CO-OP AVENUE RECONSTRUCTION

CONTRACT # 306-2091

TOWN OF OLIVER

CONTRACT DOCUMENTS

SET NO. _____

Owner:

Town of Oliver
6150 Main Street, Box 638
Oliver, BC V0H 1T0

Contract Administrator:

TRUE Consulting
2089 Falcon Road
Kamloops, BC V2C 4J2

306-2091
January 2024

PLANHOLDER REGISTRATION FORM

Request for Tender No. **306-2091**

Town of Oliver
Co-Op Avenue Reconstruction

For any further distributed information about this Request for Tender please complete this form and e-mail, fax or hand deliver IMMEDIATELY to:

Town of Oliver
Box 638, 5971 Sawmill Road
Oliver, BC V0H 1T0
Attn: Kelly Mercer, AScT, Director of Operations
Email: kmercer@oliver.ca

Company Name:			
Address:			
Contact Person:			
Contact Telephone:		Contact Fax:	
Contact Email:			

Proponents completing this form will be issued any addendums and/or any additional information regarding this tender. It is the sole responsibility of the Proponent to ensure that the Planholder Registration form has been received by the Contract Administrator.

_____ _____

Signature Date

TOWN OF OLIVER - UNIT PRICE CONTRACT DOCUMENTS

Co-Op Avenue Reconstruction

Contract No. 306-2091

CONTENTS

The complete **TOWN OF OLIVER Unit Price Contract Documents** are based on the Master Municipal Construction Documents and consist of the following parts:

1. Documents provided herein:

- Invitation to Tenderers
- Instructions to Tenderers, Part I
- Form of Tender
  Appendix 1 - Schedule of Quantities and Prices
  Appendix 2 - Preliminary Construction Schedule
  Appendix 3 - Experience of Superintendent
  Appendix 4 - Comparable Work Experience
  Appendix 5 – Subcontractors
- Agreement
  Schedule 1 - Schedule of Contract Documents
  Schedule 2 - List of Drawings
- Supplementary General Conditions
- Supplementary Specifications
- Prime Contract Designation Form
- Example Force Account Rate Schedule
- Geotechnical Report
- Contract Drawings – Bound Separately

2. Documents that must be obtained by the Tenderer / Contractor:

- Master Municipal Construction Documents – 2019 Edition

(Available at MMCDA website **www.mmcd.net**)

Instructions to Tenderers - Part II
General Conditions
Schedules and Diagrams
Standard Specifications
Standard Detail Drawings

- MMCD 2019 Edition Supplementary Document Updates

(document changes prepared by MMCDA)
(Available at MMCDA website **www.mmcd.net**)
Please ensure that all updates have been reviewed.

Owner: **Town of Oliver**
Contract: **Co-Op Avenue Reconstruction**
Project No.: **306-2091**

The Town of Oliver invites tenders for the reconstruction of Co-Op Avenue in Oliver, BC. A summary of specific work items includes the following (approx. quantities):

- Approximately 225 l.m. of sidewalk construction
- Approximately 610 l.m. of curb & gutter
- Approximately 4,400 m^3 of full depth reclamation
- Approximately 3,500 m^2 of hot mix asphaltic concrete paving for the roadway reconstruction
- Supply and placement of granular base and subbase
- Utility work for sanitary sewer, storm sewer, reclaimed water and water systems

Electronic Contract Documents are available at no charge by contacting info@true.bc.ca (Adobe pdf format).

Paper copies may be ordered and picked up at the address below, on payment of a non-refundable amount of one hundred ($100) dollars, including GST (cheques payable to Town of Oliver):

Town of Oliver Municipal Hall
Box 638, 6150 Main Street
Oliver, BC V0H 1T0

Tenderers are encouraged to attend a mandatory informational meeting scheduled for Thursday the 8th day of February, 2024, at 1:00 p.m. at the intersection of Sawmill Road and Co-Op Avenue.

Tenders are scheduled to close:

Tender Closing Time: 2:00 pm local time

Tender Closing Date: Wednesday the 21st day of February, 2024 at:

Town of Oliver Municipal Hall
Box 638, 6150 Main Street
Oliver, BC V0H 1T0

For additional information, please contact:

Kelly Mercer, AScT, Director of Operations
Town of Oliver
Email: kmercer@oliver.ca Phone: 250-486-2408

(TO BE READ WITH "INSTRUCTIONS TO TENDERERS - PART II" CONTAINED IN THE EDITION OF THE PUBLICATION "MASTER MUNICIPAL CONSTRUCTION DOCUMENTS" SPECIFIED IN ARTICLE 2.2 BELOW)

Owner: **Town of Oliver**

Contract: **Co-Op Avenue Reconstruction**

Reference No.: **306-2091**

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:

- Approximately 225 l.m. of sidewalk construction
- Approximately 610 l.m. of curb & gutter
- Approximately 4,400 m^3 of full depth reclamation
- Approximately 3,500 m^2 of hot mix asphaltic concrete paving for the roadway reconstruction
- Supply and placement of granular base and subbase
- Utility work for sanitary sewer, storm sewer, reclaimed water and water systems

1.2 Direct all inquiries regarding the *Contract*, to:

Kelly Mercer, AScT, Director of Operations

Town of Oliver

Address: Box 638, 5971 Sawmill Road, Oliver, BC V0H 1T0

Phone: 250-486-2408
Email: kmercer@oliver.ca

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 and must be obtained by the Tenderer / *Contractor*. These documents include the publication entitled "Master Municipal Construction Documents - General Conditions, Specifications and Standard Detail Drawings" (2019 Edition). Refer to Schedule 1 of the Form of Agreement for a complete list of *Contract Documents*. All sections of these publications 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 judgment 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 in a sealed envelope, marked on the outside with the above *Contract* Title and Reference No., and must be received by the office of:

Town of Oliver Municipal Hall

Address: Box 638, 6150 Main Street
Oliver, BC V0H 1T0

Email: kmercer@oliver.ca

on or before:

Tender Closing Time: **2:00 pm** local time

Tender Closing Date: **Wednesday the 21st day of February, 2024**

3.2 Late tenders will not be accepted or considered, and will be returned unopened.

4.0 Additional Instructions to Tenderers

4.1 Pre-Tender Meeting

A mandatory pre-tender meeting will be held on **Thursday the 8th day of February, 2024, at 1:00 pm** at the intersection of Sawmill Road and Co-Op Avenue. Design team members and representatives of the Town of Oliver will be available to answer questions regarding the tender. Any new information that is requested or generated will be included in an Addendum that will be issued at least three days prior to the Tender Close.

4.2 Construction Schedule

Milestone Dates for the project are listed in the Form of Tender Appendix 2 - Preliminary Construction Schedule.

4.3 Construction Site Surface Features

The existence and location of all surface features which may be encountered during construction are not guaranteed to be shown on the Drawings. Notwithstanding any other provisions of this Contract, the *Contractor* shall be solely responsible for confirming the existence, extent and location of surface features either shown on the Drawings or not, and the effect they may have on the *Work*. Surface features to be confirmed as part of the tender preparation shall include but not be limited to retaining walls, trees, shrubbery, ornamental features, signs, walkways, fences, irrigation and utility boxes. Unless specifically noted otherwise, no additional compensation will be made for protection, restoration or removal of surface features affected by the *Work*, or for the effect they may have upon the Work itself.

4.4 Survey Layout and Digital Base Drawing

Survey layout and as-built pick-up for all *Work* shall be the Contractor's responsibility. The *Contract Administrator* will provide a digital base plan in AutoCAD format, including survey control points and bench marks. The Contractor's surveyor shall locate, confirm and protect control points and preserve permanent reference points during construction, including property pins and survey monuments.

4.5 Reference Material - Geotechnical / Environmental Report

A geotechnical report prepared by Tetra Tech (dated April 27, 2023) is included with these documents. The report is provided as reference material only and is not part of the *Contract Documents*. The report provides information and recommendations for the design of the works and is prepared primarily for the use of the Designer.

4.6 Alterations to MMCD 2019 Edition Contract Documents

This contract contains numerous alterations to the *MMCD 2019 Edition Contract Documents*, as described further in the *Supplemental General Conditions*, *Supplemental Specifications*, and on the *Contract Drawings*.

The *Contractor* awarded this contract should be aware that these alterations include but are not limited to the following:

- Construction Schedule completion dates are set by reference to Milestone Dates in the Form of Tender – Appendix 2.
- Requirement for submission of a SAC Performance Bond 2012.
- Requirement for submission of a Force Account Rate Schedule, for consideration by the Owner. Should the Owner decide that the Rate Schedule is unacceptable, then Force Account Rates will revert to those described in *General Conditions 10.1.1*.
- Clarification of Prime Contractor role via submission of 'Prime Contractor Declaration' form.

4.7 **Construction Intent and Staging**

The project has been designed based on the following staging:

1. Surface removals
2. Removal of existing reclaimed watermain. Note that the Contractor is to ensure that the proposed reclaimed water system and associated tie-in is active between the western extents of the project and the 200mm diameter tie-in at about Sta 0+037 is active by May 1, 2024.
3. Potable water distribution system improvement works.
4. Sanitary sewer & remainder of reclaimed water improvement works.
5. Storm system improvement works.
6. Roadworks.

4.8 **Incidental Items**

The contract is intended to include all works necessary to complete the project scope. Any items incidental to the project scope as shown on the drawings or described in the contract documents are to be included in the unit prices on the Form of Tender.

This clause for inclusion of incidental items in the tender price will not invalidate the contract provisions in GC 11.0 for concealed or unknown conditions.

4.9 **Optional Work Items**

Per MMCD Instructions to Tenderers – Part II item 17.2, the prices for Optional Work shall be included in the Tender Price for the purpose of price comparisons between tenders.

Owner: **Town of Oliver**

Contract: **Co-Op Avenue Reconstruction**

Reference No. **306-2091**

To *Owner*:

WE, THE UNDERSIGNED:

1.1 have received and carefully reviewed all of the *Contract Documents*, including the Instructions to Tenderers, 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 have full knowledge of the *Place of the Work*, and the *Work* required; and

1.3 have complied with the Instructions to Tenderers; and

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 the *Milestone Dates*, including the dates for *Substantial Performance* and *Total Performance* of the *Work* as listed in Appendix 2 of this Form of Tender; 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 in 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*.

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.

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.

WE AGREE:

5.1 that this tender will be irrevocable and open for acceptance by the *Owner* for a period of **30** 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*:

.1 a **SAC Performance Bond 2012** and a **Labour and Material Payment Bond**, each in the amount of 50% of the *Contract Price*, covering the performance of the *Work* including the *Contractor's* obligations during the *Maintenance Period*, 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*;

.2 a *Baseline Construction Schedule*, as provided by GC 4.6.1;

.3 a "clearance letter" indicating that the tenderer is in WorkSafe BC compliance;

.4 a copy of the insurance policies as specified in GC 24 indicating that all such insurance coverage is in place;

.5 a signed "Prime Contractor Declaration" form confirming requirements of GC 21.2; and

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 2.1.2.

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*.

OUR ADDRESS IS AS FOLLOWS:

_____

_____

_____

Phone: _____

Fax: _____

Attention: _____

This Tender is executed this

_____ day of _____, 2024

Contractor:

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

_____
(AUTHORIZED SIGNATORY)

_____
(AUTHORIZED SIGNATORY)

Town of Oliver

See paragraph 5.3.1 of the Instructions to Tenderers – Part II.
All prices and *Quotations* including the *Tender Price* shall include all *Taxes*, but shall not include *GST*. *GST* shall be shown separately.

Co-Op Avenue Reconstruction

ITEM	PAYMENT SECTION	PAYMENT PARA	DESCRIPTION	UNIT	UNIT QUANTITY	UNIT PRICE	TOTAL PAYMENT
DIVISION 01 - GENERAL REQUIREMENTS							
01.1	01 53 01	1.9.2 SSpec	Mobilization / De-Mobilization	LS			
01.2	01 55 00	1.5.2 SSpec	Traffic Control, Vehicle Access and Parking	LS			
01.3	01 58 01	1.3.1	Supply and install temporary project signage and distribute public notices to affected businesses	LS			
01.4	01 33 01	1.8.2 SSpec	Survey Layout and Project Record Documents	LS			
						Subtotal Division 01	
DIVISION 03 - CONCRETE							
03.1	03 30 20	1.4.3	Machine placed concrete barrier curb and gutter c/w wheelchair ramps and driveway crossings per Oliver STD DWGS R-7, R-8, R-8B, and R-9	l.m.	510		
03.2	03 30 20	1.4.3	Machine placed concrete roll-over curb and gutter c/w wheelchair ramps and driveway crossings per Oliver STD DWGS R-7, R-8, R-8B, and R-9	l.m.	100		
03.3	03 30 20	1.4.5 SSpec	Concrete Sidewalk per Oliver STD DWGS R-8, R-8B, and R-9 - 1.5m width including driveway accesses & wheelchair ramps - all gravels to be included under payment items for 32 11 16.1 and 32 11 23	l.m.	225		
03.4	03 30 20	1.4.6	Driveway crossings for sidewalk behind barrier curb as per Oliver STD DWG R-9 - all gravels to be included under payment items for 32 11 16.1 and 32 11 23	ea.	3		
						Subtotal Division 03	
DIVISION 31 - EARTHWORK							
31.1	31 22 16.1	1.4.2 SSpec	Remove and Replace Unsuitable Subgrade (OPTIONAL ITEM)	m^3	720		
31.2	31 23 01	1.10.10 SSpec	Trench drainage for sewer installation (dewatering via well points)	LS			
31.3	31 24 13	1.8.5 SSpec	Common excavation including offsite disposal to Public Works Yard, including concrete curb, gutter, and sidewalk, & subexcavation up to 500mm depth below top of existing granular base materials	m^2	4,500		
31.4	31 24 13	1.8.9	Subgrade preparation (to 300mm beyond limit of curb, gutter and sidewalk)	m^2	4,500		

ITEM	PAYMENT SECTION	PARA	DESCRIPTION	UNIT	UNIT QUANTITY	UNIT PRICE	TOTAL PAYMENT
31.5	31 32 19	1.6.1 SSpec	Supply and place Tensar TriAx TX Type 2 Geogrid (or approved equal) on approved subgrade (limited to low-lying areas) (OPTIONAL ITEM)	m^2	3,600		
						Subtotal Division 31	
DIVISION 32 - ROADS AND SITE IMPROVEMENTS							
32.1	32 01 16.7	1.5.1	Cold milling to maximum 125mm thickness - includes disposal (stockpile at Public Works Yard)	m^2	4,000		
32.2	32 11 16.1	1.4.3	Supply and place 300mm of 75mm minus granular subbase (to 300mm beyond limit of curb, gutter and sidewalk)	m^2	4,500		
32.3	32 11 23	1.4.2	Supply and place 200mm of 19mm minus granular base (to 300mm beyond limit of curb, gutter and sidewalk)	m^2	4,300		
32.4	32 12 16	1.5.1 SSpec	Supply and place hot-mix asphalt pavement - 75mm lift	m^2	3,500		
32.5	32 92 23	1.8.3 SSpec	Topsoil and sodding for boulevard restoration (north boulevard immediately east of Chevron)	m^2	240		
32.6	32 17 23	1.5.4	Supply and install permanent signage - as shown on Contract Drawings	LS			
32.7	03 30 53	1.5.6 SSpec	Concrete driveway restoration - includes but not necessarily be limited to: 100mm thick 30MPA concrete, reinforcing steel, 50mm thickness of 19mm granular base, 200mm thickness of 75mm granular sub-base, all sub grade preparation, placing, grading and compaction; and all work necessary to restore the driveway.	m^2	40		
32.8	31 22 16	1.4.1 SSpec	Gravel driveway restoration - includes all work necessary to restore the driveway including but not limited to 75mm thickness of 19mm minus granular base and 200mm thickness of 75mm minus granular subbase, all sub grade preparation, placing, grading and compaction; and all work necessary to restore the driveway.	m^2	20		
32.9	32 12 16	1.5.9 SSpec	Asphalt driveway restoration - includes all work necessary to restore the driveway including but not limited to 50mm depth asphalt, 50mm thickness of 19mm granular base and 200mm thickness of 75mm granular subbase, all sub grade preparation, placing, grading and compaction; and all work necessary to restore the driveway.	m^2	450		
						Subtotal Division 32	

