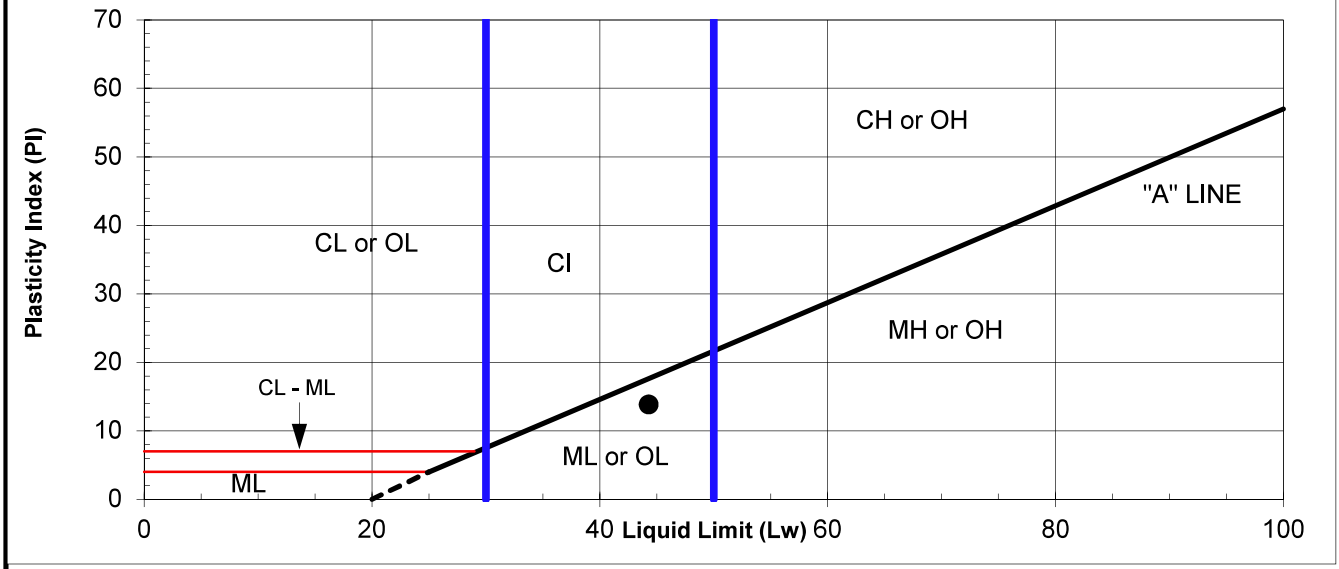
Sample No.: **5** Date Sampled: **07-Apr-21** By: **JE** of **SNC-Lavalin Inc.**

Borehole No.: **BH21-03** Depth (m) **4.30** Specification **ASTM D 2487**

Description: **Silt and clay, sandy, trace gravel.** Tech./ Eng. **MK/CE**



Gravel = **0.9%** Sand = **22.1%** Silt and Clay = **77.0%**



Pw = **30.43%** Group Index: **10**

Lw = **44.30%** Soil type: **Inorganic**

PI = **13.87%** Fines type: **ML**

Unified Soils Classification: **ML - Silt with sand**

SNC·LAVALIN

Client: **Binnie** Date: **19-Apr-21**

Project: **Schoolhouse Bridges** File No.: **680844**

Location: **Coquitlam, British Columbia** Sample No.: **5**

MOISTURE CONTENT

Sample No. **BH21-01**	1	2	3	5				
Depth (m)	0.9	3.7	4.3	7.5				
Tare No.								
Wt Tare (g)	540.06	1.44	1.5	1.36				
Wt Wet+Tare (g)	2170.74	60.15	63.56	60.58				
Wt Dry+Tare (g)	2074.97	14.81	30.67	35.9				
Wt Water (g)	95.77	45.34	32.89	24.68				
Wt Dry Soil (g)	1534.91	13.37	29.17	34.54				
Moisture Content (%)	**6.2**	**339.1**	**112.8**	**71.5**				

Sample No. **BH21-02**	2	3	5					
Depth (m)	2.8	4	5.8					
Tare No.								
Wt Tare (g)	1.48	1.41	1.47					
Wt Wet+Tare (g)	67.26	66.76	76.65					
Wt Dry+Tare (g)	21.01	16.84	38.81					
Wt Water (g)	46.25	49.92	37.84					
Wt Dry Soil (g)	19.53	15.43	37.34					
Moisture Content (%)	**236.8**	**323.5**	**101.3**					

Sample No. **BH21-03**	1	4	5					
Depth (m)	0.6	3.4	4.3					
Tare No.								
Wt Tare (g)	424.58	1.49	1.46					
Wt Wet+Tare (g)	1648.43	93	65.02					
Wt Dry+Tare (g)	1610.97	56.23	32.92					
Wt Water (g)	37.46	36.77	32.1					
Wt Dry Soil (g)	1186.39	54.74	31.46					
Moisture Content (%)	**3.2**	**67.2**	**102.0**					

Sample No.								
Depth (m)								
Tare No.								
Wt Tare (g)								
Wt Wet+Tare (g)								
Wt Dry+Tare (g)								
Wt Water (g)								
Wt Dry Soil (g)								
Moisture Content (%)								

SNC·LAVALIN

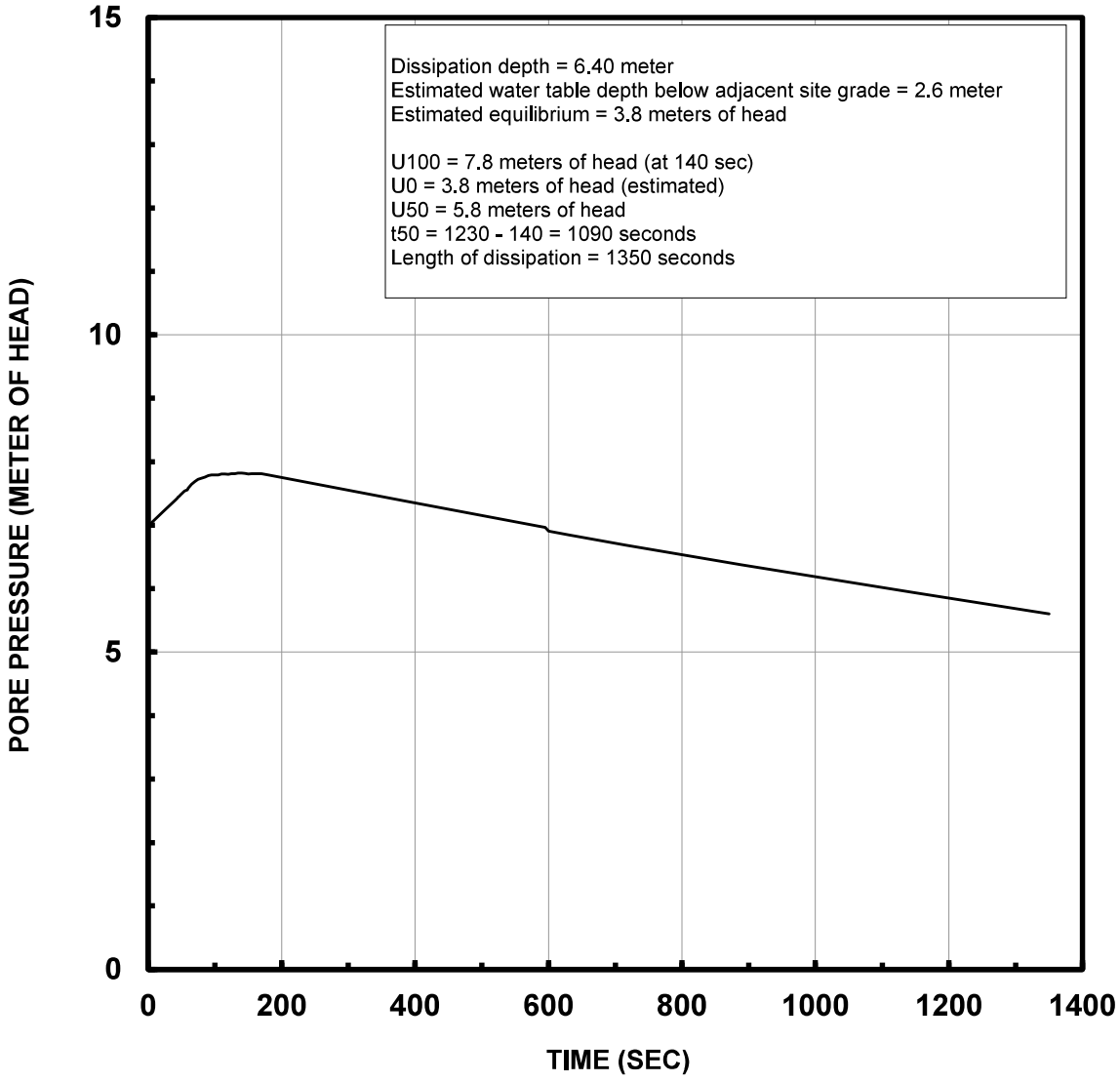
CLIENT:	**Binnie**	DATE:	**13-Apr-21**
PROJECT:	**Schoolhouse Bridges**	FILE No.:	**680844**
LOCATION:	**Coquitlam, British Columbia**	TECH:	**MK/DY**