ITEM	PAYMENT SECTION	PARA	DESCRIPTION	UNIT	UNIT QUANTITY	UNIT PRICE	TOTAL PAYMENT
DIVISION 33 - UTILITIES							
33.1	33 11 01	1.8.2 SSpec	Watermain DR 18 PVC 200 mm dia.	l.m.	310		
33.2	33 11 01	1.8.2 SSpec	Watermain DR 18 PVC 150 mm dia.	l.m.	35		
33.3	33 11 01	1.8.3	200mm FxH Gate Valve	ea.	6		
33.4	33 11 01	1.8.3	150mm FxH Gate Valve	ea.	4		
33.5	33 11 01	1.8.3	200x150mm FxF or FxH Reducer	ea.	3		
33.6	33 11 01	1.8.3	200mm HxHxF or HxFxF Tee	ea.	3		
33.7	33 11 01	1.8.3	200x150mm HxHxF or HxFxF Reducing Te	ea.	4		
33.8	33 11 01	1.8.3	200mm HxH 90° Bend	ea.	1		
33.9	33 11 01	1.8.3	200mm HxH 45° Bend	ea.	4		
33.10	33 11 01	1.8.3	200mm FxH 22.5° Bend	ea.	1		
33.11	33 11 01	1.8.3	200mm FxH 11.25° Bend	ea.	1		
33.12	33 11 01	1.8.3	150mm HxH 45° Bend	ea.	6		
33.13	33 11 01	1.8.4	Water service connection 50mm per Oliver STD DWG W-1 & W-1B (complete)	ea.	2		
33.14	33 11 01	1.8.14	Re-set existing fire hydrant as per Oliver STD DWG W-3	ea.	1		
33.15	31 23 01	1.10.4	Remove and dispose of existing valve lid, frame, and extension to 1.0m below existing grade. Fill and compact remaining extension with common fill.	ea.	12		
33.16	33 11 01	1.8.13	Watermain Tie-in to existing at various locations, includes couplings and all necessary work to complete the tie-in	ea.	8		
33.17	31 23 01	1.10.4	Remove and dispose of existing ductile iron reclaimed watermain (Return to Public Works Yard)	l.m.	330		
33.18	31 23 01	1.10.4	Remove and dispose of existing reclaimed water fire hydrant (Return to Public Works Yard)	LS			
33.19	33 11 01	1.8.2 SSpec	Reclaimed watermain DR 18 PVC 150mm dia.	l.m.	300		
33.20	33 11 01	1.8.2 SSpec	Reclaimed watermain DR 18 PVC 200mm dia.	l.m.	5		
33.21	33 11 01	1.8.2 SSpec	Reclaimed watermain DR 18 PVC 250mm dia.	l.m.	20		
33.22	33 11 01	1.8.3	250mm HxFxF Tee (reclaimed water)	ea.	1		
33.23	33 11 01	1.8.3	150mm FxH Gate Valve (reclaimed watermain)	ea.	1		

ITEM	PAYMENT SECTION	PARA	DESCRIPTION	UNIT	UNIT QUANTITY	UNIT PRICE	TOTAL PAYMENT
DIVISION 33 - UTILITIES - continued							
33.24	33 11 01	1.8.3	200mm FxH Gate Valve (reclaimed watermain)	ea.	1		
33.25	33 11 01	1.8.3	150mm HxH or HxF 45° Bend (reclaimed water)	ea.	2		
33.26	33 11 01	1.8.3	200mm HxH 45° Bend (reclaimed water) for vertical alignment to aid tie-in	ea.	1		
33.27	33 11 01	1.8.3	250mm HxH 45° Bend (reclaimed water)	ea.	2		
33.28	33 11 01	1.8.3	250x150mm FxH or FxF Reducer (reclaimed watermain)	ea.	2		
33.29	33 11 01	1.8.3	250x200mm FxF Reducer (reclaimed watermain)	ea.	1		
33.30	33 11 01	1.8.3	Air release valve assembly (reclaimed water) as per Oliver STD DWG S-10	ea.	1		
33.31	33 11 01	1.8.13	Reclaimed watermain Tie-in to existing watermain - includes couplings and all necessary work required to complete the tie-in	ea.	3		
33.32	33 30 01	1.6.1, 1.6.2	Sanitary Sewer Pipe PVC DR35 200mm dia	l.m.	15		
33.33	33 30 01	1.6.1, 1.6.2	Sanitary Sewer Pipe PVC DR35 250mm dia	l.m.	80		
33.34	33 30 01	1.6.1, 1.6.2	Sanitary Sewer Pipe PVC DR35 300mm dia c/w drainrock bedding	l.m.	10		
33.35	33 30 01	1.6.1, 1.6.2	Sanitary Sewer Pipe PVC DR35 375mm dia c/w drainrock bedding	l.m.	210		
33.36	33 30 01	1.6.1, 1.6.2	375x300mm Wye	ea.	1		
33.37	33 30 01	1.6.1, 1.6.2	Combination 600x450mm & 450x300mm Eccentric Reducers	ea.	1		
33.38	33 30 01	1.6.1, 1.6.2	Combination 600x450mm & 450x375mm Eccentric Reducers	ea.	1		
33.39	33 30 01	1.6.1, 1.6.2	300x100mm Reducer c/w bends and fittings as required for service tie-in at Sta 0+290	ea.	1		
33.40	33 30 01	1.6.1, 1.6.2	600mm dia. Cap	ea.	1		
33.41	33 30 01	1.6.3	Sanitary services DR28 PVC 100mm dia	l.m.	15		
33.42	33 30 01	1.6.4	Sanitary inspection chambers c/w tie to existing service line as per Oliver STD DWGS S-3 & S-4	ea.	2		
33.43	33 30 01	SSpec	Bypass pumping to allow for sewer tie-ins	LS			
33.44	33 44 01	1.5.1.1	Supply and install 1050mm dia manhole including manhole base, lid, slab, cover and frame as per Oliver STD DWGS S-1 & S-6 (SAN MH). Concrete to include Xypex Bio-San C500 Admixture.	ea.	6		

ITEM	PAYMENT SECTION	PARA	DESCRIPTION	UNIT	UNIT QUANTITY	UNIT PRICE	TOTAL PAYMENT
DIVISION 33 - UTILITIES - continued							
33.45	33 44 01	1.5.1.2 SSpec	Manhole Riser 1050mm dia measured from invert to underside (0.5m below rim elevation) of concrete lid as per Oliver STD DWG S-1 (SAN MH). Concrete to include Xypex Bio-San C500 Admixture.	v.m.	13		
33.46	33 44 01	1.5.1.1	Supply and install 1200mm dia manhole including manhole base, lid, slab, cover and frame as per Oliver STD DWGS S-1 & S-6 (SAN MH). Concrete to include Xypex Bio-San C500 Admixture.	ea.	2		
33.47	33 44 01	1.5.1.2 SSpec	Manhole Riser 1200mm dia measured from invert to underside (0.5m below rim elevation) of concrete lid as per Oliver STD DWG S-1 (SAN MH). Concrete to include Xypex Bio-San C500 Admixture.	v.m.	6		
33.48	31 23 01	1.10.4	Remove and dispose of existing manhole lid, frame, cover, and barrels to 1.0m below existing grade. Fill and compact remaining barrels with common fill.	ea.	3		
33.49	31 23 01	1.10.4	Remove and dispose of existing manhole (complete) to allow for tie-in to existing main	ea.	4		
33.50	33 34 01	1.8.10	Sanitary Tie-in to existing forcemain at STA 0+290, includes coupling, 2x45 degree bends c/w thrust blocks, 3.0m of 200mm DR18 PVC pipe, and all necessary work to complete the tie-in	ea.	1		
33.51	33 30 01	1.6.7	Sanitary Tie-in to existing gravity main at various locations, includes couplings and all necessary work to complete the tie-in	ea.	6		
33.52	33 44 01	1.5.4	Remove and dispose of existing catchbasins, lawn basins, cleanouts and inspection chambers	ea.	6		
33.53	31 23 01	1.10.4	Remove and dispose of existing storm main	l.m.	230		
33.54	33 40 01	1.6.1,1.6.2	Storm Sewer Pipe ADS N-12 HDPE 375mm dia.	l.m.	35		
33.55	33 40 01	1.6.1,1.6.2,	Storm Sewer Pipe ADS N-12 HDPE 250mm dia.	l.m.	60		
33.56	33 40 01	1.6.5	Catchbasin lead ADS N-12 HDPE 200mm dia	l.m.	40		
33.57	33 44 01	1.5.2	Supply and install Drainage Drywell as per Oliver STD DWG D-6	ea.	1		
33.58	33 44 01	1.5.1.1	Supply and install 1050mm dia manhole including manhole base, lid, slab, cover and frame as per Oliver STD DWGS S-1 & S-6 (STM MH)	ea.	3		
33.59	33 44 01	1.5.1.2 SSpec	Manhole Riser 1050mm dia measured from invert to underside (0.5m below rim elevation) of concrete lid as per Oliver STD DWG S-1 (STM MH)	v.m.	4		

ITEM	PAYMENT SECTION	PARA	DESCRIPTION	UNIT	UNIT QUANTITY	UNIT PRICE	TOTAL PAYMENT
DIVISION 33 - UTILITIES - continued							
33.60	33 44 01	1.5.2	Supply and install Catch Basin (Side Inlet or Standard) as per Oliver STD DWGS D-4 & D-5	ea.	9		
33.61	33 40 01	1.6.9	Tie to existing storm Catch Basins as shown on Contract Drawings	ea.	2		
33.62	33 40 01	1.6.9	Drainage Tie-in to existing at various locations, includes couplings and all necessary work to complete the tie-in	ea.	2		
						Subtotal Division 33	

CONTRACT SUMMARY	
SUBTOTAL DIVISION 01 - GENERAL REQUIREMENTS	
SUBTOTAL DIVISION 03 - CONCRETE	
SUBTOTAL DIVISION 31 - EARTHWORK	
SUBTOTAL DIVISION 32 - ROADS AND SITE IMPROVEMENTS	
SUBTOTAL DIVISION 33 - UTILITIES	
SUBTOTAL ALL PARTS	
TENDER SUBTOTAL	
GST (5% of Tender Subtotal)	
TOTAL CONTRACT SUM	

Town of Oliver

Co-Op Avenue Reconstruction

See paragraph 5.3.2 of the Instructions to Tenderers – Part II.

Indicate Schedule with bar chart with major item descriptions and time.

MILESTONE DATES:

Anticipated Contract Award:	March 6, 2024
Milestone 1 BC Tree Fruits water system tie-in	May 1, 2024
Milestone 2 Airport Tie-in for Reclaimed Water	May 1, 2024
Milestone 3 (Substantial Performance):	July 15, 2024
Milestone 4 (Total Performance):	August 15, 2024

ACTIVITY	CONSTRUCTION SCHEDULE											
Week/Month	1	2	3	4	5	6	7	8	9	10	11	12

Note: In the case of a discrepancy between the Preliminary Construction Schedule prepared by the Tenderer and the Milestone Dates prescribed by the Owner above, the Milestone Dates will govern.

Tenderer's Initials _____

Town of Oliver

Co-Op Avenue Reconstruction

See paragraph 5.3.3 of the Instructions to Tenderers – Part II.

Name: _____

Experience:

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

_____

References: _____

_____

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

_____

References: _____

_____

Dates: _____

Project Name: _____

Responsibility: _____

_____

_____

_____

References: _____

_____

Town of Oliver

Co-Op Avenue Reconstruction

See paragraph 5.3.4 of the Instructions to Tenderers – Part II.

PROJECT	OWNER / CONTACT NAME PHONE and FAX	WORK DESCRIPTION	VALUE ($)
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		
	Owner / Contract ______ Phone ( ) ______ Fax ( ) ______		

Tenderer's Initials ______________________

Town of Oliver

Co-Op Avenue Reconstruction

See paragraph 5.3.5 of the Instructions to Tenderers – Part II.

TENDER ITEM	TRADE	SUBCONTRACTOR NAME	PHONE NUMBER
SURVEYING			
PIPE LAYING			
CONCRETE			
ASPHALT PAVING			

BETWEEN *OWNER* AND *CONTRACTOR*

This agreement made in duplicate this

_____ day of _____, 2024

Contract: **Co-Op Avenue Reconstruction**

Reference No. 306-2091

BETWEEN:

The **Town of Oliver**

(the "*Owner*")

AND:

_____

_____

_____

(NAME AND OFFICE ADDRESS OF CONTRACTOR)

(the "*Contractor*")

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

Article 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 the *Milestone Dates*, including *Substantial Performance* and *Total Performance* of the *Work* on or before the dates listed in Appendix 2 of the Form of Tender, subject to the provisions of the *Contract Documents* for adjustments to the *Contract Time*

1.3 Time shall be of the essence of the Contract.

Article 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.*

Article 3 Contract Price

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

.1 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

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

.3 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*.

Article 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.

Article 5 Rights and Remedies

5.1 The duties and obligations imposed by the *Contract Documents* and the rights and remedies available thereunder 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*.

Article 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 hand, or by fax, or by pre-paid registered mail to the addresses as set out below:

The *Owner*:

Town of Oliver
6150 Main Street, Box 638
Oliver, BC V0H 1T0
Email: kmercer@oliver.ca
Attention: Kelly Mercer, AScT, Director of Operations

The *Contractor*:

_____
_____
_____
Fax: _____
Attention: _____

The *Contract Administrator*:

TRUE Consulting
2089 Falcon Road
Kamloops, BC V2C 4J2
Email: scurry@true.bc.ca
Attention: Sean curry, P. Eng.

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

.1 immediately upon delivery, if delivered by hand; or

.2 immediately upon transmission if sent by fax and received in hard copy; or

.3 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.*

6.4 The sender of a notice by fax assumes all risk that the fax is received in hard copy.

Article 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 ensure 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)

Owner:

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

_____
(AUTHORIZED SIGNATORY)

_____
(AUTHORIZED SIGNATORY)

Schedule 1 Schedule of Contract Documents

The following is an exact and complete list of the *Contract Documents*, as referred to in Article 2.1 of the Agreement. The items are listed in order of precedence in accordance with GC2.2.4.

***NOTE*:** The documents noted with "*" are contained in the "Master Municipal Construction Documents – 2019 Edition". All sections of these publications are included in the *Contract Documents.*

1.1 Agreement, including all Schedules;

1.2 The following Addenda (ADDENDA # and Date, if any):

_____

_____

_____

_____

1.3 Supplementary General Conditions;

1.4 General Conditions*;

1.5 Supplementary Specifications;

1.6 Specifications *;

1.7 *Contract Drawings* listed in Schedule 2 to the Agreement - "List of *Contract Drawings*";

1.8 Standard Detail Drawings *;

1.9 Executed Form of Tender, including all Appendices;

1.10 Instructions to Tenderers - Part I;.

1.11 Instructions to Tenderers - Part II *.

Schedule 2 List of Contract Drawings

(COMPLETE LISTING OF ALL DRAWINGS, PLANS AND SKETCHES WHICH ARE TO FORM A PART OF THE CONTRACT, OTHER THAN STANDARD DETAIL DRAWINGS AND SUPPLEMENTARY STANDARD DETAIL DRAWINGS.)

TITLE	DRAWING NO.	DATE	REVISION NO.	REVISION DATE
LOCATION PLAN c/w DRAWING LIST	306-2091-001-01-R3	December 1, 2022	R3	January 29, 2024
OVERALL PLAN	306-2091-001-02-R3	December 1, 2022	R3	January 29, 2024
REMOVALS PLAN	306-2091-001-03-R3	December 1, 2022	R3	January 29, 2024
UTILITIES PLAN & PROFILE STA 0+000 TO 0+185	306-2091-001-04-R3	December 1, 2022	R3	January 29, 2024
UTILITIES PLAN & PROFILE STA 0+185 TO 0+360	306-2091-001-05-R3	December 1, 2022	R3	January 29, 2024
ROADWORKS PLAN & PROFILE STA 0+000 TO 0+185	306-2091-001-06-R3	December 1, 2022	R3	January 29, 2024
ROADWORKS PLAN & PROFILE STA 0+185 TO 0+360	306-2091-001-07-R3	December 1, 2022	R3	January 29, 2024
STANDARD DRAWINGS	306-2091-001-08-R3	December 1, 2022	R3	January 29, 2024
STANDARD DRAWINGS	306-2091-001-09-R3	December 1, 2022	R3	January 29, 2024
STANDARD DRAWINGS & SECTIONS & DETAILS	306-2091-001-10-R3	December 1, 2022	R3	January 29, 2024

The General Conditions for this project are contained in the Master Municipal Construction Documents (MMCD) 2019 Edition, except as specified in the following Supplementary General Conditions and MMCD Supplementary Document Updates (see Schedule 1 of the Agreement). These Supplementary General Conditions take precedence over the applicable MMCD General Conditions.

1.0 DEFINITIONS

1.19 Contingency or Contingency Allowance

SGC 1.19.1 – Add the following:

The *Owner* will retain any unused portion of the *Contingency Allowance*, and the *Contractor* cannot make a claim for lost overhead or profit on the unused portion of the *Contingency Allowance*.

2.0 DOCUMENTS

2.2 Interpretation

SGC 2.2.4(5)S - Add new clause

(5) Any reference in the standard specifications to a detail drawing will reference the applicable standard detail drawing as published in the Town of Oliver's current Subdivision & Development Servicing Standards document.

4.0 CONTRACTOR

4.3 Protection of *Work*, Property and the Public

SGC 4.3.4 - Add the following paragraph:

(4) expose all connection points and crossing locations for proposed utilities that have reasonable potential to affect the design grades or alignments and notify the *Contract Administrator* of the exact location and elevation of the connection points and crossing utilities for design confirmation at least one week prior to construction at each site. If this confirmation is not completed as specified then the *Contractor* will not be eligible for any delay claims or extra costs incurred by conflicts or changes necessary to complete the related operations. Payment for pre-exposing of utilities will be incidental to payment for utility work unless shown otherwise in the Schedule of Quantities and Prices.

4.6 Construction Schedule

SGC 4.6 - Add the following sub-section:

4.6.8 Working hours shall be 7 am to 8 pm Monday to Saturday, with work allowed on Sunday between 8 a.m. and 8 p.m. No work is allowed on Statutory Holidays unless otherwise approved by the Contract Administrator.

4.12 Tests and Inspections

SGC 4.12 – Clarification of Testing Requirements and Responsibilities:

The *Contractor* shall conduct and pay for sufficient Quality Assurance testing to demonstrate that specific materials, products and workmanship are in strict conformance with the Contract Documents. For this project, expected materials testing shall include but not be limited to the following:

- Sieve analysis and proctors for all imported granular materials.
- Proctors for native trenching and general earthworks materials.
- Subgrade approval as provided in a sealed letter provided by a qualified geotechnical engineer. During this review, the subgrade shall be proof rolled with a loaded single axle truck with a rear axle load of 8165 kg. Any soft or wet areas shall be excavated and backfilled with select granular subbase compacted to 100% Standard Proctor density.
- Density testing of bedding, pipe surround, trench backfill, road gravels and general earthworks to confirm that the techniques and level of compaction effort is sufficient to meet the required specifications.
- Asphalt testing to ensure all pavement structures meet contact specifications, including as a minimum:
    - one Marshall analysis with sieve per 150 tonnes of asphalt, or per maximum 2 days production where no changes have occurred to the production.
    - three asphalt cores with subsequent thickness and density analysis per 150 tonnes of asphalt, or per maximum 2 days production where no changes have occurred to the production and method of placement. Asphalt core locations will be randomly selected by the Contract Administrator.
- Concrete testing to ensure all concrete structures meet contact specifications, including as a minimum:
    - One slump, air, and compressive strength (3 cylinders) testing per 200m of concrete curb placement, or maximum 2 days production where no changes have occurred to the production and method of placement.
    - One slump, air, and compressive strength (3 cylinders) testing per 150 sq.m of concrete sidewalk placement, or maximum 2 days production where no changes have occurred to the production and method of placement.

6.0 OTHER CONTRACTORS

6.4 Shallow Utility Work By Others

SGC 6.4 - Add the following sub-section:

6.4.1 Utility removal, relocation, adjustment or upgrading work may be required to be completed by others within the work area during the project. The Owner reserves the right to make changes in the design and scope of work as a result of conflicting utilities if required. Standard Contract clauses for Changes will apply.

6.4.2 The *Contractor* shall coordinate work with City Utilities, Gas, Electrical and Communication Companies as required for any conflicts, adjustments or protective measures. The *Contractor* shall permit and accommodate other contractors or companies working within the site on shallow utility work or other utility improvements. Contractor shall remain the Prime Contractor as per GC 21.2.

9.0 VALUATION OF CHANGES AND EXTRA WORK

9.5 Adjustments of Contract Time

SGC 9.5.3 - Delete 9.5.3 and replace with the following:

9.5.3 The *Construction Schedule* shall include allowance for all *Optional Work* unless specified otherwise in the *Contract Documents*. If the Contract Administrator authorizes *Optional Work* pursuant to GC 7.4.1 then the related Change Order shall **not** include any adjustment to the Contract Time.

10.0 FORCE ACCOUNT

10.1 Force Account Costs

SGC 10.1 – Add the following subsections:

10.1.2 Within 15 *Days* of receipt of the written *Notice of Award*, the *Contractor* shall deliver a **Force Account Rate Schedule** to the *Owner*. The Force Account Rate Schedule shall include hourly rates for all Labour and Equipment intended to be used in completion of the works. These hourly rates are to be 'all-inclusive', or 'all-found'. Labour rates are to be inclusive of wages, insurance, holiday pay, benefits, small tools, overhead, and profit. Equipment rates are to be inclusive of operator, overhead, and profit.

If the *Owner* is in agreement with the **Force Account Rate Schedule** as submitted, written acceptance will be given by the *Contract Administrator*, and the payment for *Force Account Work* shall be calculated based on the rates included in the **Force Account Rate Schedule** instead of the rates noted in General Conditions item 10.1.1.

However, if the *Owner* does not agree to the rates shown in the **Force Account Rate Schedule**, or if the *Contractor* utilizes Labour, Equipment, or Subcontractors whose rates are not shown in the **Force Account Rate Schedule**, then MMCD items 10.1.1 (1), (2), (3), and (4) will be used to determine applicable payment for *Force Account Work*.

13.0 DELAYS

13.1 Delay by Owner or Contract Administrator

SGC 13.1.1 (2) – Delete 13.1.1 (2) and replace with the following:

(2) Reimbursement by the *Owner* for directly related out of pocket additional costs reasonably and necessarily incurred by the *Contractor* as a result of such delay, plus payment of a markup of 10% on such costs shall be allowed for overhead, plus a further markup of 10% on the total of the foregoing shall be allowed for profit. No payment shall be owed for lost opportunity of other indirect cost. Directly related out of pocket additional costs which are submitted to the *Contract Administrator* will be reviewed for reasonableness, with consideration given to whether the Delay is 'short term' (Hours) or 'long term' (Days or more). When reviewing costs, the *Contract Administrator* shall have consideration for the following components:

- Labour: Labour and site overheads at the job site (such as the Superintendent, field office staff, site staff vehicles, site office utilities, and site security) are out of pocket costs during a short term delay only.
- Equipment: Only the fixed costs associated with equipment such as depreciation, interest cost, insurance cost, shop cost allocation, and support staff such as mechanics or purchasing agents are out of pocket costs.

13.9 Liquidated Damages for Late Completion

SGC 13.9.1 (1) – Delete 13.9.1 (1) and replace with the following:

(1) as a genuine pre-estimate of the *Owner's* increased costs for the *Contract Administrator* and the *Owner's* own staff caused by such delay an amount of **$1,000.00** per day or pro rata portion for each *Day* that actual *Substantial Performance* is achieved after the *Substantial Performance Milestone Date*; plus

18.0 PAYMENT

18.6 Substantial Performance

SGC 18.6.4 – Delete GC 18.6.4 and replace with the following:

18.6.4 The *Contract Administrator* shall include the date of *Substantial Performance* in the *Certificate of Substantial Performance*. The date for *Total Performance* shall be the set number of *Days* after *Substantial Performance* as listed in Appendix 2 of the *Form of Tender*, unless otherwise agreed by the *Contract Administrator.*

SGC 18.6.5 – Add the following:

The *Contract Administrator* shall prepare a *Payment Certificate* for release of the lien holdback and the amount shall be due and payable in accordance with GC 18.5.1.

18.7 Total Performance

SGC 18.7.4 – Add the following clause:

18.7.4 If *Total Performance* is not achieved on the date as outlined in SGC 18.6.4, upon written notification to the *Contractor*, the *Owner* may complete or cause to be complete any and all outstanding deficiencies. All resulting costs incurred by the *Owner* in completing the *Work*, including administration and inspection costs, will be deducted from the amounts owing by the *Owner* to the *Contractor*.

21.0 WORKERS COMPENSATION REGULATIONS

21.2 Contractor is "Prime Contractor"

SGC 21.2.2 - Add the following:

21.2.2 Prior to issuance of the Notice to Proceed, the *Contractor* shall sign and submit a Prime Contractor Agreement form (to be provided by *Contract Administrator*), acknowledging acceptance and understanding of the requirements and obligations of the Prime Contractor role. If at any time the *Contractor* believes he is no longer acting as the Prime Contractor, due to multiple contractors or other factors, written notification must be provided by the *Contractor* to the *Contract Administrator*. An investigation will then be completed and the Prime Contractor status will be confirmed or amended as warranted.

22.0 INDEMNIFICATION

22.1 Contractor to Indemnify

SGC 22.1.2 - Add the following:

22.1.2 The *Contractor* shall indemnify the *Owner* from third party liability with respect to health care costs recoverable under the *Health Care Costs Recovery Act* arising out of the *Contractor's* performance of the Contract Work.

24.0 Insurance

24.1 Required Insurance

SGC 24.1.1 – Delete GC 24.1.1 and replaced with the following:

Contractor will at the Contractor's expense, carry with an insurance company or companies and under policies of insurance acceptable to and approved by Owner the following insurance with limits not less than shown in the respective items:

a) Automotive Liability Insurance (Owned and Non-Owned Units)
Limits: Bodily Injury, Death and Property Damage – inclusive each accident $5,000,000

The Contractor shall, at the Contractor's expense, throughout the term of the Contract, maintain such insurance as required under the Insurance (Motor Vehicle) Act of British Columbia. The Contractor shall provide the Owner with a Certificate of Insurance, I.C.B.C. form No. APV 47, for owned, rented or leased vehicle as evidence of third party motor vehicle insurance coverage.

b) Comprehensive General Bodily Injury, Death and Property Damage Liability Insurance
Limits: Bodily Injury, Death and Property Damage – inclusive each accident $5,000,000

The Insurance shall include Contractor's Contingent Liability, and Contingent Liability of sufficient scope to include the liability assumed by the Contractor under the terms of this Contract, and Completed Operations Liability. The policy shall include the Owner's, the Contract Administrator as additional insured's with a cross liability clause. Any property damage deductible shall be for the account of the Contractor and shall not exceed $2,500.00 for any one occurrence.

c) Course of Construction Builders' Risk Insurance.

d) Coverage on an "All Risks" basis in the amount of not less than the amount of the Contract Price; subject to a deductible provision for the Contractor's account not exceeding $2,500.00 each loss. Coverage to include the Owner's as an additional insured.

e) Insurance on Contractor supplied Equipment, Equipment rented, leased or owned by the Contractor to its full insurable value.

26.0 EARLY USE OF THE WORK

26.3 Effect on Maintenance Period

SGC 26.3 - Delete GC 26.3.1 and replace with the following:

26.3.1 There will be no effect on the *Maintenance Period* if the *Owner* takes over and begins to use a portion of the *Work* before *Substantial Performance* is achieved. The *Maintenance Period* for all *Work* shall commence from the date of *Substantial Performance* of the *Contract*.

The Construction Specifications for this project are contained in the Master Municipal Construction Documents (MMCD) 2019 Edition, except as specified in the following Supplementary Specifications and MMCD Supplementary Document Updates (see Schedule 1 of the Agreement). These Supplementary Specifications take precedence over the applicable MMCD Specifications.

CONTENTS

Section 01 33 01 Project Record Documents

1.7 Recording Actual Site Conditions, Add the following:

.5 Survey layout and as-built pick-up for all Work shall be the Contractor's responsibility. The Contract Administrator will provide a digital base plan in AutoCAD format, including survey control points and bench marks. The Contractor's surveyor shall locate, confirm and protect control points and preserve permanent reference points during construction, including property pins and survey monuments.

.6 Contractor to complete and submit a complete digital survey of all Work in AutoCAD format prior to Substantial Performance. Survey data shall include all visible and nonvisible construction items, including but not limited to manholes, inspection chambers, inverts, end stakes, valves, hydrants, curb stops, street lights, junction boxes, concrete curbs (horizontal and vertical transitions) and extent of sidewalk work. The survey shall include buried items, such as pipe inverts, bends, deflections and pipe crossings.

.7 The Contractor shall be responsible for the cost of verifying non-disturbance or replacing any legal survey pins or monuments damaged during construction operations. In the event that the Contractor requires the removal of any legal survey markers for the purpose of the Work, the Contractor must receive written consent from the Contract Administrator and the pin must be adequately referenced by a BCLS prior to removal.

1.8 Payment, Add the following:

.2 *Survey Layout and Project Record Documents* is a lump sum item and will be paid 50% with the first progress payment and 50% after submission of the final Project Record Documents. The work shall be in accordance with Section 01 33 01.

Section 01 52 01 Temporary Structures – Site Office

Delete 1.3.1, no Site Office is required for the Contract Administrator.

Section 01 53 01 Temporary Facilities

1.9 Payment, Add the following:

.2 Mobilization/Demobilization is a fixed lump sum payment item and will be paid 50% with the first progress payment and 50% with the final progress payment after Total Performance has been achieved. The second 50% amount will not factor into determination of Substantial Performance.