Appendix IV

Cone Penetration Testing Data

SNC LAVALIN

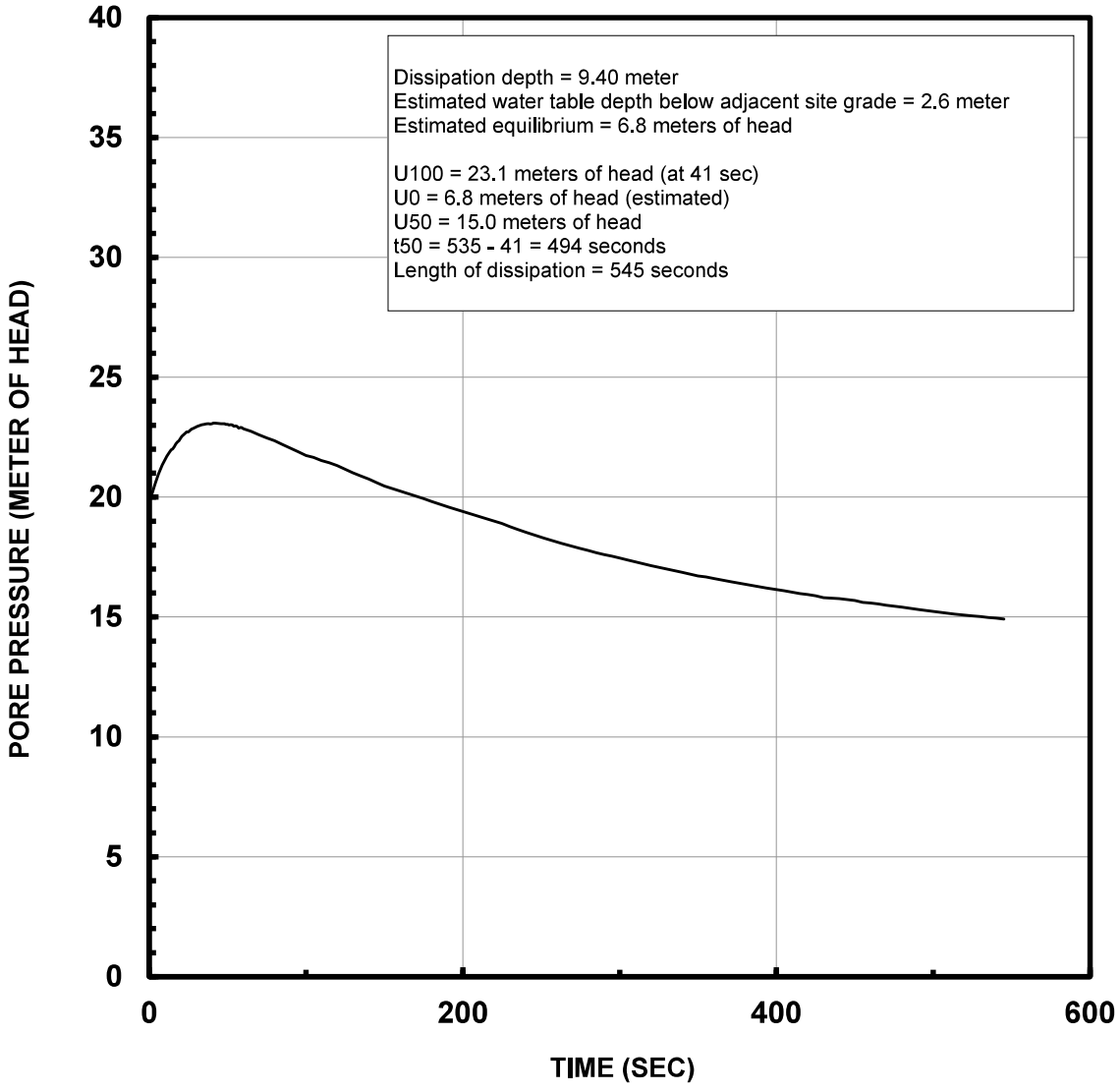
U2 PORE PRESSURE DISSIPATION
BOOTH CREEK BRIDGES
CPT21 - 01 6.40 METER DEPTH
APRIL 5, 2021



Schwartz SOIL TECH

SNC LAVALIN

U2 PORE PRESSURE DISSIPATION
BOOTH CREEK BRIDGES
CPT21 - 01 9.40 METER DEPTH
APRIL 5, 2021



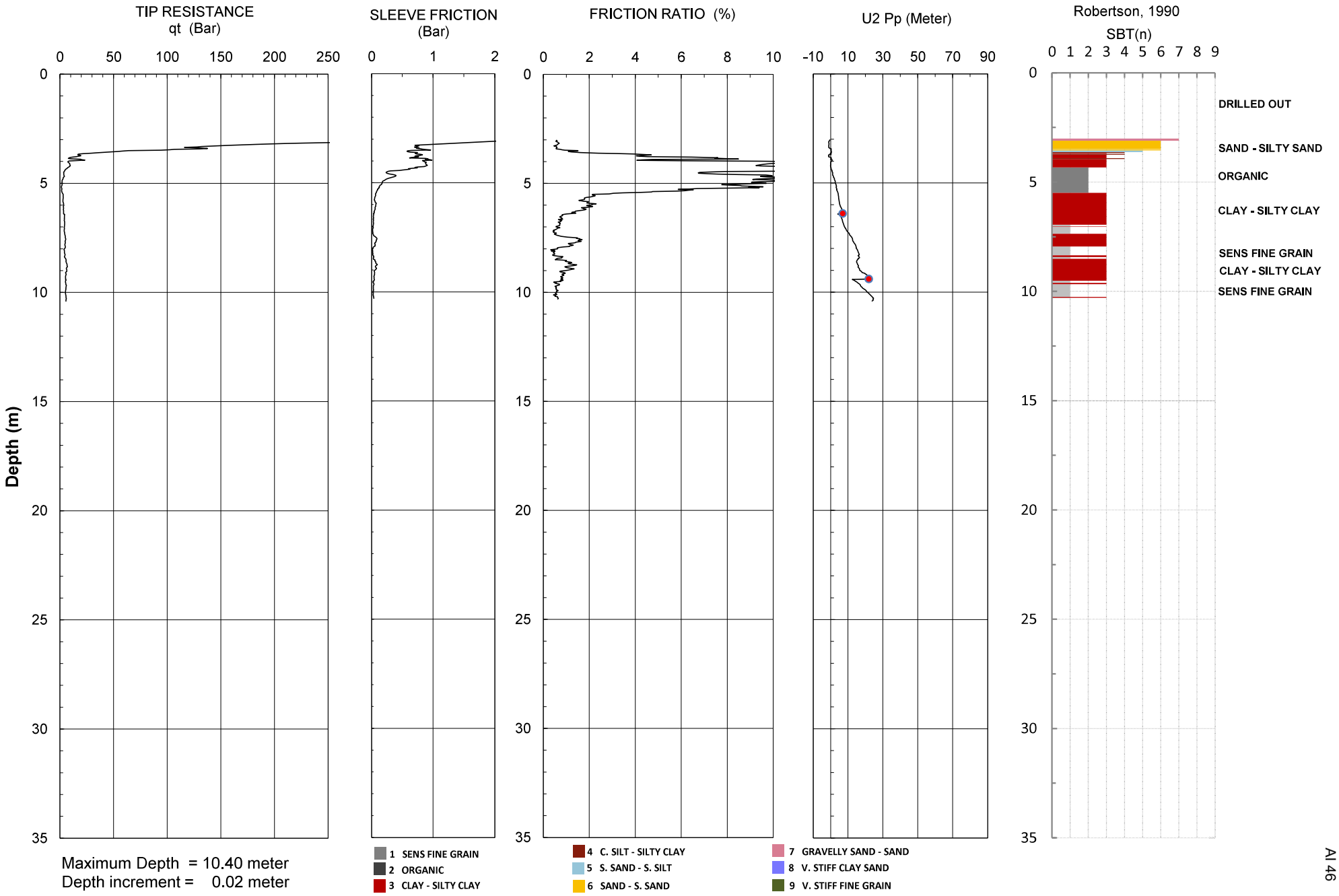
Schwartz SOIL TECH

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: CPT21 - 01
Cone ID: DPG0236

Date: April 5, 2021
Site: Booth Creek Bridges, Coq
SNC project: 680 844

Schwartz SOIL TECH



Maximum Depth = 10.40 meter
Depth increment = 0.02 meter

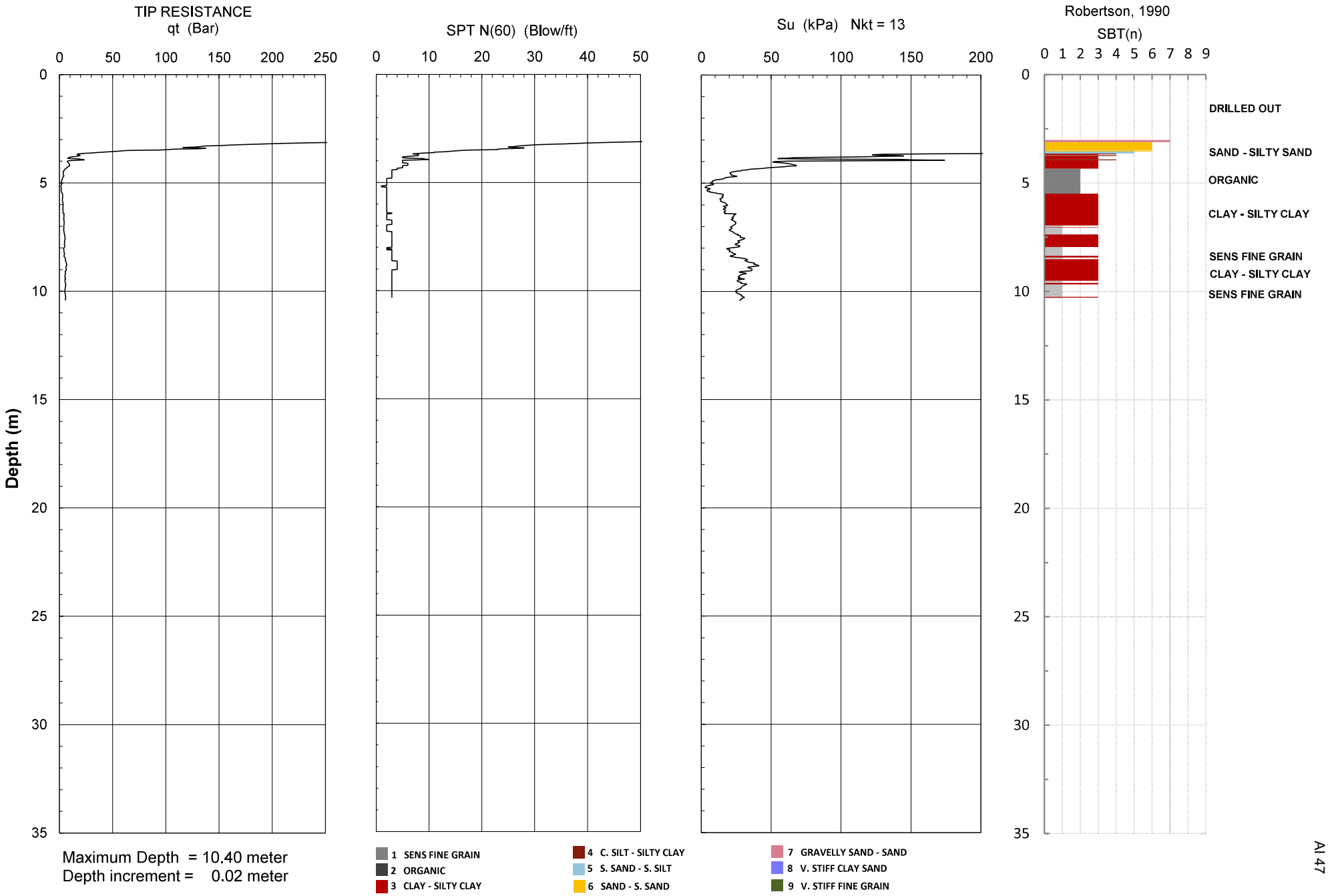
AI 46

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: CPT21 - 01
Cone ID: DPG0236

Date: April 5, 2021
Site: Booth Creek Bridges, Coq
SNC project : 680 844

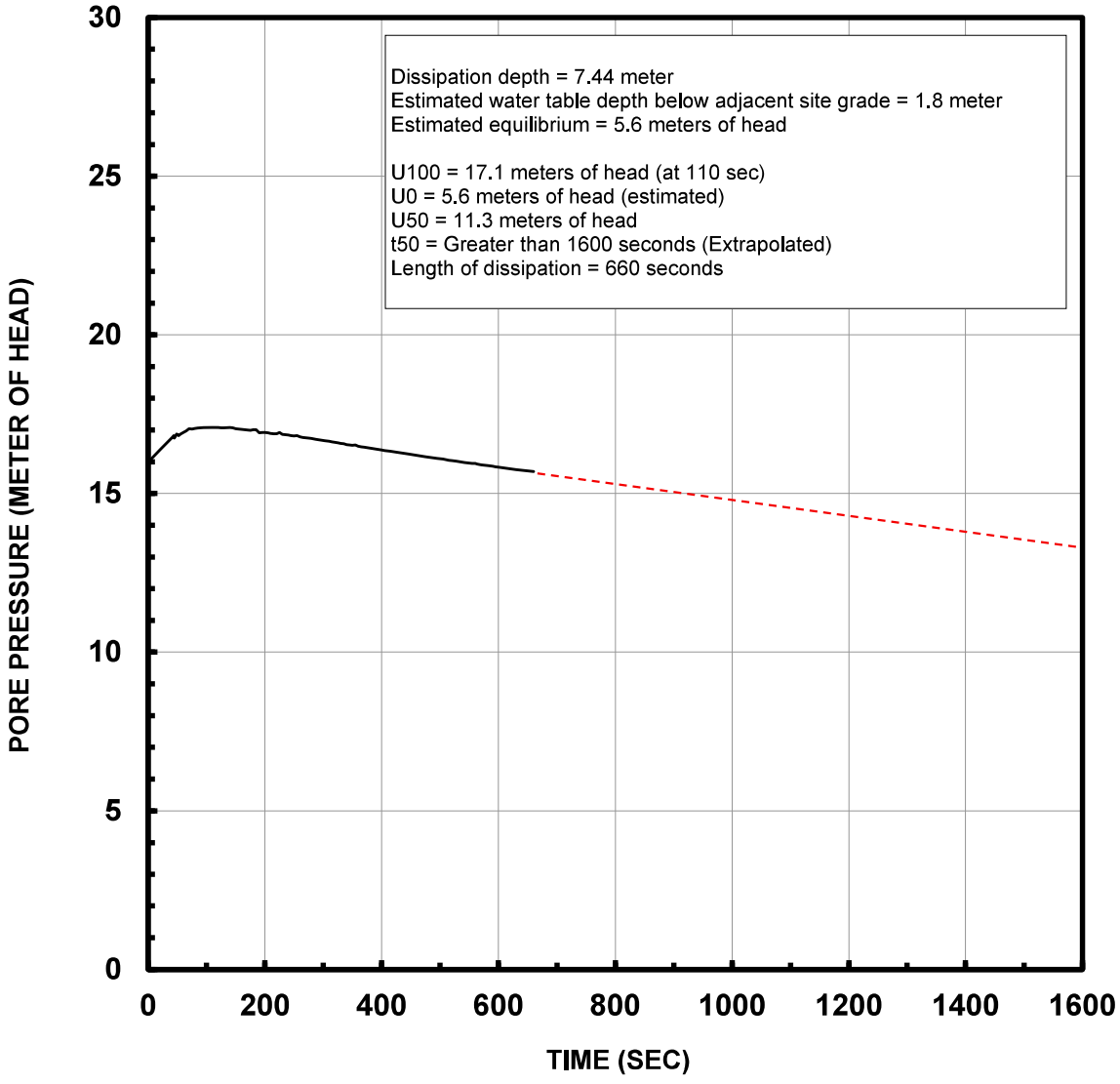
Schwartz SOIL TECH



AI 47

SNC LAVALIN

U2 PORE PRESSURE DISSIPATION
BOOTH CREEK BRIDGES
CPT21 - 02 7.44 METER DEPTH
APRIL 6, 2021



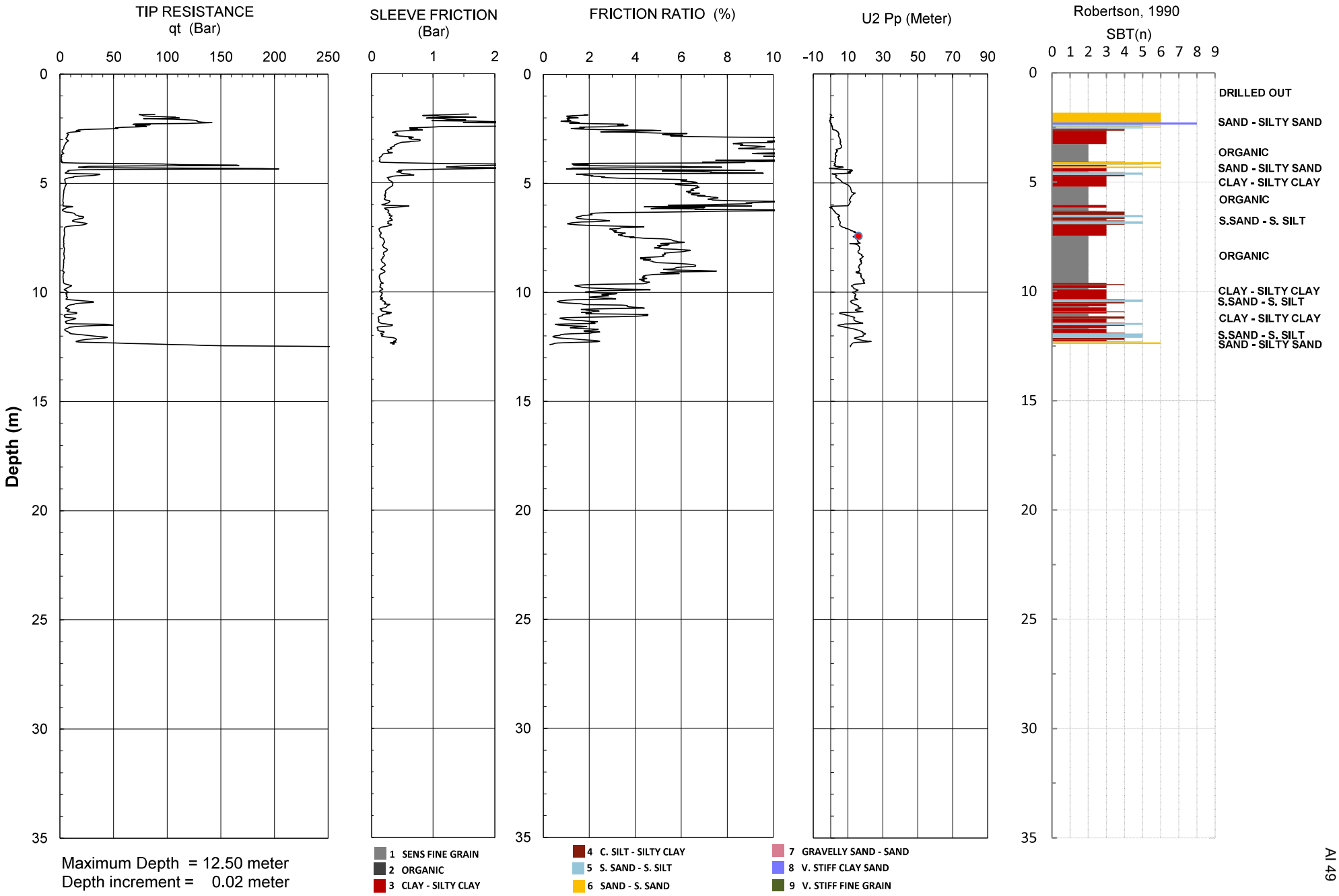
Schwartz SOIL TECH

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: CPT21 - 02
Cone ID: DPG0236