Section 01 55 00 Traffic Control, Vehicle Access and Parking

1.4 Traffic Control, Add the following:

.14 The Contractor will be required to provide a Traffic Control Plan for each stage of construction, as described in the MoTI Traffic Control Manual for Work on Roadways (latest edition). Traffic Control Plans shall be prepared or reviewed and approved by a Professional Engineer with traffic experience

or a Professional Traffic Operations Engineer (PTOE). The Traffic Control Plan must be submitted to the Contract Administrator for review and approval 5 working days prior to commencement of work in each stage.

.15 All construction signage and traffic control must be in compliance with the Contract Documents, local bylaws, MOTI Manual and as directed by the Contract Administrator. All signage, barricades, delineators and garments must comply with MoTI Technical Circular T09-05 for Retro-Reflectivity.

.16 The Contractor shall designate a Traffic Control Supervisor responsible for site safety (pedestrian, cyclist and vehicles) with specific training as identified in the MoTI Traffic Control Manual. The Traffic control Supervisor and the Site Inspector will review signage identified in the Contractor's Traffic Plan prior to construction on each stage and on a daily basis. The Traffic Control Supervisor shall maintain a Traffic Control Log Book as required by the MoTI Manual to facilitate a safe traffic control system for dynamic and static construction zone operation.

.17 The Contractor shall provide additional written notice to residents and businesses one day prior to access closures or restrictions. The content and form of the written notifications shall be reviewed and approved by the Contract Administrator prior to delivery.

.18 Emergency access and pedestrian access to all businesses and residences shall be maintained at all times.

.19 Vehicle access for business and residential properties shall be maintained at all times unless otherwise approved by the Contract Administrator. Suitable access shall have a minimum lane width of 3.0m and be defined as a bladed and comfortable driving surface, free of potholes and other impediments, sufficient to accommodate a standard two-wheel drive passenger vehicles at a speed of 20 km/h.

.20 The Contractor shall provide daily/weekly notification and coordination with all emergency and public services, including but not limited to fire, police, ambulance, transit, garbage collection and Canada Post. If regular recycling or garbage collection is impeded due to construction activity, the Contractor shall ensure that recycling and garbage is removed from the curbside and disposed.

.21 The Contractor shall make provision at all times for adequate separation between public and work area hazards, active and inactive, such as construction equipment, excavations and equipment by means of delineation, barricades and fencing. Applicable traffic control devices used for night time service must have ASTM9 equivalent or diamond grade equivalent reflectivity and flashing beacons. Where equipment enters or exists in the work area, Traffic Control Persons shall be used.

.22 The Site Inspector is to approve any trenches left open overnight. These trenches shall be fenced with 1.8m high metal fencing, in conjunction with reflectorized signs, barricades and flashers. Any trenches left open overnight shall not disrupt access to or cause any other service inconvenience to any dwelling, business or pedestrian walkway.

.23 The Contractor shall utilize H-20 traffic load steel plates for emergency crossings or other short term trench or excavation crossings required for access purposes.

.24 Traffic interruptions are not permitted on arterial and major collector roads between the hours of 7-9 am and 3:30-5:30 pm.

.25 All regulatory signs that are affected by the work must be removed and replaced by the road jurisdiction crews only (i.e. stop signs, speed zone signs, etc.). Contractor to provide 7 days written notice to Contract Administrator for sign removal.

.26 All affected roads shall be swept and have dust control applied as conditions warrant or as directed by the Contract Administrator.

1.5 Payment, Add the following:

.2 *Traffic Control, Vehicle Access and Parking* is a lump sum item and will be paid as a percentage of the completed contract work. The work shall be in accordance with the Specifications and Traffic Control Plan.

Section 01 57 01 Environmental Protection

1.4.3 Environmental Protection, .3 Pollution Control, Add the following:

.5 Ensure proper containment and disposal of concrete wash water.

.6 Prepare written Spill Contingency Plan prior to commencement of construction activities. Spill Contingency Plan shall include the following:

.1 Provisions for secondary containment for all stationary bulk fuelling tanks, equipment washing and maintenance areas. Secondary containment for fuelling tanks must be a minimum 110% of the volume of the tank or 40% of the volume of all the containers stored, whichever is the greater volume.

.2 Spill Kits and protective equipment that include adsorbent pads, booms, etc. for containing and mopping up small spills, and gloves, coveralls, shovels, containers, etc. to use to mop up spilled substances.

.3 Segregation and disposal procedure (or contingency plan) for contaminated soils and/or contaminated groundwater.

.4 Reporting procedure that includes “reportable volumes” and numbers to call in the event of a spill. For example, spills of oil or diesel fuel equal to or in excess of 100 L must be reported to the Provincial Emergency Program (PEP) at 1.800.663.3456.

When calling PEP be prepared to answer the following:

- your name and contact phone number;
- name and telephone number of the person who caused the spill;
- location and time of the spill;
- type and quantity of the substances spilled;

- cause and effect of the spill;
- details of action taken or proposed;
- description of the spill location and surrounding area;
- names of agencies on scene; and
- name of other persons or agencies advised concerning the spill.

.5 Small spills may be dealt with by the Contractor provided equipment is available (may be a sub-contractor like NEWALTA) to contain and clean-up the spilled substances and all soils affected by the soil. Any spill to a surface water or sewer utility must be reported to the Owner, or use 911 in any emergency situations where response times are critical.

.6 The Contractor shall not conduct any refuelling activities within 30m of the stormwater outfall classified as a Creek (located in the proximate location of Sta 0+050).

Section 01 58 01 Project Identification

Delete 1.2.2.1 Public Notice and replace with the following:

.1 The Contractor shall be responsible for notifying, in writing, all residents and businesses affected by the proposed construction within the project limits and affected area. This notification shall be done on a block by block basis, with each occupied parcel contacted 7 days in advance of construction in the particular area or block. The content and form of the written notification shall be reviewed by the Contract Administrator and the Contractor shall incorporate any modifications or comments made into notification prior to issuance. The notice shall include an invitation for owners and residents to meet the Contractor's Superintendent and Resident Inspector at a brief street meeting prior to the commencement of the work in the particular block.

Section 30 30 53 Cast-in-Place Concrete

1.5 Measurement and Payment, Add the following:

.6 Payment for cast-in-place concrete driveway restoration includes all subgrade preparation, indicated thickness of granular base and subbase, formwork, reinforcing steel, supply and placing of the concrete, compaction and adjusting and cleaning frames, covers and lids of all castings affected and all other work that is necessary to restore the driveway.

Section 31 05 17 Aggregates and Granular Materials

1.3 Approvals, Add the following:

.5 Crushing and /or screening of granular aggregates for this or other projects shall not be permitted within the project area or on any road rights-of-way.

Section 31 15 60 Dust Control

1.0 GENERAL, Add the following:

.3 The Contractor is responsible for dust control. The Contractor must maintain adequate dampness on all "disturbed" areas so as to prevent unacceptable dust levels. Dust levels will be deemed unacceptable if the Contract Administrator deems them unacceptable. Water for dust control (as well as water for material compaction) will be made available at no cost to the Contractor from City of Nelson Public Works Yard. Connection to local fire hydrants for dust control by the Contractor will not be permitted.

Section 31 22 16.1 Reshaping Existing Subgrade

Remove and replace unsuitable subgrade (Section 31 22 16.1) is an Optional Work item, and will only be utilized directed to by the Geotechnical Engineer of Record and authorized by the Contract Administrator.

Section 31 23 01 Excavating, Trenching and Backfilling

1.7 Disposal, Add the following:

.2 Waste and/or excess clean excavated material and concrete not exceeding 300mm in maximum dimension may be disposed of at the Town of Oliver's public works yard (5971 Sawmill Road). Asbestos Cement (AC) pipe shall be separated from other waste and removed and disposed of at the Contractor's expense in accordance with WorkSafeBC requirements and Special Waste Provisions of the Waste Management Act.

1.10 Measurement and Payment, Add the following:

.9 Payment for road base and sub base materials within the trench zone for new and restored pavement will be measured and paid in Sections 32 11 23 and 32 11 16.1.

1.10 Measurement and Payment, Add the following:

.10 Payment for trench drainage for sanitary sewer installation will be for all work to implement well point dewatering necessary to lower the groundwater elevation in the project area. Payment to include supply, installation, operation and removal of any well point pumps, well point installations as necessary, piping, hoses, controls, power supply, standby power, transfer switches, and proper disposal of withdrawn groundwater. Payment will be made via Lump Sum for this Schedule of Quantities and Prices line item.

Section 31 24 13 Roadway Excavation, Embankment and Compaction

1.8 Measurement and Payment, Delete and replace 1.8.5 with the following:

.5 Payment for surface removal and common excavation includes saw-cutting and removal of remaining asphalt following milling, existing curbs and gutters, sidewalks, boulevard strips, driveways, pipes and conduits which are removed as part of the operation for common excavation, unless specifically shown otherwise as separate pay items. Measurement for area of surface removals shall be based on neat line requirements calculated by the Contract Administrator. Details of the calculations will be provided to the Contractor upon request.

Section 32 12 16 Hot-Mix Asphalt Concrete Paving

1.5 Measurement and Payment, Delete and replace 1.5.1 with the following:

.1 Payment for asphaltic concrete placing includes all final asphalt saw cutting, construction joint preparation, supply and placing of the asphaltic concrete, compaction, adjusting of frames, covers and lids of all castings affected and taped temporary pavement markings where warranted. Surface measurement for asphaltic concrete paving will be made separately for each of the specified tender items. Payment will be for actual area placed at specified thickness.

add the following:

.9 Payment for asphaltic concrete driveway restoration includes all subgrade preparation, indicated thickness of granular base and subbase, construction joint preparations, supply and placing of the asphaltic concrete, compaction and adjusting and cleaning frames, covers and lids of all castings affected and <u>all other work that is necessary to restore the driveway.</u>

Measurement for asphaltic concrete driveway restoration will be made separately for each specified type and thickness for asphaltic concrete which may be checked by Contract Administrator as given in 1.5.2 of this Section.

Section 31 32 19 Geosynthetics

Supply and place geogrid (Section 31 32 19) is an Optional Work item, and will only be utilized directed to by the Geotechnical Engineer of Record and authorized by the Contract Administrator.

Section 32 92 23 Sodding

1.8 Measurement and Payment, Add the following:

.3 Payment for Boulevard Restoration – Topsoil and Sod is to dispose, then reinstate existing landscaped areas impacted by construction. This pay item includes removal and replacement of 100mm thick

topsoil and sod to existing or better condition. Landscaping restoration will be paid by observation of work completed.

Section 33 01 30.1 CCTV Inspection of Pipelines

1.6 Measurement and Payment, Append to section:

.1 CCTV inspection of gravity pipelines (greater than 200mm diameter, not including catchbasin leads) is a project requirement and is considered an incidental project cost.

Section 33 11 01 Waterworks

1.7 Scheduling of Work, Delete and replace with the following:

.4 Do not interrupt water service for more than 3 hours and confine this period to between 8am and 5pm. An exception to this prescribed maximum service interruption duration is to accommodate the tie-ins to existing watermains; an 8 hour shut-down will be allowed for each of those connections. The proposed water tie-in for the 200mm diameter BC Tree Fruits water service is to be completed in the period between Friday at 5pm and Monday at 8am.

1.8 Measurement and Payment for watermain and service connection, Replace with the following:

.2 Payment for Watermain and water service piping includes saw cutting pavement, trench excavation, trench drainage (dewatering), disposal of surplus excavated material, Class B sand bedding, supply and installation of all pipe, bends, restraints, thrust blocks, couplings, bolts, gaskets and tie rods, water/storm/sewer joint wrap and protection where required as per Ministry of Health Guidelines, Class II backfill, cleaning, pressure and leakage testing, flushing, disinfection and bacteriological sampling and testing (in accordance with Section 33 11 01, part 3.24). Surface removals and restoration is covered by other payment items. Measurement for watermain will be made along the centrelines of trenches, through valves and fittings, with no deduction for length of valves or fittings, over surface after work has been completed.

3.24 Bacteriological Sampling and Testing, Add the following:

.1 Bacteriological tests shall be as per the current ANSI/AWWA C651 Standard for Disinfecting Water Mains. It is the *Contractor's* responsibility to sample for and complete bacteriological testing. All associated costs are to be borne by the *Contractor*.

Quoting from AWWA C651-14, Section 5: Verification:
"Option A: Before approving a main for release, take an initial set of samples and then resample again after a minimum of 16 hr using the sampling site procedures outlined. Both sets of samples must pass for the main to be approved for release.

Section 33 30 01 Sanitary Sewer

1.6 Measurement and Payment, Remove and replace as follows:

.2 Payment for sanitary sewer includes trench excavation, disposal of surplus excavated material, supply and installation of all pipe, fittings and related materials, Class B sand bedding, Class II backfill, cleaning, flushing and testing, and all other work and materials necessary to complete installation as shown on Contract Drawings and specified under this section. Surface removals and restoration is covered by other payment items.

Measurement will be made horizontally from manhole centreline to manhole centreline over surface after work has been completed

1.6 Measurement and Payment, Add the following:

.8 Payment for bypass pumping system or hydro-vac necessary for sewer system tie-ins includes all work and equipment necessary to complete tie-ins in a timely manner. If utilizing bypass pumping system, payment to include supply, installation, operation and removal of any temporary pumps, piping, hoses, controls, power supply, standby power, transfer switches, and by-pass of all designated connections to the main. Payment will be made via Lump Sum for this Schedule of Quantities and Prices line item.

Anticipated bypass pumping requirements (associated with peak flow periods) to allow for sewer system tie-ins are as follows:

- Forcemain at Sta 0+290 - Contributing flow from:
  - McPherson Lift Station – 18.5 L/s
  - Rotary Beach Lift Station – 14.9 L/s
- Gravity flow at Sta 0+290 – Contributing flow from:
  - From north direction (right-of-way) – 20 L/s
  - From West direction (Co-Op Avenue) – 7 L/s
- Gravity flow at Sta 0+191 – Contributing flow from:
  - From north direction (Station Street) – 1 L/s
- Gravity flow at Sta 0+120 – Contributing flow from:
  - From south direction (BC Tree Fruits) – 2 L/s
- Gravity flow at Sta 0+081 – Contributing flow from:
  - From north direction (laneway) – 1 L/s
- Gravity flow at Sta 0+030 – Contributing flow from:
  - From west direction (Co-Op Avenue) – 5 L/s
  - From south direction (Oliver Place Mall) – 3 L/s

Section 33 34 01 Sewage Forcemains

1.7 Scheduling of Work, Delete and replace with the following:

.1 Schedule work to ensure that the sewage forcemain tie-in will occur during periods of low flow from the period of 11pm until 5am, from Monday to Thursday. A maximum 4 hour shut-down will be allowed for the proposed sewage forcemain tie-in.

33 40 01 Storm Sewers

1.6 Measurement and Payment, Remove and replace as follows:

.2 Payment for storm sewer includes trench excavation, disposal of surplus excavated material, supply and installation of all pipe, fittings and related materials, Class B sand bedding, Class II backfill, cleaning, flushing and testing, and all other work and materials necessary to complete installation as shown on Contract Drawings and specified under this section. Surface removals and restoration is covered by other payment items.

Measurement for storm sewer will be made horizontally from manhole centerline to manhole centerline over surface after work has been completed.