Date: April 6, 2021
Site: Booth Creek Bridges, Coq
SNC project: 680 844

Schwartz SOIL TECH



Maximum Depth = 12.50 meter
Depth increment = 0.02 meter

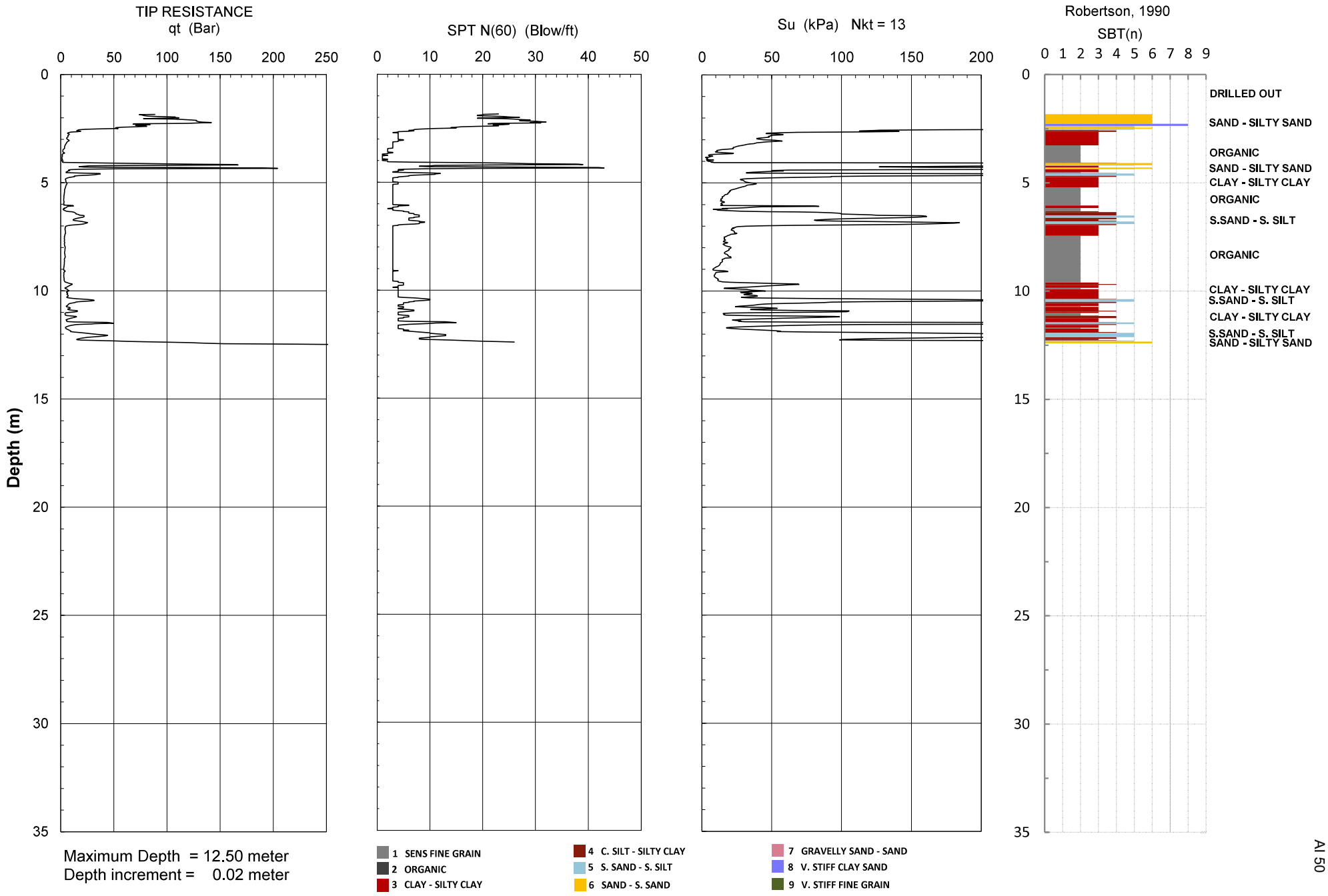
AI 49

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: CPT21 - 02
Cone ID: DPG0236

Date: April 6, 2021
Site: Booth Creek Bridges, Coq
SNC project : 680 844

Schwartz SOIL TECH



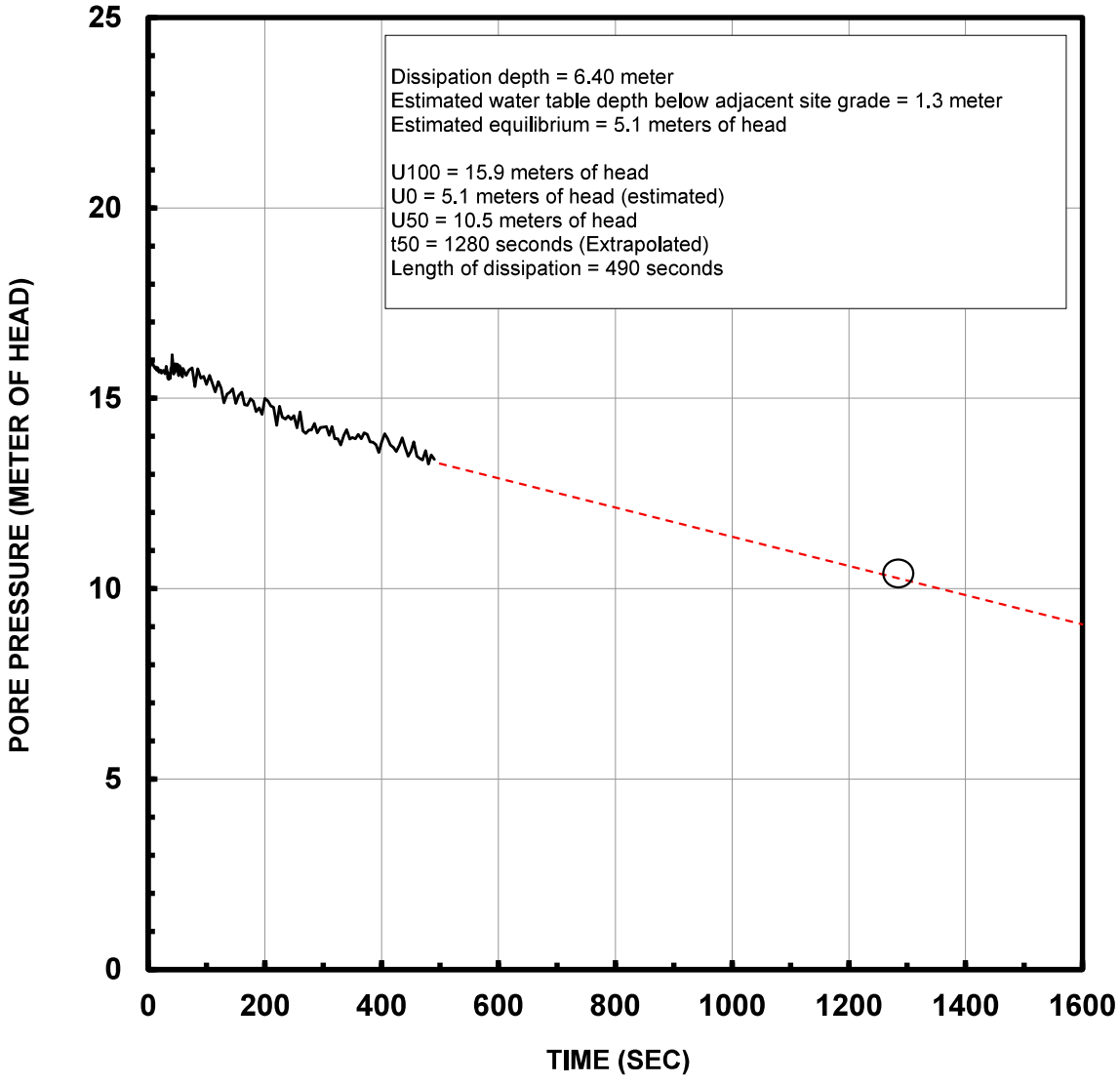
Maximum Depth = 12.50 meter
Depth increment = 0.02 meter

1 SENS FINE GRAIN
2 ORGANIC
3 CLAY - SILTY CLAY
4 C. SILT - SILTY CLAY
5 S. SAND - S. SILT
6 SAND - S. SAND
7 GRAVELLY SAND - SAND
8 V. STIFF CLAY SAND
9 V. STIFF FINE GRAIN

AI 50

SNC LAVALIN

U2 PORE PRESSURE DISSIPATION
BOOTH CREEK BRIDGES
SCPT21 - 02 6.40 METER DEPTH
MAY 19, 2021



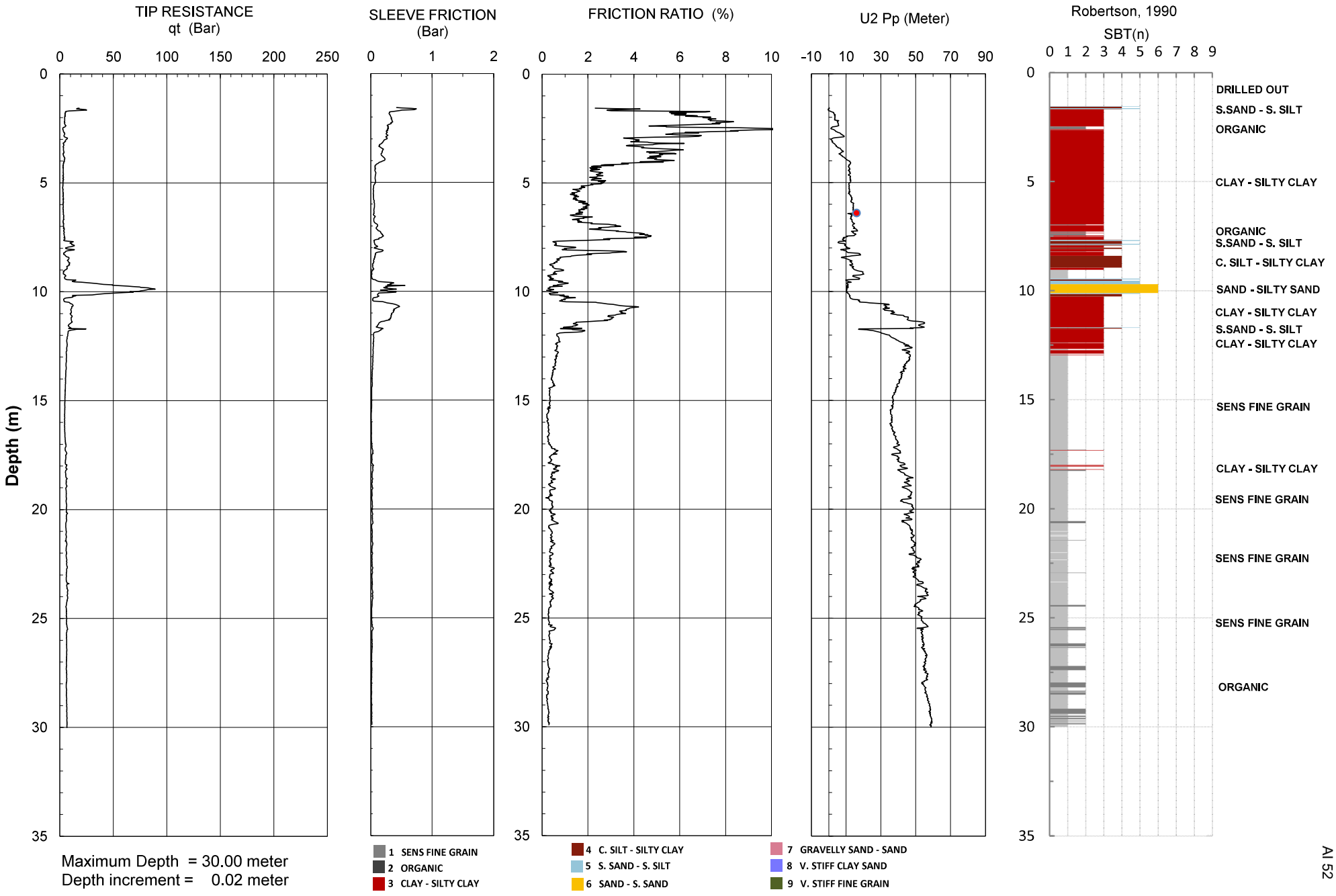
Schwartz SOIL TECH

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: SCPT21 - 02
Cone ID: DPG1433