Section 33 44 01 Manholes and Catchbasins

1.5.1 Measurement and Payment, Revise section (2) as follows:

.2 Payment for manhole riser sections will be for risers of standard or non-standard heights required to complete manhole from specified invert to finishing level. Payment includes all risers and necessary work for installing risers as shown on the Standard Detail Drawings. Measurement will be made vertically for the length of risers required from the top of the precast manhole base with integral barrel section to reach the underside of the concrete lid or slab. If the manhole base is cast in place, the measurement shall be taken from the top of the riser section used to form the base.

PRIME CONTRACTOR DECLARATION

PROJECT: _____

LOCATION(S): _____

This declaration is a WorkSafe BC (formally Workers' Compensation Board) requirement for work on road allowances, and City-owned properties, projects, and developments.

As per the requirements of the Workers' Compensation Act Part 3, Division 3, Section 118 (1-3) which states:

Coordination of multiple-employer workplaces:

118 (1) In this section:

"multiple-employer workplace" means a workplace where workers of 2 or more employers are working at the same time;

"prime contractor" means in relation to a multiple-employer workplace;

(a) the directing contractor, employer or other person who enters into a written Agreement with the owner of that workplace to be the prime contractor for the purposes of this Part, or

(b) if there is no Agreement referred to in paragraph (a), the owner of the workplace.

(2) The prime contractor of a multiple-employer workplace must

(a) ensure that the activities of employers, workers and other persons at the workplace relating to occupational health and safety are coordinated, and

(b) do everything that is reasonably practicable to establish and maintain a system or process that will ensure compliance with this Part and the regulation in respect to the workplace.

(3) Each employer of workers at a multiple-employer workplace must give to the prime contractor the name of the person the employer has designated to supervise the employer's workers at that workplace.

By signing this Agreement, the undersigned accepts all responsibilities of a Prime Contractor as outlined in the Workers' Compensation Act, and WorkSafe BC (OH&S Regulation).

As a contractor signing this Agreement, you are agreeing that your Company, Management staff, Supervisory staff and workers will comply with the Work Safe B.C. Occupational Health and Safety Regulations OH&S Regulations and the Workers' Compensation (WC) Act.

Any penalties, sanctions or additional costs levied against the municipality, as a result of the actions of the Prime Contractor are the responsibility of the Prime Contractor.

I, the undersigned, acknowledge having read and understand the information above.

By signing this Agreement, I agree as a representative of the firm noted below, to accept all responsibilities of the Prime Contractor for this project.

I fully understand and accept the responsibilities of the Prime Contractor designation in accordance with the Workers' Compensation Act for all work on road allowances, rights-of-way in favour of the municipality and municipal-owned property; as described above, and will abide by all WorkSafe BC Regulation requirements.

Municipal File #: _____ WorkSafe B.C. Notice of Project No.: _____

Company: _____ Date: _____

Authorized Rep.: _____ Signature: _____

Owner: **Town of Oliver**

Contract: **Co-Op Avenue Reconstruction**

Reference No. **306-2091**

See paragraph 5.1.1.6 of the Form of Tender.

The Contractor shall provide hourly rates for all Labour and Equipment intended to be used in completion of the works. These Hourly Rates are to be 'all-inclusive', or 'all-found'. Labour rates are to be inclusive of wages, insurance, holiday pay, benefits, small tools, overhead, and profit. Equipment rates are to be inclusive of operator, overhead, and profit.

LABOUR	
CLASSIFICATION BY TRADE	***ALL-INCLUSIVE HOURLY RATE***

EQUIPMENT		
TYPE	***UNIT AND MODEL DESCRIPTION***	***ALL-INCLUSIVE HOURLY RATE***

Contractor's Initials _____

TETRA TECH

April 27, 2023

ISSUED FOR USE
FILE: 704-ENG.KGEO03799-01
Email: pyurkiw@shaw.ca

BC Tree Fruits Cooperative
9751 Bottom Wood Lake Road
Lake Country, BC V4V 1S7

Attention: Peter Yurkiw
Project Coordinator

Subject: Geotechnical Assessment - BC Tree Fruits, Oliver, BC

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) has been retained by BC Tree Fruits Cooperative (the client) to provide geotechnical engineering services in support of the proposed building expansion located at 327 Co-op Avenue, Oliver, BC.

Based on the preliminary information provided by the client, we understand that the proposed expansion consists of extending the existing building to the west, while constructing one adjoining structures to the south. It is Tetra Tech's understanding that the first adjoining structure was preliminary planned to comprise a 120 ft. (36.5 m) by 128 ft. (39 m) area with a 30 ft. (9.1 m) clearance height that is intended to be used for rack and loading docks, while the second structure was preliminary planned to consist of a 280 ft. (85.3 m) by 150 ft. (45.7 m) packing area with a 20 ft. (6.1 m) clearance height.

Tetra Tech performed a preliminary investigation of the subject site for the proposed expansions in September 2022. After the preliminary geotechnical report was completed, BC Tree Fruits informed Tetra Tech that a supplementary investigation was required to provide geotechnical recommendations for upgrades to Co-op Road and the east laneway. An additional borehole was performed during the investigation for the southern expansion as the building envelope had changed since the preliminary design.

It is Tera Tech's understanding at this time that specific details of the proposed expansion are yet to be finalized/confirmed; however, it is anticipated that the proposed building expansion will fall within the requirements of Part 4 of the British Columbia Building Code (BCBC) 2018.

This geotechnical assessment report summarizes the findings of our desktop review, the preliminary and supplementary geotechnical site investigation, and includes geotechnical recommendations based on our current understanding of the proposed development. Once the details are finalized, Tetra Tech will review the information and provide a separate cover with the detailed design.

2.0 BACKGROUND REVIEW

2.1 Surficial Geology

The Geological Survey of Canada (GSC) surficial geology map for the area (Nasmith, 1962) indicates that the site is underlain by Okanagan River Floodplain, which typically consist of sand, silt, and swamp deposits. Nasmith stated that segments between Skaha Lake and Osoyoos Lake consist of the channel of the Okanagan River that

Tetra Tech Canada Inc.
150, 1715 Dickson Avenue
Kelowna, BC V1Y 9G6 CANADA
Tel 250.862.4832 Fax 250.862.2941

was cut by large flows of meltwater, and the present Okanagan River is undersized in comparison with the older channel and the existing Okanagan River now meanders across the floodplain deposits, which have been deposited to unknown depths.

2.2 Bedrock Geology

The GSC bedrock geology map for the area (Hoy, 1994) indicates that the bedrock underlying the site comprises granodioritic intrusive rocks from the Okanagan Batholith Group. Bedrock is considered to be at a considerable depth in this area and is not anticipated to be encountered within the excavation depths of this project.

2.3 Groundwater Monitoring Wells

Reference to the Provincial Well Database, iMapBC, indicates that one water well (Tag #20407) was installed within 100 m of the site. The water well data is summarized in Table 1.

Table 1: Water Well Summary

Water Well No.	Approx. Distance from Center of Site (m)	Lithology	Depth (m bgl)	Static Groundwater (m bgl)
20407	100 m (NW)	Pea Gravel and Topsoil	0.0 – 0.9	2.1
		Coarse Rusty Gravel	0.9 – 3.7	
		Blue – Black Sand	3.7 – 4.9	

*Data taken from iMapBC Water Well Reports (https://maps.gov.bc.ca/ess/hm/imap4m/)

3.0 GEOTECHNICAL SITE INVESTIGATIONS

3.1 Preliminary Geotechnical Investigation

Tetra Tech conducted a geotechnical site investigation between September 13 and September 16, 2022, utilizing a B53 truck mounted drill rig operated by On the Mark Utility Locates, from West Kelowna, BC. The geotechnical site investigation comprised the advancement of five boreholes (BH22-01 to BH22-05), which were distributed across the proposed building area. The boreholes were typically advanced utilizing the overburden excentric drilling (Odex) methodology to a maximum depth of 30.5 m; however, BH22-04 was advanced utilizing the mud rotary drilling methodology. Standard Penetration Testing (SPT) was conducted at regular intervals within the investigated depths to determine the strength consistency of the underlying stratigraphy.

The geotechnical site investigation was supervised by Tetra Tech field personnel, Mr. Dylan Bryce, P.Eng, who logged the encountered material and collected representative soil samples for laboratory testing.

The location of the boreholes was established using a handheld GPS receiver with a horizontal accuracy of +/- 3.0 m. The borehole elevations were estimated from the Regional District Okanagan-Similkameen lidar obtained from the Lidar BC – Open Lidar data Portal. Table 2 provides a summary of the borehole locations, elevation, and termination depth. The geodetic location of the boreholes is also shown on Figure 1 and detailed borehole logs are included in Appendix B.

Table 2: Summary of Preliminary Geotechnical Investigation Boreholes

Borehole No.	Northing[1] (m NAD83)	Easting[1] (m NAD83)	Collar Elevation (masl)	Termination Depth (m)	Termination Reason
BH22-01	5450519	314538	296.29	15.9	Target Depth Reached
BH22-02	5450485	314305	295.72	30.5	Target Depth Reached
BH22-03	5450519	314358	295.54	12.2	Practical Refusal
BH22-04	5450508	314244	296.24	15.9	Target Depth Reached
BH22-05	5450538	314225	296.17	15.9	Target Depth Reached

Notes: 1 – NAD = North American Datum 1983, Zone 11

3.2 Supplementary Geotechnical Investigation

Tetra Tech conducted a supplementary geotechnical site investigation on April 03, 2023, utilizing a B53 truck mounted drill rig operated by On the Mark Utility Locates, from West Kelowna, BC. The geotechnical site investigation comprised the advancement of six boreholes (BH23-01 to BH23-06), which were advanced along Co-op Road and the east laneway. BH23-01 was advanced to proposed eastern edge of the southern expansion. The boreholes were typically advanced utilizing the solid stem auger drilling methodology with Dynamic Cone Penetration Testing conducted from surface within the investigated depths to determine the strength consistency of the underlying stratigraphy's.

The geotechnical site investigation was supervised by Tetra Tech field personnel, Mr. Dylan Bryce, P.Eng, who logged the encountered material and collected representative soil samples for laboratory testing.

The location of the boreholes was established using a handheld GPS receiver with a horizontal accuracy of +/- 3.0 m. The borehole elevations were estimated from the Regional District Okanagan-Similkameen lidar obtained from the Lidar BC – Open Lidar data Portal. Table 3 provides a summary of the borehole locations, elevation, and termination depth. The geodetic location of the boreholes is also shown on Figure 1 and detailed borehole logs are included in Appendix B.

Table 3: Summary of Supplementary Geotechnical Investigation Boreholes

Borehole No.	Northing[1] (m NAD83)	Easting[1] (m NAD83)	Collar Elevation (masl)	Termination Depth (m)	Termination Reason
BH23-01	5450512	314401	296.2	9.1	Target Depth Reached
BH23-02	5450634	314246	295.7	3.0	Target Depth Reached
BH23-03	5450648	314311	296.4	3.0	Target Depth Reached
BH23-04	5450605	314394	296.4	3.0	Target Depth Reached
BH23-05	5450513	314422	296.3	3.0	Target Depth Reached
BH23-06	5450395	314457	296.2	3.0	Target Depth Reached

Notes: 1 – NAD = North American Datum 1983, Zone 11

3.3 Soil Laboratory Testing

Following the completion of the subsurface drilling, laboratory testing was conducted on select representative soil samples, at Tetra Tech's Canadian Council of Independent Laboratories (CCIL) certified laboratory. Testing was carried out in general conformance with the relevant ASTMs and are summarized in Table 4 and Table 5, with detailed results presented in Appendix C and within the borehole logs.

Table 4: Summary of Particle Size Distribution and Moisture Contents

Borehole No.	Depth (m)	Moisture Content (%)	Grain Size Analysis (%)			
			Gravel	Sand	Fines	
					Silt	Clay
BH22-01	9.1 – 9.8	29.3	0	24	76	
BH22-02	1.5 – 2.1	42.9	0	56	31	13
BH22-02	12.2 - 12.8	27.5	0	36	65	
BH22-04	3.1 – 3.7	9.4	63	32	6	
BH22-05	1.5 – 2.1	42.2	0	47	47	6
BH22-05	6.1 – 6.7	27.4	0	53	47	
BH23-01	4.9 – 5.2	17.0	25	34	41	
BH23-01	6.7 – 7.0	17.1	38	38	24	
BH23-01	8.2 – 8.5	27.4	5	36	59	
BH23-02	0.3 – 0.6	17.2	34	42	24	
BH23-02	0.9 – 1.2	11.4	37	45	18	

Table 5: Summary of Organic Contents

Borehole No.	Depth (m)	Moisture Content (%)	Organic Content (%)
BH22-02	1.5 – 2.1	42.9	4.7
BH22-05	1.5 – 2.1	42.2	2.1

4.0 SUBSURFACE CONDITIONS

4.1 Soil Conditions

The following interpreted soil profile was encountered within the proposed expansion area:

- **Fill,** comprising compact to very dense sand and gravel, trace silt. The fill is typically greyish brown to brown, dry to moist, fine to coarse grained sand, and fine to coarse rounded to angular gravel with SPT "N-values" in the range of 29 to 64 (average of 47). The Tetra Tech field representative noted that most of the fill was likely reworked native material from previous building expansions, with certain areas consisting of imported fill from other sites. These deposits were encountered from the surface to a depth of approximately 0.9 m.

- **Organic Sand and Silt,** comprising very soft organic sand and silt with varying amounts of clay and sand. The organic silt is typically dark brown, wet, low plasticity, and fine-grained sand with an SPT "N-value" of 0. The organic sand and silts have an organic content in the range of 2.1% to 4.9%. The organic sand and silt is present from a depth of 0.9 m to an approximate depth of 2.1 m.
- **Granular Fluvial Deposits,** comprising gravel with varying amounts of sand, silt, and cobbles. The fluvial deposits are typically grey to brown, wet, medium to coarse grained sand, fine to coarse grained subrounded to subangular gravel with SPT "N-values" in the range of 10 to 53 (average of 32) The fluvial deposits are present form a depth of approximately 2.1 m to an approximate maximum depth of 10.4 m.
- **Okanagan River Floodplain Deposits,** comprising compact to dense silt and sands. The floodplain deposits typically comprise grey, wet, non-plastic, fine-grained sand, with SPT "N-values" in the range of 10 to 34 (average of 21). It was noted throughout the floodplain deposits that the floodplain deposits contained small interbedded lens of silt and clay, typically less than 100 mm in thickness. The floodplain deposits are present from a depth of approximately 4.0 m to the maximum extents investigated by BH22-02 (i.e., 30.5).

4.2 Groundwater Conditions

Groundwater elevations were encountered at a varying depth as shown in Table 6. The soil samples were typically described as "wet" below the water table elevations. It should be noted that groundwater levels may fluctuate during certain times of year, particularly during periods of heavy rainfall and snow melt where groundwater levels may be higher than those recorded.

Table 6: Geodetic Elevations of Groundwater

Borehole No.	Depth to Groundwater from Surface (m)	Geodetic Elevation of Groundwater (masl)
BH22-01	2.4	293.9
BH22-02	2.1	293.6
BH22-03	1.8	293.7
BH22-04	1.8	294.4
BH22-05	1.8	294.4
BH23-01	2.1	294.1
BH23-02	2.3	293.4
BH23-03	2.1	294.3
BH23-04	2.4	294.0
BH23-05	2.4	293.9
BH23-06	2.7	293.5

5.0 SEISMIC CONDITIONS

5.1 Site Classification and Seismic Hazard Values

The National Building Code of Canada (NBCC) (2015) primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion which is defined in terms of the mean ground motion amplitude having a probability of exceedance of 2% in 50 years. The NBC states although there may be extensive and non-structural damage during the design ground motion, there is a reasonable degree of confidence that the building will not collapse. The NBC seismic provisions only consider damage from ground shaking and does not consider the extent of soil failure that may occur (i.e., lateral spreading, settlement caused by liquefaction, and slope instability under or beyond the structure).

In accordance with Table 4.1.8.4.A (NBCC, 2015) and with considerations of the subsurface conditions, the seismic site classification at the proposed building location is Site Class D “Stiff Soil”. The site classification was determined based on the SPT blow counts within BH22-02 averaging 21 blows withing the depths investigated.

NBCC 2015 seismic hazard values for reference ground conditions (Class C, 2% in 50 years) were obtained using Natural Resources Canada (NRC) online hazard calculator tool (NRC, 2022). Site coefficients were then obtained from Section 4.1.8.4 of the 2015 NBCC and applied to the reference ground conditions for Site Class D using a PGA reference value of 0.08 g to obtain the site-specific hazard values used for proposed building location and listed in Table 7.

Table 7: Seismic Design Criteria for 327 Co-op Ave, Oliver, BC

Annual Exceedance Probability (AEP)	PGA_{ref} (g)	F(PGA)	Design PGA (g)
1/2,475	0.08	1.29	0.10

The relative contribution of the earthquake sources to the seismic hazard in terms of distance and magnitude can be obtained by deaggregation of the seismic hazard. The deaggregation data for the NBCC 2015 design model has been obtained from Earthquakes Canada, which provides the mean and modal magnitude of the seismic hazard near the subject site, as summarized in Table 8.

Table 8: Design Earthquake Magnitudes

Magnitude Contribution	PGA
Mean	6.49
Modal	4.85

5.2 Liquefaction Triggering Assessment

Liquefaction potential was assessed using CSR/CRR ratio comparison utilizing PGA and mean magnitude degradation data provided by NRC for NBCC 2015 seismic hazard values. The PGA used was 0.10 g and the mean magnitude earthquake was 6.49. Our CSR/CRR analysis showed that the soils beneath the site have a low to no susceptibility to liquefaction under the design earthquake scenario and further assessment is not required.

6.0 PRELIMINARY GEOTECHNICAL DESIGN

6.1 General

As previously outlined, the proposed building structure and envelope has not yet been finalized; however, the conceptual building envelope was provided by the client. Based on Tetra Tech's experience on similar projects, we anticipate that the footing pressures would be in the order of 125 kPa to 175 kPa.

The following presents a summary of our findings and analyses based on the conceptual design and the assumptions stated above:

- The encountered subsurface conditions across most of the site typically comprised "compact to very dense" fill comprising sands and gravels, extending form the surface to a maximum depth of 1.2 m, which in turn was underlain by a layer of organic silts. The organic silts extended to a maximum depth of 2.1 m, and in turn were underlain by fluvial and floodplain deposits comprising sands and gravels to the maximum depth investigated of 30.5 m.
- At the time of the investigation, groundwater was encountered at varying elevation, with the highest groundwater elevation being recorded at 294.44 m. Based on the groundwater depths, and the time of year that construction is performed, it is likely that groundwater will be encountered during construction.
- A seismic site classification of Class D is considered appropriate for the structural design of the proposed structure. Based on the encountered subsurface conditions and low seismic hazard values of the site, the soils encountered across the subject site are not considered susceptible to liquefaction.
- Shallow foundation systems are considered appropriate for the proposed expansion given that the organic material is either removed or a ground improvement technique is utilized such as controlled modulus columns.

Based on Tetra Tech's understanding of the project and our investigation and analysis, it is our professional opinion that from a geotechnical perspective, the site is suitable for the proposed building expansion provided that our recommendations are followed during design and construction of the project.

The options and recommendations are being provided without a detailed design. Once the detailed design has been completed, the recommendations provided herein should be reviewed and revised by the geotechnical engineer of record.

6.2 Option 1 – Sub Excavate and Replace

6.2.1 Stripping and Sub Excavation

The site preparation for the proposed building expansion envelope shall comprise the removal of all fill, organics, topsoil, saturated or disturbed surficial soils, or other deleterious material to expose the native sandy gravels. Based on the soil conditions encountered during the geotechnical site investigation, Tetra Tech anticipates that stripping depths will range between 1.5 m to 2.1 m of all fill and organic sand and silts; however, greater excavation may be required in localized areas.

6.2.2 Subgrade Preparation

The stripped subgrade shall be moisture conditioned as required, compacted, and reviewed and approved by the Geotechnical Engineer prior to fill or concrete form placement. The review of the subgrade shall include a "proof-roll" by completing several passes with approved heavy construction equipment. Any soft areas or areas showing pumping, cracking, or deflection should be sub-excavated. Any cobbles present at the subgrade elevation should be removed to create a level surface prior to the "proof-roll".

Due to the anticipated sub-excavation depths being deeper than the inferred water table depths, a dewatering plan will be required in order to approve the subgrade.

Once the subgrade has been approved by the geotechnical engineer, TenCate Mirafi HP570/17/265 Woven Geotextile or an approved equivalent shall be placed upon the approved subgrade. The contractor shall place the Woven Geotextile following the installation method.

- Place geotextile by unrolling onto the approved subgrade.
- Place geotextile smooth and free of tension, stress, folds, wrinkles, and creases.
- Extend the geotextile 1.0 m past the excavation bottom onto the excavation slopes.
- Overlap each successive length of geotextile 600 mm, or to manufactures instructions.
- Heat tack or sew seams as per the manufacturer's instructions.
- Protect installed geotextile from displacement and damage. Replace damaged and deteriorated geotextile.
- Do not permit passage of any vehicle directly on geotextile at any time.

6.2.3 Transition Rock Fill

Transition rock fill shall be used between the approved subgrade and 0.3 m below the underside of footing elevation. The minimum thickness of the transition rock fill shall be 0.6 m, placed in horizontal lifts typically not exceeding 300 mm in loose thickness. Transition rock fill shall consist of hard durable particles, be free of roots, topsoil, and other deleterious material and have a particle size distribution with the limits specified in Table 9.

Table 9: Transition Rock Fill – Particle Size Distribution Limits

Particle Size (mm)	% Passing
150	100
100	60 – 100
50	35 – 65
25	20 – 40
5	5 – 15
0.08	< 2

Proof-rolling shall be conducted on the compacted rock fill using a loaded haul truck, water truck, or approved heavy equipment by the geotechnical engineer. The number of full passes should be at least six, or until the transition rock fill does not exhibit any rutting. A full pass is defined as one forward pass followed by a backward pass.

The transition rock fill should extend horizontally beyond the building perimeter foundation a minimum distance equal to the thickness of transition rock fill and structural fill below the foundations.

6.2.4 Structural Fill

The term “Structural Fill” in this report pertains to permanent fill that will be located beneath the underside of footing or concrete slab and above the transition rock fill. Structural fill shall comprise clean (free draining, less than 8% fines), well graded granular material such as 100 mm minus pit run sand and gravel or an approved alternative. Tetra Tech should be provided the opportunity to review and approve alternative materials prior to their use as structural fill at the subject site.

Upon approval of the transition rockfill from the Geotechnical Engineer, structural fill shall be moisture conditioned to +/- 2% of the optimum moisture content and placed in horizontal lifts typically not exceeding 300 mm in loose thickness. The structural fill shall be uniformly compacted using vibratory equipment to obtain a minimum 100% SPMDD (ASTM D698).

6.2.5 Reuse of On-Site Material

Excavated granular soils above the organic sand and silts may be reused as structural fill provided the fines content is less than 8%, it is free of organics or any deleterious material, and that the specified 100% SPMDD compaction can be achieved. The suitability of any on-site material proposed for use as structural fill should be confirmed by a geotechnical engineer prior to its use on-site.

Excavated on-site granular soils may be reused as utility trench backfill provided it is free of organics, any deleterious material and that the specified compaction can be achieved.

6.2.6 Soil Bearing Resistance Values

Shallow foundations placed directly on prepared structural fill shall be designed in general accordance with Part 4 of the BCBC 2018, which states that shallow foundations shall be designed using the Ultimate Limit State (ULS) and Serviceability Limit State (SLS) soil bearing resistance values summarized in Table 10.

The ULS and SLS soil bearing resistance values were calculated for pad and strip footings for the proposed building structures assuming:

- A maximum permissible settlement of 25 mm and a maximum angular distortion of 1 in 200, which will be confirmed when the detailed design of the foundations and structural loads of the building are finalized.
- The footings are founded upon structural fill with the subgrade prepared as per Section 6.2.2.
- Footings shall not be less than 450 mm and 600 mm in width for strip and pad footings, respectively.

Table 10: Summary of Limit State Soil Bearing Limit Values

Footing Dimensions	Geotechnical Bearing Resistance at ULS (kPa)	Geotechnical Resistance Factor[1], ϕ	Factored Geotechnical Bearing Resistance at ULS (kPa)	SLS Bearing Resistance (kPa)
Up to 1.0 m x 1.0 (pad)	500	0.5	250	150
Up to 1.5 m x 1.5 m (pad)	550	0.5	275	175
0.6 m Strip Footing	450	0.5	225	150

6.2.7 Sliding

The ultimate geotechnical sliding resistance of shallow foundations shall be assessed utilizing Equation 7.9.3, where W equals structural dead loads, the weight of the footings, and any surcharging backfill material, and δ the interface friction angle of the soil/bedrock with formed concrete from Table 24.4 of the Canadian Foundation Engineering Manual (CFEM) (2006). Tetra Tech anticipates that δ will be 25° for structural fill.

$$Sr = Wtan\delta \qquad \text{(Equation 6.2.7)}$$

A geotechnical resistance factor (ϕ) of 0.8 shall be used in the ULS design of the shallow foundations in sliding, in accordance with Table 8.2 of the CFEM (2006).

6.3 Option 2 - Controlled Modulus Columns Ground Improvement

Controlled Modulus Columns (CMC) are concrete columns placed in a grid network adapted to loading distribution and settlement criteria. These columns, made using a reverse flight displacement auger and injecting concrete through the tool's hollow core, have diameters ranging from 250 to 450 mm. The inclusions typically induce partial densification of soil due to material displacement and generate higher bearing resistance by dispersing loads through the columns. A granular load transfer platform (LTP) or a raft foundation is typically designed between the top of the columns and the structure (spread and strip foundations) to efficiently transfer the load to the CMCs. Typically, a 300 mm and 450 mm thick LTP is founded under footings and raft foundations, respectively.

CMCs have almost no vibration and would not require structural considerations such as structurally supporting the existing structure during excavation. If this option is chosen, a detailed design can be completed to determine the exact depth, width, and spacing of the columns.

Once a detailed design is completed, Tetra Tech recommends performing a series of static and creep load tests on the CMCs to determine the ultimate axial capacity and design requirements for the project.

6.4 Slab-on-Grade Floors

Interior slab-on-grade floors should be founded on a minimum 150 mm thick layer of granular fill comprising 25 mm minus crushed gravel, overlying structural fill approved by the geotechnical engineer. Slab-on-grade floors shall be designed in accordance with the BCBC 2018 regarding damp proofing, waterproofing, and soil gas control.

6.5 Perimeter Foundation Drainage

Section 9.14.2 of the BCBC 2018 specifies unless it can be shown to be unnecessary, the bottom of every exterior foundation wall shall be drained by one of the following drainage systems:

- Drainage tile of pipe laid around the exterior of the building; or
- A layer of gravel or crushed rock.

Tetra Tech recommends that a perimeter foundation drainage system be designed around the proposed structure. The perimeter foundation drainage system should be constructed with rigid perforated PVC piping with a minimum diameter of 100 mm surrounded by a minimum 150 mm of 19 mm diameter clear crushed gravel. The clear crushed gravel should be wrapped in non-woven geotextile such as Nilex 4545 or an approved equivalent by the geotechnical engineer of record. The invert of the perimeter foundation drain should be located at least 300 mm below the top of the basement floor elevation or top of footing elevation.

The invert of the perimeter drainpipes should be located at least at the underside of footing elevation. The collected perimeter drain water should be collected and disposed of separately from the stormwater drainage and discharged to the Town of Oliver storm system or on-site water disposal system.

6.6 Stormwater Management and Site Storm Disposal

Roof downspouts should be connected to non-perforated PVC pipes separate from the perimeter foundation drainage system. The diameter of the drainpipes should be determined by others. The collected water should be conveyed by non-perforated drainpipes to an on-site stormwater disposal system or alternatively connected to the nearest Town of Oliver stormwater system. Due to the shallow water table, it is recommended to connect the concentrated stormwater to the Town of Oliver stormwater system.

If the proposed structure cannot be connected to the Town of Oliver stormwater system, an engineer experienced in drainage should be consulted to provide input in regard to the on-site stormwater disposal. It is Tetra Tech's professional opinion that infiltration pits should not be used within the subject site.

Site grading shall be designed in such a manner to prevent ponding of surface water near foundation walls and paved areas (i.e., slope away from structure). Drainage considerations established during design and construction should be maintained for the life of the development as altering drainage patterns can cause the performance of the buildings foundation and floor slab to deteriorate over time.

6.7 Excavations and Setbacks

6.7.1 Permanent Cut and Fill Slopes

Tetra Tech recommends that permanent cut and fill slopes shall not be graded steeper than a 2H:1V (horizontal: vertical). Permanent fill slopes shall be over-built and then trimmed back to the recommended inclination before recompacting the slope.

Permanent cut and fill slopes shall be vegetated with native grasses and pocket planted shrubs immediately after construction to prevent surface erosion. Vegetation growing on slopes assists in stabilizing by root-binding, preventing erosion and lowering soil moisture content.

6.7.2 Temporary Excavations

Based on the soil conditions encountered in the boreholes and project area, Tetra Tech recommends a maximum temporary cut slope angle of 1.2H:1V (horizontal: vertical) up to a maximum height of 3.0 m. If these sloping requirements cannot be achieved, temporary shoring may be required prior to entering the excavation.

Temporary excavation work should be carried out in accordance with the requirements specified by WorkSafe BC Occupational Health & Safety Regulation, Part 20. Flatter excavations may be required if soil sloughing, the development of tension cracks along the crest of the slope, groundwater seepage, or loose soils are encountered. A geotechnical engineer shall review any excavation greater than 3.0 m.

6.7.3 Recommended Set-Back and Set-Forward Distances

For preliminary planning and design, Tetra Tech recommends all foundations are set-back the greater of the following:

- 5 m from the crest of any slope; and
- Outside a 2H:1V line project projected upwards from the toe of any adjacent slope and/or retaining walls.

Similarly, Tetra Tech recommends all foundations are set-forward the greater of the following:

- 5 m from the toe of any slope (including those off the subject property); and
- Outside a 2H:1V line project downwards from the crest of any adjacent slope and/or retaining walls.

6.8 Frost Penetration

Tetra Tech completed a frost depth analysis based on freezing index provided in the 2015 NBCC climactic data for the Oliver area. The results of the analysis indicate an estimated frost depth of 1,000 mm. However, the Regional District of the Okanagan-Similkameen Bylaw No. 2333.06, 2010. Schedule A provides a minimum frost depth of 600 mm.

Considering that the subgrade soils will be replaced with non-frost susceptible soils, we consider that the frost depth can be taken as 600 mm.