Date: May 19, 2021
Site: Booth Creek Bridges, Coq
SNC project: 680 844

Schwartz SOIL TECH



Maximum Depth = 30.00 meter
Depth increment = 0.02 meter

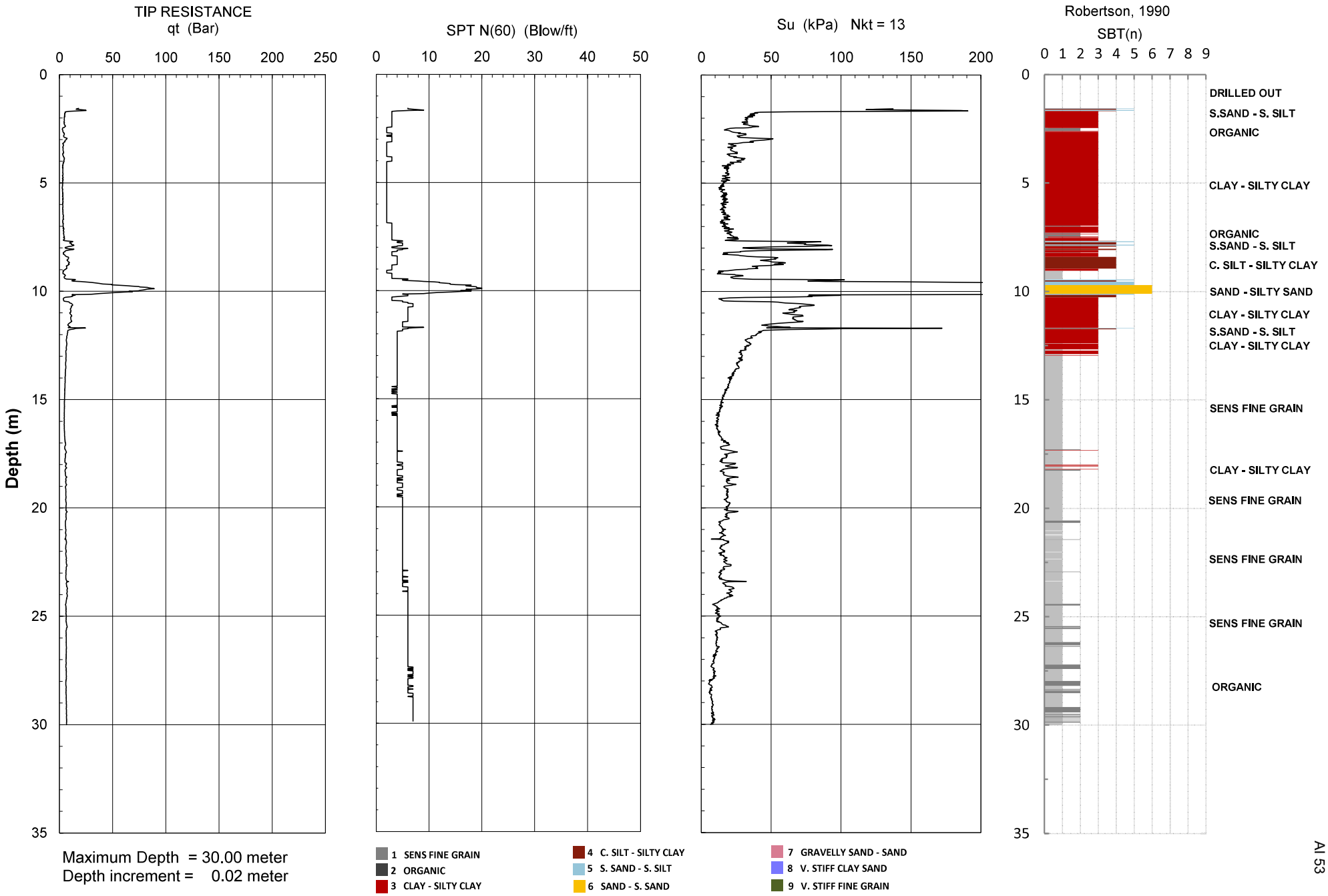
AI 52

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: SCPT21 - 02
Cone ID: DPG1433

Date: May 19, 2021
Site: Booth Creek Bridges, Coq
SNC project : 680 844

Schwartz SOIL TECH



Maximum Depth = 30.00 meter
Depth increment = 0.02 meter

1 SENS FINE GRAIN
2 ORGANIC
3 CLAY - SILTY CLAY
4 C. SILT - SILTY CLAY
5 S. SAND - S. SILT
6 SAND - S. SAND
7 GRAVELLY SAND - SAND
8 V. STIFF CLAY SAND
9 V. STIFF FINE GRAIN

AI 53

Schwartz SOIL TECH

SHEAR WAVE VELOCITY DATA

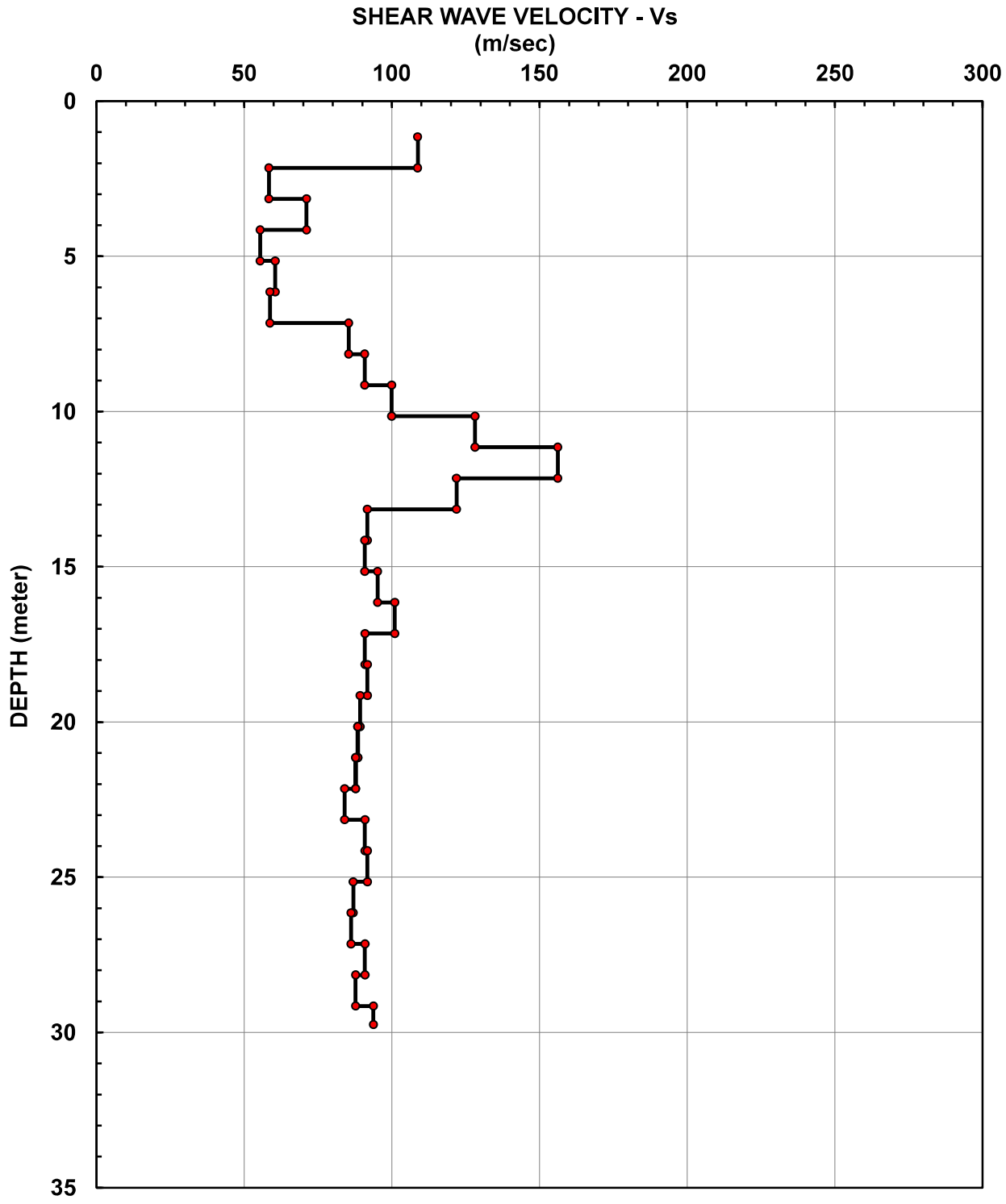
Client: SNC		Date:	May 19, 2021
Test: SCPT21 - 02		Cone ID:	DPG1433
Site: Booth Creek Bridges		Source offset:	0.33 m
Coquitlam, BC		Source:	Beam

Cone tip Depth (m)	Geophone Depth (m)	Wave Path Length (m)	Wave Path Interval (m)	Wave Travel Time interval (ms)	Interval Velocity (m/sec)
1.40	1.15	1.20			
			0.98	9.00	109
2.40	2.15	2.18			
			0.99	17.00	58
3.40	3.15	3.17			
			1.00	14.00	71
4.40	4.15	4.16			
			1.00	18.00	55
5.40	5.15	5.16			
			1.00	16.50	61
6.40	6.15	6.16			
			1.00	17.00	59
7.40	7.15	7.16			
			1.00	11.70	85
8.40	8.15	8.16			
			1.00	11.00	91
9.40	9.15	9.16			
			1.00	10.00	100
10.40	10.15	10.16			
			1.00	7.80	128
11.40	11.15	11.15			
			1.00	6.40	156
12.40	12.15	12.15			
			1.00	8.20	122
13.40	13.15	13.15			
			1.00	10.90	92
14.40	14.15	14.15			
			1.00	11.00	91
15.40	15.15	15.15			
			1.00	10.50	95
16.40	16.15	16.15			
			1.00	9.90	101
17.40	17.15	17.15			
			1.00	11.00	91
18.40	18.15	18.15			
			1.00	10.90	92
19.40	19.15	19.15			
			1.00	11.20	89
20.40	20.15	20.15			
			1.00	11.30	88
21.40	21.15	21.15			
			1.00	11.40	88
22.40	22.15	22.15			
			1.00	11.90	84
23.40	23.15	23.15			
			1.00	11.00	91
24.40	24.15	24.15			
			1.00	10.90	92
25.40	25.15	25.15			
			1.00	11.50	87
26.40	26.15	26.15			
			1.00	11.60	86
27.40	27.15	27.15			
			1.00	11.00	91
28.40	28.15	28.15			
			1.00	11.40	88
29.40	29.15	29.15			
			0.60	6.40	94
30.00	29.75	29.75			

Schwartz SOIL TECH

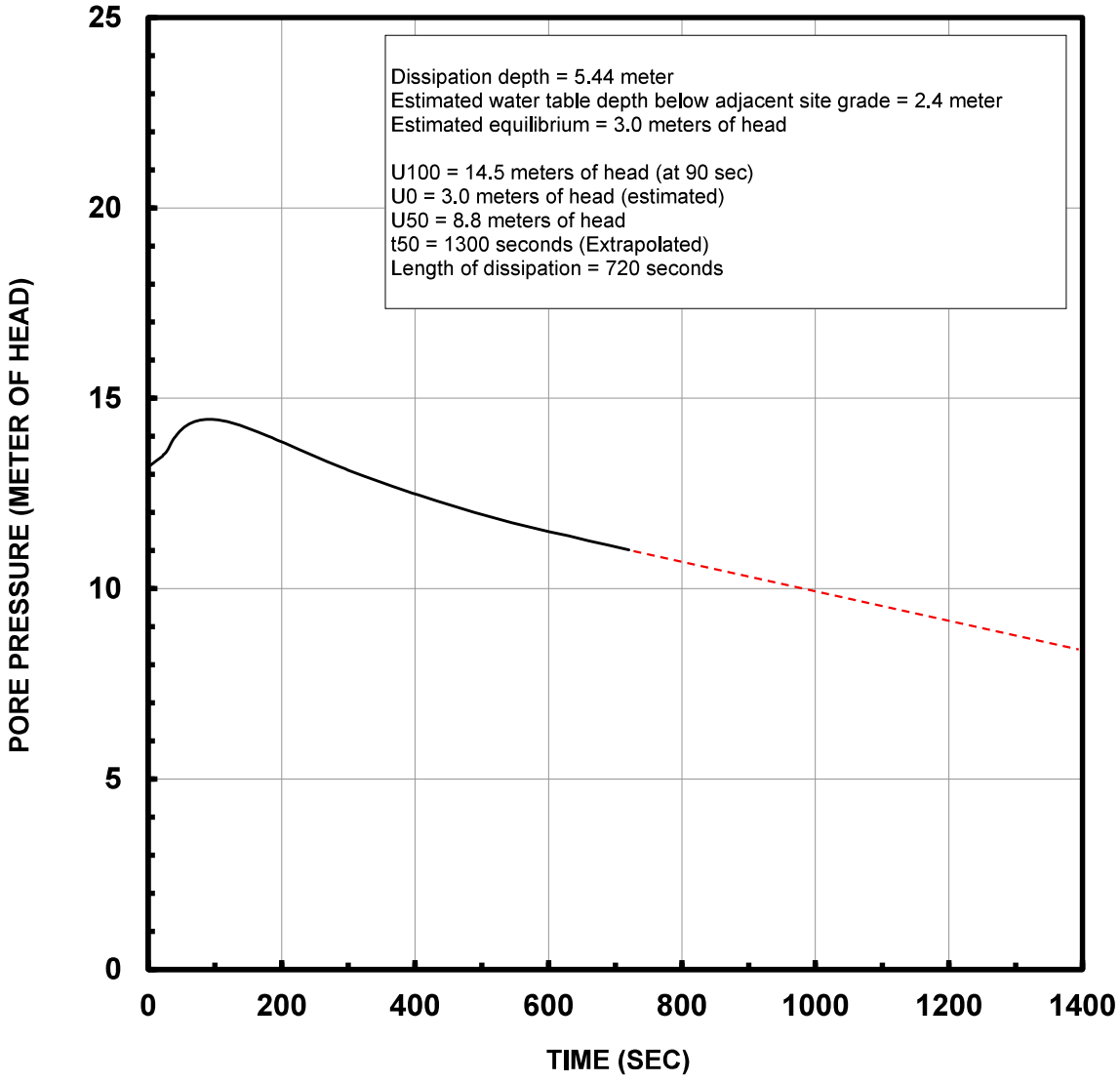
SHEAR WAVE VELOCITY PROFILE

Client:	SNC	Date:	May 19, 2021
Test:	SCPT21 - 02	Cone ID:	DPG1433
Site:	Booth Creek Bridges Coquitlam, BC	Source offset: Source:	0.33 m Beam



SNC LAVELIN

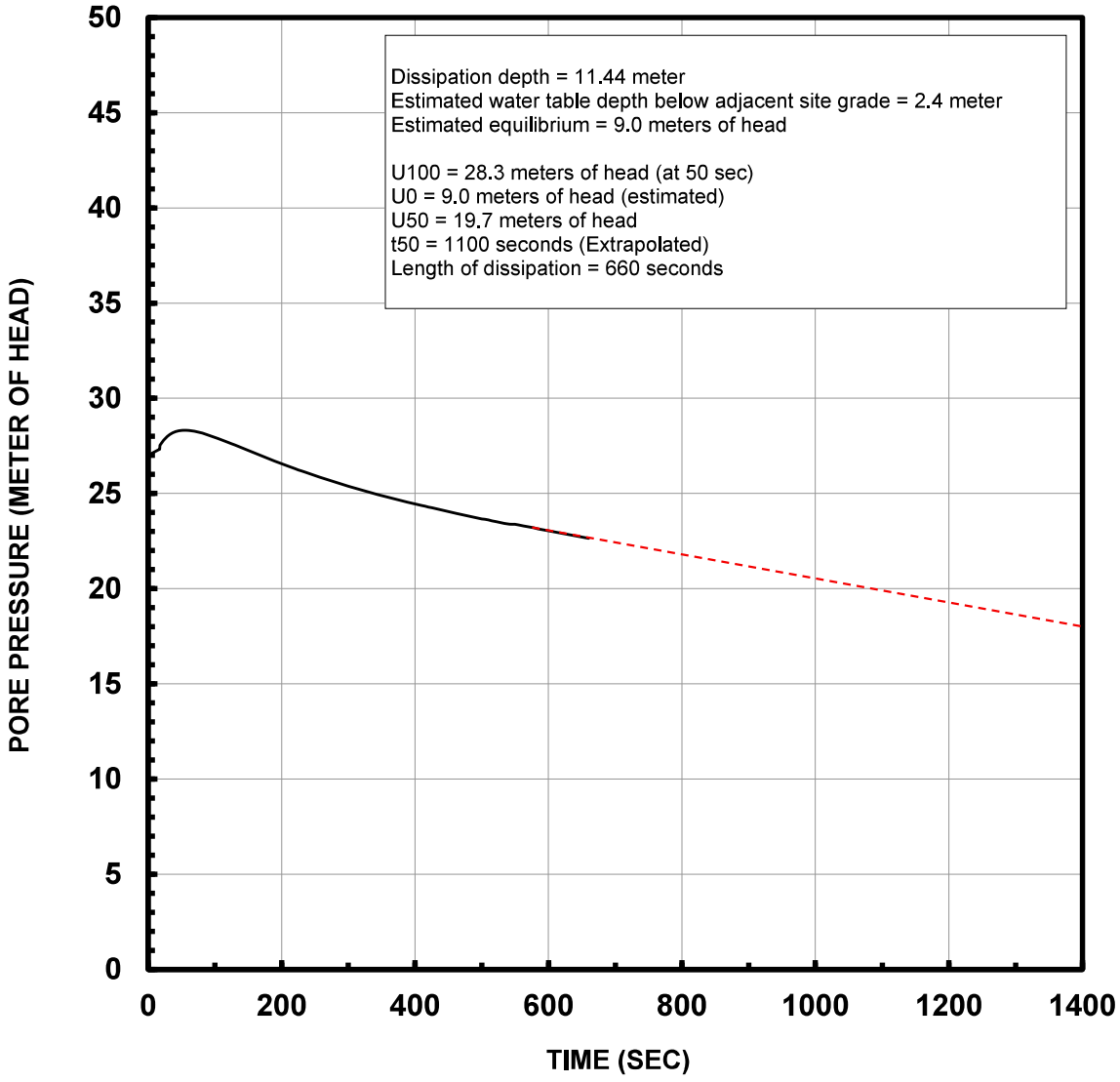
U2 PORE PRESSURE DISSIPATION
BOOTH CREEK BRIDGES
SCPT21 - 03 5.44 METER DEPTH
APRIL 6, 2021