7.0 PAVEMENT STRUCTURE RECOMMENDATIONS

7.1 Co-op Road and East Laneway Pavement Structure

The classification of the pavement structure is determined by the estimated number of ESAL's over the service design life. The strength of the subgrade is measured in terms of the California Bearing Ratio (CBR) testing procedures.

The minimum pavement structures and their respective attributes are provided in Table 2-8 in the Town of Oliver Subdivision and Development Servicing Standards. The structural road elements shown are the minimum requirements for adequate subgrades, compacted design thickness must be engineered when poor subgrade material is encountered. In an email dated Jan 31, 2023, with the Town of Oliver Representative, Randy Houle,

Co-op Ave is classified as a major collector road while the east laneway can be classified as a laneway. For the purpose of this analysis, Tetra Tech has assumed a 200,000 ESAL for Co-op Ave.

Due to the soft subgrade soils near the surface of Co-op Road, Tetra Tech anticipates that the subgrade soils along Co-op Road would have a soaked CBR value less than 5. Consequently, the minimum values provided in Table 2-8 in the Town of Oliver Subdivision and Development Servicing Standards cannot be utilized. Table 11 provides the recommended pavement structure for the anticipated subgrade conditions for Co-op Ave and the east laneway.

Table 11: Pavement Structure Recommendations

Structural Component	Recommended Minimum Thickness for Co-op Ave	Recommended Minimum Thickness for East Laneway
Asphalt	75 mm	50 mm
Crushed Gravel Base Course	200 mm	100 mm
Crushed Gravel Sub-Base Course	300 mm	300 mm

It should be noted that Tetra Tech anticipates that the roadway elevation will remain relatively unchanged. If the elevation of the roadway is lowered Tetra Tech shall be notified to update the pavement structure recommendations.

7.2 Town of Oliver Required Specifications

The Town of Oliver specifications for sub-base, base, and asphaltic concrete materials must be followed for gradation limits. Sub-base and base materials must be placed in maximum 150 mm lifts and compacted to a minimum of 100% of SPMDD, and within 2% of optimum moisture content.

A subgrade requirement from the Town of Oliver is that upon completion of the subgrade preparation, the subgrade shall be proof rolled with a loaded single axle truck with a rear axle load of 8165 kg. Any soft areas shall be excavated and backfilled with crushed gravel sub-base compacted to 100% of the SPMDD. The materials testing frequency for trench backfill, sub-base, and base course placement is specified in Section 3.10 of the Town of Oliver Subdivision and Development Servicing Standards.

Good drainage provisions will optimize pavement performance. The finished pavement surface must be free of depressions and must be sloped at a minimum grade of two percent to provide effective surface drainage toward the catch basins. Surface water must not be allowed to pond adjacent to the outside edges of pavement areas. In low areas, subdrains must be installed to intercept excess subsurface moisture and prevent subgrade softening.

8.0 CLIENT SELECTED FOUNDATION OPTION

In discussion with the client and Mark Fuhrmann of Fillmore Construction, the client would like to pursue Option 2 for the foundation design. Tetra Tech will provide the detailed design in a separate cover in collaboration with Menard Canada.

9.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of BC Tree Fruits Cooperative and their agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than BC Tree Fruits Cooperative or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

10.0 CLOSURE

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech Canada Inc.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
J. D. BRYCE
55842
04/27/2023

FILE: 704-ENG.KGEO03799-01
FILE: 704-ENG.KGEO03799-01

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
PERMIT NUMBER: 1001972

FILE: 704-ENG.KGEO03799-01
FILE: 704-ENG.KGEO03799-01
FILE: 704-ENG.KGEO03799-01

Prepared by:
Dylan Bryce, P.Eng.
Geotechnical Engineer
Direct Line: 778.940.1216
dylan.bryce@tetratech.com

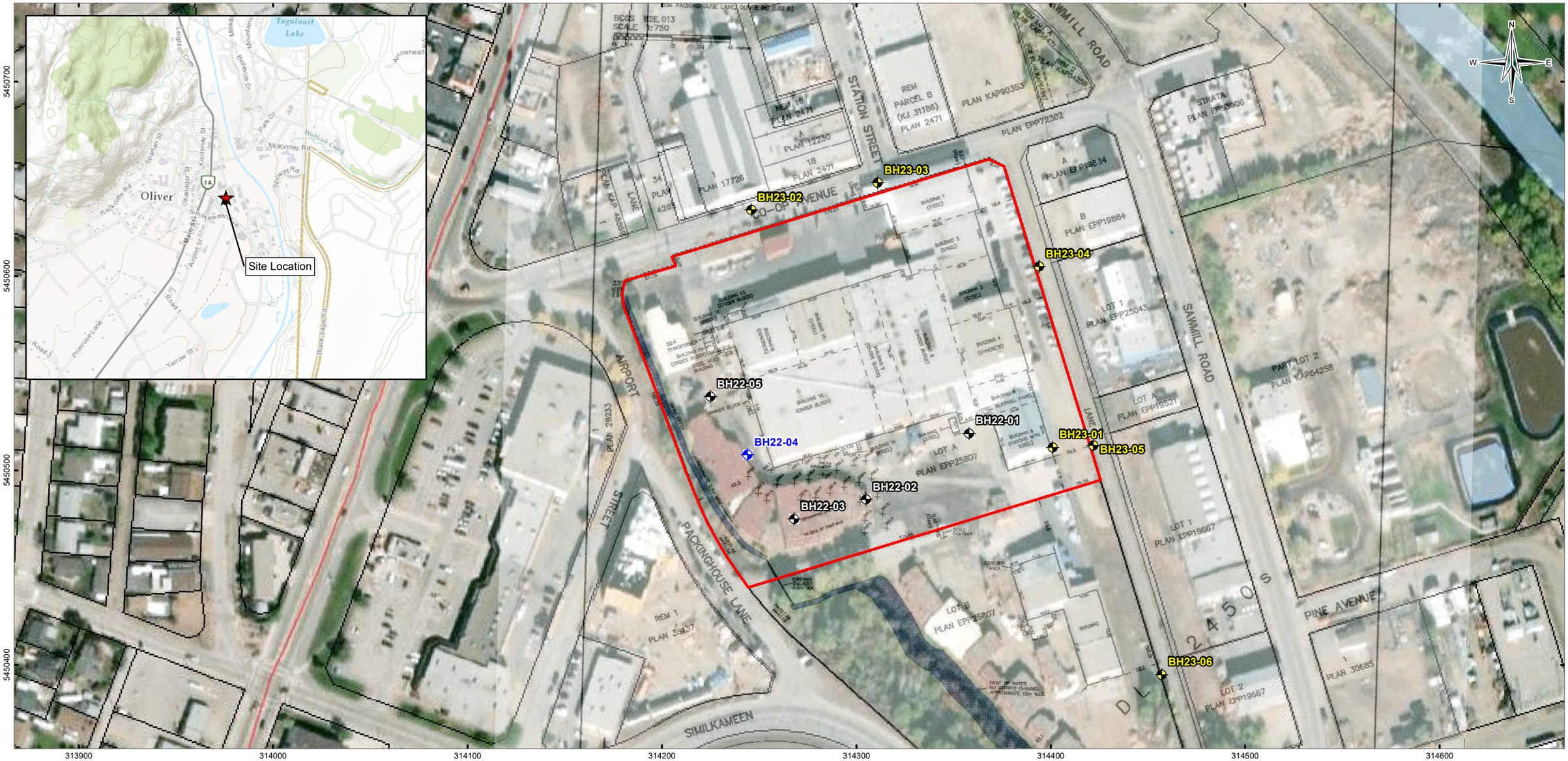
Reviewed by:
German Martinez, P.Eng.
Senior Geotechnical
Direct Line: 778.940.1224
german.martinez@tetratech.com

/sa

Attachments:

	Figure 1	Site Plan
	Appendix A	Tetra Tech's Limitations on the Use of This Document
	Appendix B	Borehole Logs
	Appendix C	Laboratory Testing

FIGURE



LEGEND

- Approximate Borehole Location
- Previous Monitoring Well/Borehole Location (Tetra Tech, 2022)
- Previous Borehole Location (Tetra Tech, 2022)
- Approximate Property Boundary

NOTES

Base data source:
- Imagery provided by Regional District Okanagan-Similkameen (date of imagery: 2013)
- Inset Map sourced from ESRI Topographic Basemap Services
- Site plan provided by client

STATUS
ISSUED FOR USE

BC TREE FRUITS, OLIVER BC GEOTECHNICAL ASSESSMENT

Testhole Location Plan

PROJECTION UTM ZONE 11	**DATUM** NAD83	**CLIENT** BC Tree Fruits	
Scale: 1:2,000 (25 12.5 0 25 Metres)			
FILE NO. KGEO03799-01 Figure 1.mxd		TETRA TECH	
OFFICE Kelowna	**DWN** MG / **CKD** SL / **APVD** DB / **REV** 0		Figure 1
DATE April 24, 2023	**PROJECT NO.** ENG.KGEO03799-01		

Q:\Kelowna\GIS\ENGINEERING\KGEO\KGEO03799-01 BC Tree Fruits Oliver\Maps\KGEO03799-01 Figure 1.mxd modified 4/24/2023 by murray.gaffney

APPENDIX A

TETRA TECH'S LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

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1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this document, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to explore, address or consider and has not explored, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems, methods and standards employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historical environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional exploration and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

Construction activity can impact structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques, and construction sequence are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, and the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function. Where temporary or permanent drainage systems are installed within or around a structure, these systems must protect the structure from loss of ground due to mechanisms such as internal erosion and must be designed so as to assure continued satisfactory performance of the drains. Specific design details regarding the geotechnical aspects of such systems (e.g. bedding material, surrounding soil, soil cover, geotextile type) should be reviewed by the geotechnical engineer to confirm the performance of the system is consistent with the conditions used in the geotechnical design.

1.16 DESIGN PARAMETERS

Bearing capacities for Limit States or Allowable Stress Design, strength/stiffness properties and similar geotechnical design parameters quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition used in this report. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions considered in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

1.18 APPLICABLE CODES, STANDARDS, GUIDELINES & BEST PRACTICE

This document has been prepared based on the applicable codes, standards, guidelines or best practice as identified in the report. Some mandated codes, standards and guidelines (such as ASTM, AASHTO Bridge Design/Construction Codes, Canadian Highway Bridge Design Code, National/Provincial Building Codes) are routinely updated and corrections made. TETRA TECH cannot predict nor be held liable for any such future changes, amendments, errors or omissions in these documents that may have a bearing on the assessment, design or analyses included in this report.

APPENDIX B

BOREHOLE LOGS

BC Tree Fruits

Borehole No: **BH22-01**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.29 m
Oliver	UTM: 314538 E; 5450519 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Blowcount (blows/300 mm)	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
0			SAND and GRAVEL (FILL), trace silt, dry, dense, greyish brown; medium to coarse sand; fine to coarse subrounded to subangular gravel			SPT1							296
1													
			GRAVEL, sandy, trace silt, trace cobbles, moist, compact, brown; medium to coarse sand; fine to coarse subrounded to subangular gravel			SPT2							295
2													
			-water table encountered at 2.4 m										294
3			-becomes dense at 3.1 m			SPT3							293
4													292
5	ODEX					SPT4							291
6			-becomes compact at 6.1 m			SPT5							290
7			SILT and SAND, wet, compact, light brown; fine sand; 4" lenses of silt and clay dissemenated throughout										289
8						SPT6							288
9			-becomes SILT, sandy at 9.1 m										287
10						SPT7	0	23.8	76.2				

09/13/2022

Field Blowcount (blows/300 mm): SPT; 20 40 60 80

Field Vane (kPa): Post-Peak, Peak; 10 20 30 40

Plastic Limit, Moisture Content, Liquid Limit; 20 40 60 80

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 15.9 m
Equipment Type: B53 Truck Mount	Start Date: September 13, 2022
Logged By: DB	Completion Date: September 13, 2022
Reviewed By: GM	Page 1 of 2

BC Tree Fruits

Borehole No: **BH22-01**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.29 m
Oliver	UTM: 314538 E; 5450519 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Field Blowcount (blows/300 mm) SPT	Field Vane (kPa) Post-Peak / Peak; Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
10											20 40 60 80	10 20 30 40; 20 40 60 80	
11	ODEX		-becomes dense at 10.7 m			SPT8							286
12													285
13			-becomes SILT, sandy at 12.2 m			SPT9							284
14			-becomes comapct at 13.7 m			SPT10							283
15			-becomes dense at 15.2 m			SPT11							282
16			End of Borehole at 15.9 m, target depth reached										281
17													280
18													279
19													278
20													277

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 15.9 m
Equipment Type: B53 Truck Mount	Start Date: September 13, 2022
Logged By: DB	Completion Date: September 13, 2022
Reviewed By: GM	Page 2 of 2

BC Tree Fruits

Borehole No: **BH22-02**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 295.72 m
Oliver	UTM: 314305 E; 5450485 N; Z 11 NAD83

Depth (m)	Soil Description	Sample Number	Gravel (%)	Sand (%)	Silt & Clay (%)	Elevation (m)
0	SAND and GRAVEL (FILL), trace silt, dry, very dense, brown; fine to coarse sand; fine to coarse subrounded to subangular gravel	SPT1				295
1	ORGANIC SAND, silty, some clay, wet, very soft, low plasticity, dark brown; fine sand	GS2				
		SPT3	0	56	31 (Silt) 13 (Clay)	294
2 ▽ 09/14/2022	SAND, trace to some silt, trace gravel, wet, compact, grey; fine to medium sand; fine subrounded gravel -water table encountered at 2.1 m					293
3		SPT4				
4	GRAVEL and SAND, trace silt, trace cobbles, moist, compact, greyish brown; medium to coarse sand; fine to coarse subrounded to subangular gravel					292
5		SPT5				291
6	-becomes dense at 6.1 m	SPT6				290
7	-becomes sandy at 7.0 m					289
8		SPT7				288
9						287
10		SPT8				286

Method: ODEX

Core Diameter (mm):

Graphical Representation / Sample Type

Particle Size Distribution

Field Blowcount (blows/300 mm): □ SPT — 20 40 60 80

Field Vane (kPa): Post-Peak ◇ Peak ◆ — 10 20 30 40

Plastic Limit — Moisture Content — Liquid Limit — 20 40 60 80

Contractor: On the Mark Locates Ltd.	Completion Depth: 30.5 m
Equipment Type: B53 Truck Mount	Start Date: September 14, 2022
Logged By: DB	Completion Date: September 14, 2022
Reviewed By: GM	Page 1 of 4

TETRA TECH

BC Tree Fruits

Borehole No: **BH22-02**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 295.72 m
Oliver	UTM: 314305 E; 5450485 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Blowcount (blows/300 mm) □ SPT	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
10											20 40 60 80	10 20 30 40 (Post-Peak / Peak); 20 40 60 80	
			SILT and SAND, wet, dense, light brown; fine sand; 4" lenses of silt and clay dissemenated throughout										285
11	ODEX					SPT9							
12			-becomes compact at 12.2 m										284
						SPT10	0	35.5	64.5				283
13													
													282
14						SPT11							
													281
15													
						SPT12							280
16													
													279
17						SPT13							
													278
18													
						SPT14							277
19													
													276
20													

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 30.5 m
Equipment Type: B53 Truck Mount	Start Date: September 14, 2022
Logged By: DB	Completion Date: September 14, 2022
Reviewed By: GM	Page 2 of 4