Schwartz SOIL TECH

SNC LAVELIN

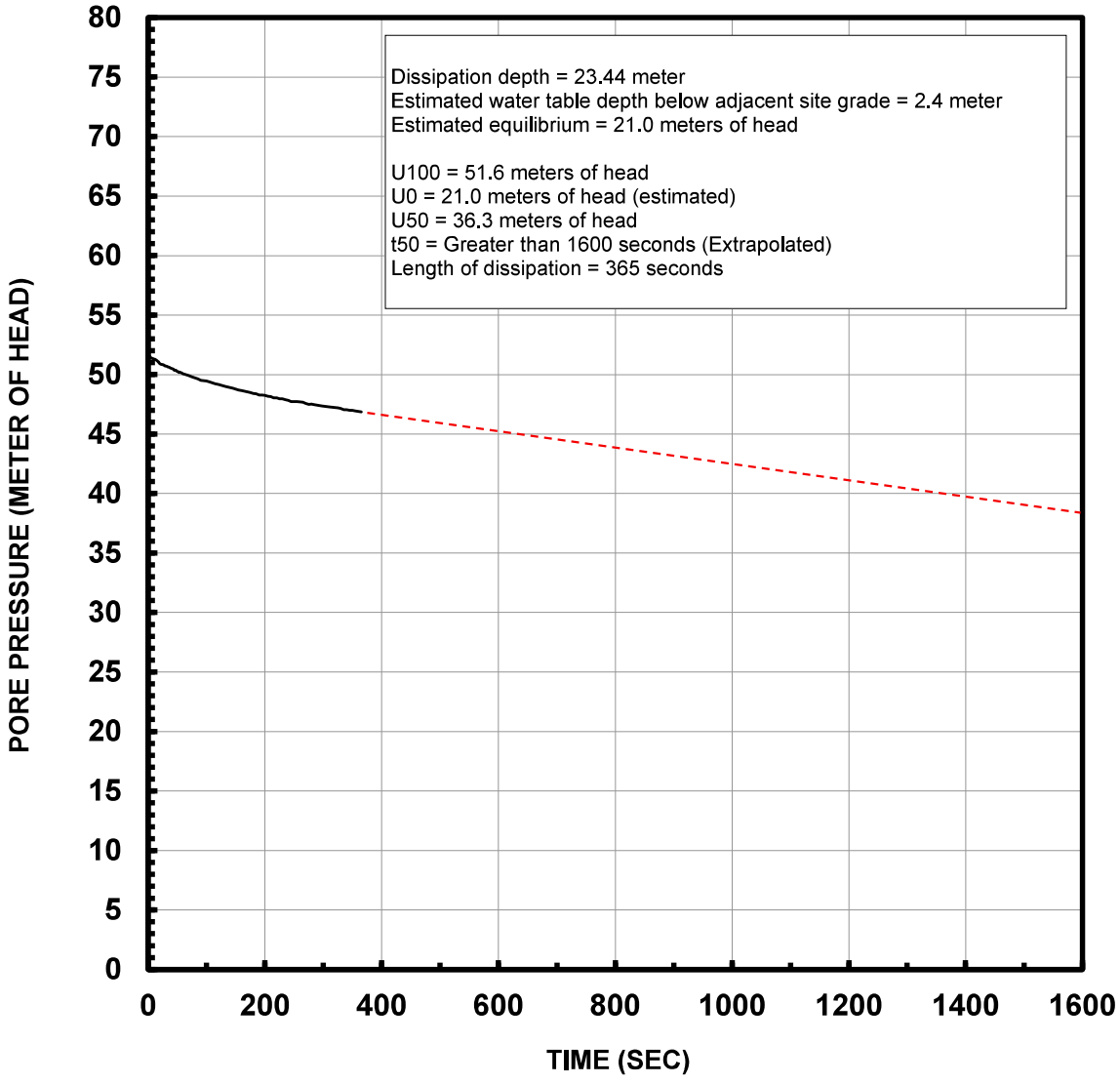
U2 PORE PRESSURE DISSIPATION
BOOTH CREEK BRIDGES
SCPT21 - 03 11.44 METER DEPTH
APRIL 6, 2021



Schwartz SOIL TECH

SNC LAVELIN

U2 PORE PRESSURE DISSIPATION
BOOTH CREEK BRIDGES
SCPT21 - 03 23.44 METER DEPTH
APRIL 6, 2021



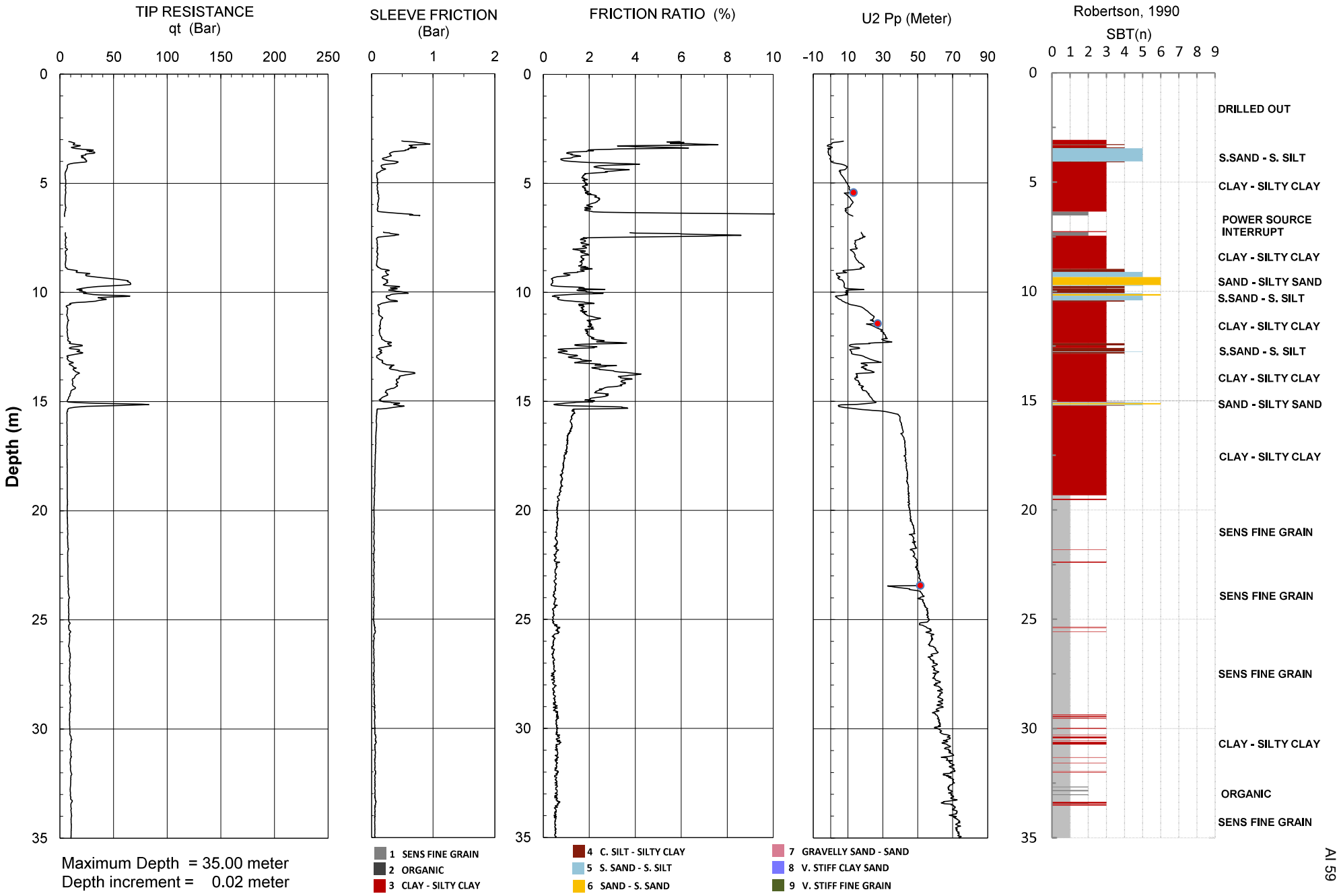
Schwartz SOIL TECH

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: SCPT21 - 03
Cone ID: DPG0236

Date: April 7, 2021
Site: Booth Creek Bridges, Coq
SNC project: 680 844

Schwartz SOIL TECH



Maximum Depth = 35.00 meter
Depth increment = 0.02 meter

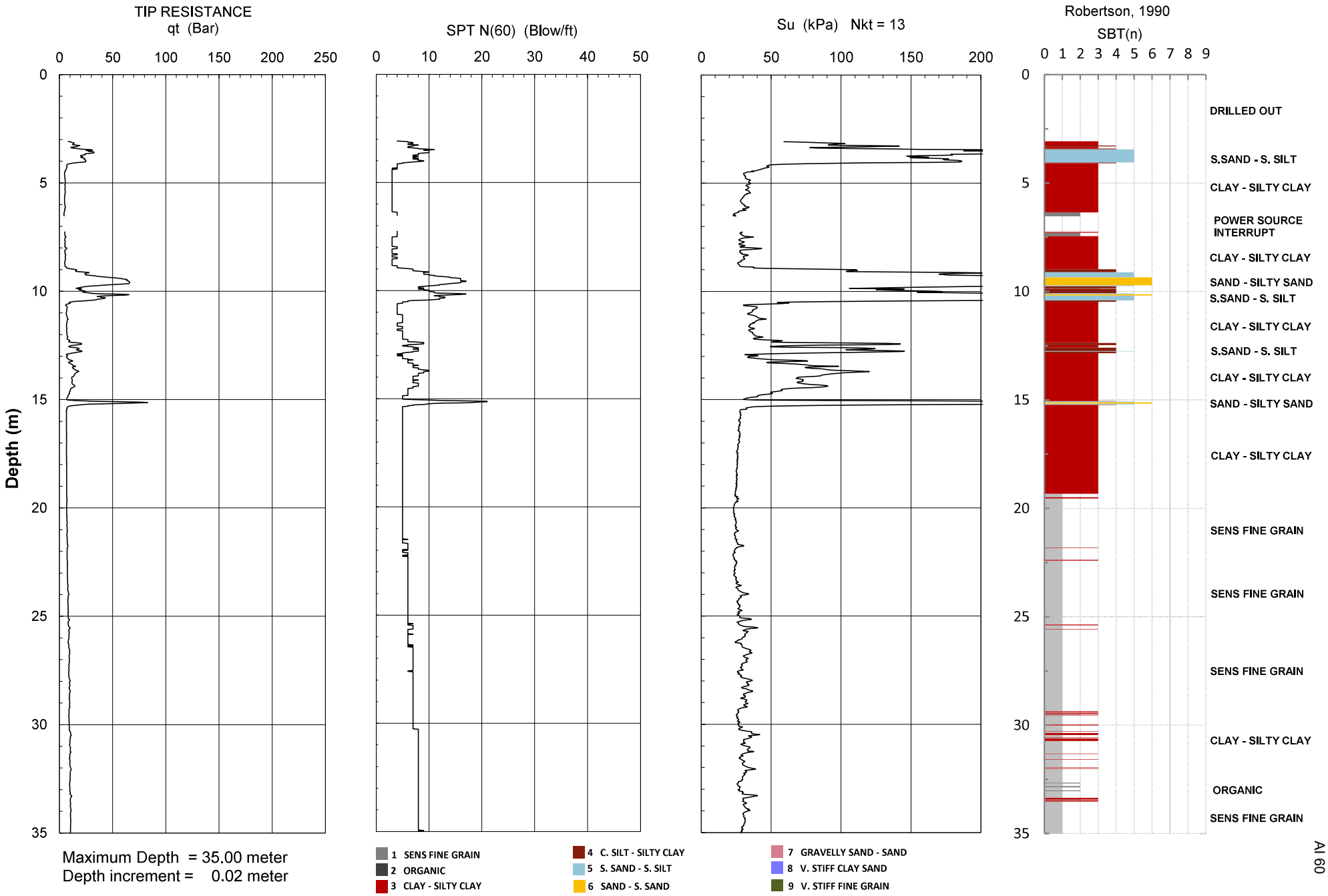
AI 59

SNC·LAVALIN

Operator: Schwartz Soil Technical
Sounding: SCPT21 - 03
Cone ID: DPG0236

Date: April 7, 2021
Site: Booth Creek Bridges, Coq
SNC project : 680 844

Schwartz SOIL TECH



Maximum Depth = 35.00 meter
Depth increment = 0.02 meter

Schwartz SOIL TECH

SHEAR WAVE VELOCITY DATA

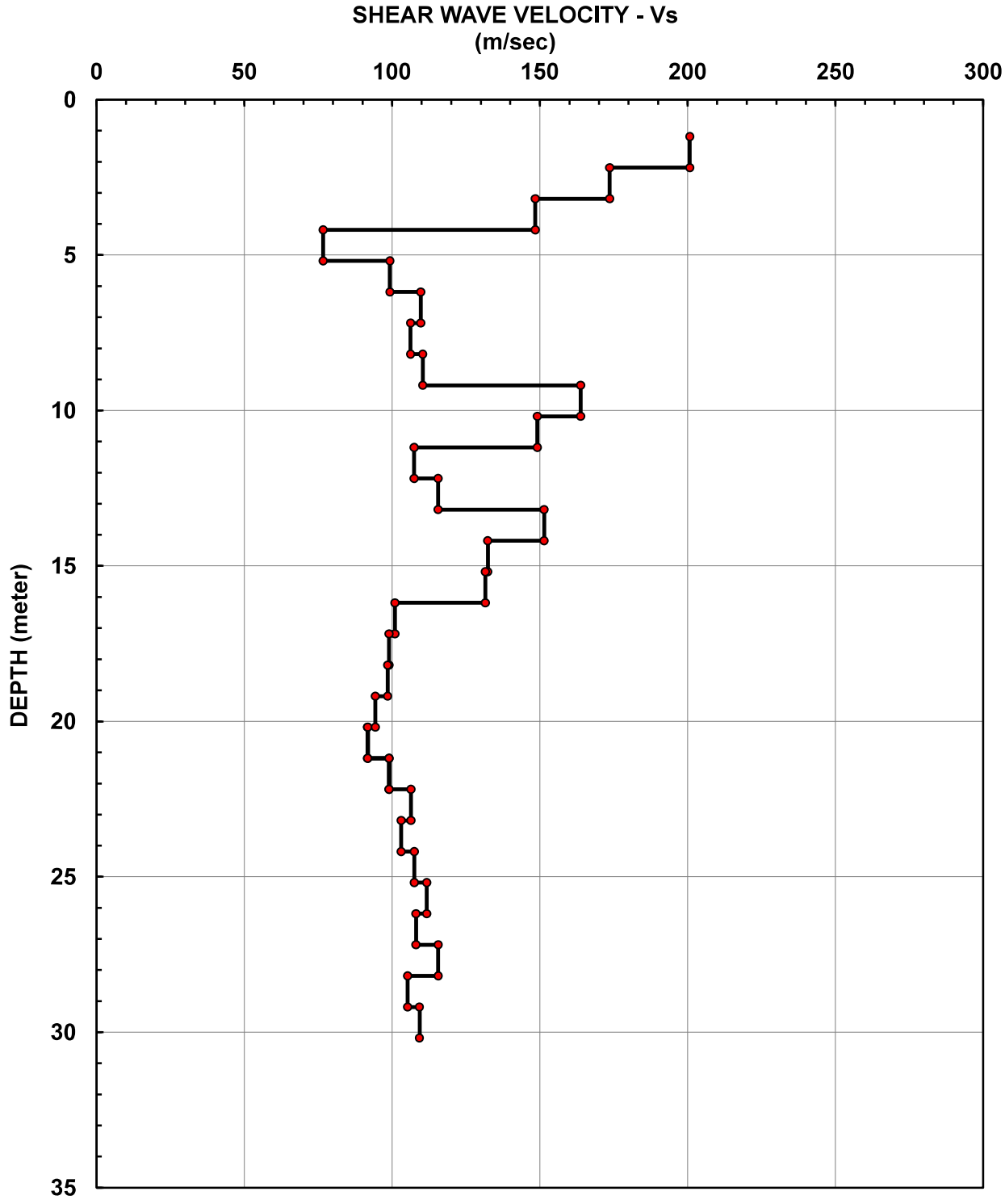
Client: SNC		Date:	April 7, 2021
Test: SCPT21 - 03		Cone ID:	DPG0236
Site: Booth Creek Bridges		Source offset:	0.38 m
Coquitlam, BC		Source:	Beam

Cone tip Depth (m)	Geophone Depth (m)	Wave Path Length (m)	Wave Path Interval (m)	Wave Travel Time interval (ms)	Interval Velocity (m/sec)
1.44	1.19	1.25			
			0.97	4.85	201
2.44	2.19	2.22			
			0.99	5.70	174
3.44	3.19	3.21			
			0.99	6.70	148
4.44	4.19	4.21			
			1.00	13.00	77
5.44	5.19	5.20			
			1.00	10.05	99
6.44	6.19	6.20			
			1.00	9.10	110
7.44	7.19	7.20			
			1.00	9.40	106
8.44	8.19	8.20			
			1.00	9.05	110
9.44	9.19	9.20			
			1.00	6.10	164
10.44	10.19	10.20			
			1.00	6.70	149
11.44	11.19	11.20			
			1.00	9.30	107
12.44	12.19	12.20			
			1.00	8.65	116
13.44	13.19	13.20			
			1.00	6.60	151
14.44	14.19	14.20			
			1.00	7.55	132
15.44	15.19	15.19			
			1.00	7.60	132
16.44	16.19	16.19			
			1.00	9.90	101
17.44	17.19	17.19			
			1.00	10.10	99
18.44	18.19	18.19			
			1.00	10.15	99
19.44	19.19	19.19			
			1.00	10.60	94
20.44	20.19	20.19			
			1.00	10.90	92
21.44	21.19	21.19			
			1.00	10.10	99
22.44	22.19	22.19			
			1.00	9.40	106
23.44	23.19	23.19			
			1.00	9.70	103
24.44	24.19	24.19			
			1.00	9.30	108
25.44	25.19	25.19			
			1.00	8.95	112
26.44	26.19	26.19			
			1.00	9.25	108
27.44	27.19	27.19			
			1.00	8.65	116
28.44	28.19	28.19			
			1.00	9.50	105
29.44	29.19	29.19			
			1.00	9.15	109
30.44	30.19	30.19			

Schwartz SOIL TECH

SHEAR WAVE VELOCITY PROFILE

Client:	SNC	Date:	April 7, 2021
Test:	SCPT21 - 03	Cone ID:	DPG0236
Site:	Booth Creek Bridges Coquitlam, BC	Source offset: Source:	0.38 m Beam



Appendix V

Seismic Hazard Parameters

2015 National Building Code Seismic Hazard Calculation

INFORMATION: Eastern Canada English (613) 995-5548 français (613) 995-0600 Facsimile (613) 992-8836
Western Canada English (250) 363-6500 Facsimile (250) 363-6565

Site: 49.235N 122.853W **User File Reference:** Schoolhouse Bridge 2021-04-27 18:06 UT

Probability of exceedance per annum	0.000404	0.001	0.0021	0.01
Probability of exceedance in 50 years	2 %	5 %	10 %	40 %
Sa (0.05)	0.408	0.282	0.203	0.090
Sa (0.1)	0.622	0.431	0.311	0.138
Sa (0.2)	0.773	0.542	0.394	0.177
Sa (0.3)	0.772	0.546	0.398	0.177
Sa (0.5)	0.681	0.478	0.344	0.146
Sa (1.0)	0.388	0.267	0.187	0.075
Sa (2.0)	0.238	0.159	0.108	0.041
Sa (5.0)	0.076	0.045	0.027	0.009
Sa (10.0)	0.027	0.016	0.009	0.003
PGA (g)	0.335	0.235	0.171	0.075
PGV (m/s)	0.504	0.343	0.237	0.090

Notes: Spectral (Sa(T), where T is the period in seconds) and peak ground acceleration (PGA) values are given in units of g (9.81 m/s^2). Peak ground velocity is given in m/s. Values are for "firm ground" (NBCC2015 Site Class C, average shear wave velocity 450 m/s). NBCC2015 and CSAS6-14 values are highlighted in yellow. Three additional periods are provided - their use is discussed in the NBCC2015 Commentary. Only 2 significant figures are to be used. **These values have been interpolated from a 10-km-spaced grid of points. Depending on the gradient of the nearby points, values at this location calculated directly from the hazard program may vary. More than 95 percent of interpolated values are within 2 percent of the directly calculated values.**

References

National Building Code of Canada 2015 NRCC no. 56190; Appendix C: Table C-3, Seismic Design Data for Selected Locations in Canada

Structural Commentaries (User's Guide - NBC 2015: Part 4 of Division B)
Commentary J: Design for Seismic Effects

Geological Survey of Canada Open File 7893 Fifth Generation Seismic Hazard Model for Canada: Grid values of mean hazard to be used with the 2015 National Building Code of Canada

See the websites www.EarthquakesCanada.ca and www.nationalcodes.ca for more information

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