BC Tree Fruits

Borehole No: **BH22-02**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 295.72 m
Oliver	UTM: 314305 E; 5450485 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Field Blowcount (blows/300 mm) SPT	Field Vane (kPa) Post-Peak / Peak; Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
20	ODEX					SPT15					20 40 60 80	10 20 30 40 / 20 40 60 80	275
21													
22						SPT16							274
23													273
24						SPT17							272
25													271
26						SPT18							270
27													269
28						SPT19							268
29													267
30													266

Contractor: On the Mark Locates Ltd.	Completion Depth: 30.5 m
Equipment Type: B53 Truck Mount	Start Date: September 14, 2022
Logged By: DB	Completion Date: September 14, 2022
Reviewed By: GM	Page 3 of 4

TETRA TECH

BC Tree Fruits

Borehole No: **BH22-02**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 295.72 m
Oliver	UTM: 314305 E; 5450485 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Field Blowcount (blows/300 mm) □ SPT	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
30	ODEX		End of Borehole at 30.5 m, target depth reached								20 40 60 80	Post-Peak ◇ Peak 10 20 30 40; Plastic Limit / Moisture Content / Liquid Limit 20 40 60 80	265
31													264
32													263
33													262
34													261
35													260
36													259
37													258
38													257
39													256
40													

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 30.5 m
Equipment Type: B53 Truck Mount	Start Date: September 14, 2022
Logged By: DB	Completion Date: September 14, 2022
Reviewed By: GM	Page 4 of 4

BC Tree Fruits

Borehole No: **BH22-03**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 295.54 m
Oliver	UTM: 314358 E; 5450519 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Elevation (m)
0											
0	Mud Rotary		SAND and GRAVEL (FILL), trace silt, moist, very dense, brown; medium to coarse sand; fine to coarse subrounded to subangular gravel			SPT1					295
1			ORGANIC SILT and SAND, trace clay, wet, very soft, low plasticity, greyish brown; fine sand			GS2					
2			GRAVEL, sandy, trace to some silt, wet, very dense, greyish brown; medium to coarse sand; fine to coarse subrounded to subangular gravel			SPT3					294
2			-water table encountered at 1.8 m (09/15/2022)								293
3			-becomes compact at 3.4 m			SPT4					292
4											291
5			-becomes gravel and sand at 4.9 m			SPT5					290
6	DCPT										289
7											288
8											287
9											286
10											

Field Blowcount (blows/300 mm): ☐ SPT ○ DCPT; 20 40 60 80

Field Vane (kPa): Post-Peak ◇ Peak ◆; 10 20 30 40

Plastic Limit | Moisture Content ● | Liquid Limit; 20 40 60 80

Contractor: On the Mark Locates Ltd.	Completion Depth: 12.2 m
Equipment Type: B53 Truck Mount	Start Date: September 15, 2022
Logged By: DB	Completion Date: September 15, 2022
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TETRA TECH

BC Tree Fruits

Borehole No: **BH22-03**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 295.54 m
Oliver	UTM: 314358 E; 5450519 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Elevation (m)
10	DCPT										285
11											284
12			End of Borehole at 12.2 m, practical refusal of DCPT								283
13											282
14											281
15											280
16											279
17											278
18											277
19											276
20											

Field Blowcount (blows/300 mm): ☐ SPT ○ DCPT; 20 40 60 80; 112

Field Vane (kPa): Post-Peak ◇ Peak; 10 20 30 40

Plastic Limit | Moisture Content | Liquid Limit; 20 40 60 80

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 12.2 m
Equipment Type: B53 Truck Mount	Start Date: September 15, 2022
Logged By: DB	Completion Date: September 15, 2022
Reviewed By: GM	Page 2 of 2

BC Tree Fruits

Borehole No: **BH22-04**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.24 m
Oliver	UTM: 314244 E; 5450508 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Blowcount (blows/300 mm)	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
0											SPT; 20 40 60 80	Post-Peak ◇ Peak; 10 20 30 40; Plastic Limit / Moisture Content / Liquid Limit; 20 40 60 80	
0	ODEX		SAND and GRAVEL (FILL), trace silt, moist, very dense, greyish brown; fine to coarse sand; fine to coarse rounded to subangular gravel			SPT1							296
1			ORGANIC SILT, sandy, some clay, wet, very soft, low plasticity, greyish brown; fine sand			GS2							295
2			GRAVEL, sandy, trace to some silt, trace cobbles, wet, dense, grey; medium to coarse sand; fine to coarse subrounded to subangular gravel			SPT3							294
2			-water table encountered at 1.8 m (09/15/2022)										09/15/2022
3			-becomes trace silt at 3.1 m			SPT4	62.7	31.5	5.8				293
4													292
5						SPT5							291
6			SAND, gravelly, trace silt, wet, dense, grey; medium to coarse sand; fine to coarse subrounded gravel										290
6			-becomes compact at 6.1 m			SPT6							
7													289
7			SILT and SAND, wet, dense, light brown to grey; fine sand; 4" lenses of silt and clay dissemenated throughout										
8						SPT7							288
9			-becomes compact at 9.1 m			SPT8							287
10													

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 15.9 m
Equipment Type: B53 Truck Mount	Start Date: September 15, 2022
Logged By: DB	Completion Date: September 15, 2022
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BC Tree Fruits

Borehole No: **BH22-04**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.24 m
Oliver	UTM: 314244 E; 5450508 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Field Blowcount (blows/300 mm) □ SPT	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
10											20 40 60 80	10 20 30 40 / 20 40 60 80	
11	ODEX					SPT9							286
12													285
13						SPT10							284
14													283
15						SPT11							282
16			End of Borehole at 15.9 m, target depth reached			SPT12							281
17													280
18													279
19													278
20													277

Field Vane (kPa): Post-Peak ◇ / Peak ◆ — 10 20 30 40

Plastic Limit — Moisture Content — Liquid Limit — 20 40 60 80

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 15.9 m
Equipment Type: B53 Truck Mount	Start Date: September 15, 2022
Logged By: DB	Completion Date: September 15, 2022
Reviewed By: GM	Page 2 of 2

BC Tree Fruits

Borehole No: **BH22-05**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.17 m
Oliver	UTM: 314225 E; 5450538 N; Z 11 NAD83

Depth (m)	Soil Description	Sample Number	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Elevation (m)
0	SAND and GRAVEL (FILL), trace silt, moist, compact, greyish brown; fine to coarse sand; fine to coarse subrounded to angular gravel	SPT1					296
1	ORGANIC SAND and SILT, trace clay, wet, very soft, low plasticity, greyish brown; fine sand						295
2	-groundwater encountered at 1.8 m 09/13/2022	SPT2		47	47	6	294 09/13/2022
2	GRAVEL, sandy, trace silt, wet, dense, grey; medium to coarse sand; fine to coarse subrounded to subangular gravel						
3		SPT3					293
4	SAND and SILT, wet, compact, light brown to grey; fine sand; 4" lenses of silt and clay dissemenated throughout						292
5		SPT4					291
6		SPT5	0	53.8	47.2		290
7							289
8		SPT6					288
8	Clay, silty, moist, stiff, medium plasticity, grey						
9	SILT and SAND, wet, compact, grey; fine sand; 4" lenses of silt and clay dissemenated throughout						287
9		SPT7					
10							

Method: ODEX

Core Diameter (mm)

Graphical Representation / Sample Type

Particle Size Distribution

Field Blowcount (blows/300 mm): SPT (20, 40, 60, 80)

Field Vane (kPa): Post-Peak, Peak (10, 20, 30, 40)

Plastic Limit, Moisture Content, Liquid Limit (20, 40, 60, 80)

Contractor: On the Mark Locates Ltd.	Completion Depth: 15.9 m
Equipment Type: B53 Truck Mount	Start Date: September 13, 2022
Logged By: DB	Completion Date: September 13, 2022
Reviewed By: GM	Page 1 of 2

TETRA TECH

BC Tree Fruits

Borehole No: **BH22-05**

Project: BC Tree Fruits Geotechnical Services	Project No: KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.17 m
Oliver	UTM: 314225 E; 5450538 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Blowcount (blows/300 mm) □ SPT	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
10	ODEX					SPT8					20 40 60 80	10 20 30 40 (Post-Peak ◇ – Peak ◆); 20 40 60 80	286
11													285
12						SPT9							284
13													283
14						SPT10							282
15													281
16						SPT11							280
17													279
18													278
19													277
20													

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 15.9 m
Equipment Type: B53 Truck Mount	Start Date: September 13, 2022
Logged By: DB	Completion Date: September 13, 2022
Reviewed By: GM	Page 2 of 2

BC Tree Fruits

Borehole No: **BH23-01**

Project: BC Tree Fruits Geotechnical Services	Project No: 704-ENG.KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.2 m
Oliver	UTM: 314401 E; 5450512 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Elevation (m)
0	Solid stem auger		SAND and GRAVEL (FILL), trace silt, moist, compact, brown; fine to caorse sand; fine to coarse subrounded to subangular gravel			GS1					296
1						GS2					295
			SAND, trace silt, moist, compact, tan; fine to medium sand								
			SAND and GRAVEL, trace silt, trace cobbles, moist, compact to dense, greyish brown; fine to coarse sand; fine to coarse subrounded gravel; cobbles noted up to 100 mm in diameter			GS3					
2			-water table encountered, becomes gravel and sand			GS4					294
											April 03, 2023
3											293
4						GS5					292
5			SILT, sandy, gravelly, wet, compact, grey; fine sand; fine to coarse subrounded gravels, non-plastic			GS6	24.8	33.7	41.5		291
6											290
7			-lens of gravel and sand, silty from 6.8 m to 7.8 m			GS7	37.7	38.4	23.9		289
8			-becomes trace to some gravel at 8.3 m			GS8	5.6	35.7	58.7		288
9			End of Borehole at 9.1 m, target depth reached								287
10											

Field Blowcount (blows/300 mm): ○ DCPT — 10 20 30 40; 55; 63

Field Vane (kPa): Post-Peak ◇ — Peak ◆; 10 20 30 40

Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80

Contractor: On the Mark Locates Ltd.	Completion Depth: 10 m
Equipment Type: B53 Truck Mount	Start Date: April 3, 2023
Logged By: DB	Completion Date: April 3, 2023
Reviewed By: GM	Page 1 of 1

TETRA TECH

BC Tree Fruits

Borehole No: **BH23-02**

Project: BC Tree Fruits Geotechnical Services	Project No: 704-ENG.KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 295.7 m
Oliver	UTM: 314246 E; 5450634 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Blowcount (blows/300 mm)	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
0			Asphalt											
			SAND and GRAVEL (FILL), trace silt, damp, compact, brown; medium to coarse sand; fine to coarse subrounded to subangular gravel											
			SAND and GRAVEL, silty, trace woody debris, moist, loose, black; fine to medium sand; fine to coarse subrounded gravel			GS1	34.5	41	4.9	23.6				295
1			SAND AND GRAVEL, some silt to silty, moist, loose, brown; fine to medium sand; fine to coarse subrounded gravel			GS2	37.2	44	6.6	18.2				
	Solid stem auger		SILT, some clay, some sand, wet, soft, grey, non-plastic; fine sand; interbedded organics			GS3								294
2			SAND, gravelly, silty, saturated, dense, grey; fine to coarse sand; fine to coarse subrounded gravel -water table encountered at 2.3 m			GS4								
April 03, 2023														April 03, 2023
														293
3			End of Borehole at 3.0 m, target depth reached											
														292
4														

Field Blowcount (blows/300 mm): ○ DCPT — 10 20 30 40

Field Vane (kPa): Post-Peak ◇ — Peak ◆ — 10 20 30 40

Plastic Limit — Moisture Content — Liquid Limit: 20 40 60 80

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 3 m
Equipment Type: B53 Truck Mount	Start Date: April 3, 2023
Logged By: DB	Completion Date: April 3, 2023
Reviewed By: GM	Page 1 of 1

BC Tree Fruits

Borehole No: **BH23-03**

Project: BC Tree Fruits Geotechnical Services	Project No: 704-ENG.KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.4 m
Oliver	UTM: 314311 E; 5450648 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Blowcount (blows/300 mm)	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
0			ASPHALT										
			SAND and GRAVEL (FILL), trace silt, trace cobbles, damp, very dense, brown; medium to coarse sand; fine to coarse subrounded to subangular gravel; cobbles up to 100 mm in diameter			GS1							
			-becomes compact at 0.6 m										
1													296
	Solid stem auger												
			SAND and GRAVEL, some silt, moist, loose to compact, brown; fine to coarse sand; fine to coarse subrounded gravel										295
2			-water table encountered at 2.1 m, becomes saturated, becomes silty			GS2							294
3			End of Borehole at 3.0 m, target depth reached										293
4													

Field Blowcount (blows/300 mm): ○ DCPT; 10 20 30 40; 52

Field Vane (kPa): Post-Peak ◇ Peak; 10 20 30 40

Plastic Limit Moisture Content Liquid Limit; 20 40 60 80

April 03, 2023

April 03, 2023

Contractor: On the Mark Locates Ltd.	Completion Depth: 3 m
Equipment Type: B53 Truck Mount	Start Date: April 3, 2023
Logged By: DB	Completion Date: April 3, 2023
Reviewed By: GM	Page 1 of 1

TETRA TECH

BC Tree Fruits

Borehole No: **BH23-04**

Project: BC Tree Fruits Geotechnical Services	Project No: 704-ENG.KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.4 m
Oliver	UTM: 314394 E; 5450605 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Blowcount (blows/300 mm)	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
0	Solid stem auger		SAND, gravelly, (FILL), trace silt, dry, very dense, brown; fine to coarse sand; fine to coarse subrounded to subangular gravel			GS1					DCPT: 56	Post-Peak 10 20 30 40 Peak; Plastic Limit 20 40 60 80 Liquid Limit	296
1			SAND, silty, some gravel, damp, loose to compact, tan; fine sand to medium sand; fine to coarse subrounded gravel			GS2							
						GS3							295
2			GRAVEL, sandy, trace to some silt, trace cobbles, moist, dense, brown; fine to coarse sand; fine to coarse subrounded to angular gravel			GS4					DCPT: 52		
			-water table encountered at 2.4 m										294
3			End of Borehole at 3.0 m, target depth reached										293
4													

April 03, 2023

April 03, 2023

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 3 m
Equipment Type: B53 Truck Mount	Start Date: April 3, 2023
Logged By: DB	Completion Date: April 3, 2023
Reviewed By: GM	Page 1 of 1

BC Tree Fruits

Borehole No: **BH23-05**

Project: BC Tree Fruits Geotechnical Services	Project No: 704-ENG.KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.3 m
Oliver	UTM: 314422 E; 5450513 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Blowcount (blows/300 mm)	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
0			SAND, gravelly, (FILL), trace silt, dry, very dense, brown; fine to coarse sand; fine to coarse subrounded to subangular gravel								DCPT: 10 20 30 40	Post-Peak / Peak: 10 20 30 40; Plastic Limit / Moisture Content / Liquid Limit: 20 40 60 80	296
1	Solid stem auger		SAND, some silt, some gravel, damp, loose to compact, tan; fine sand to medium sand; fine to coarse subrounded gravel								60		
			-lens of dry silt form 1.2 m to 1.5 m			GS1							295
2													
			GRAVEL and SAND, trace silt, trace cobbles, moist, compact, brown; fine to coarse sand; fine to coarse subrounded to angular gravel										294
			-water table encountered at 2.4 m										
3			End of Borehole at 3.0 m, target depth reached										293
4													

April 03, 2023

April 03, 2023

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 3 m
Equipment Type: B53 Truck Mount	Start Date: April 3, 2023
Logged By: DB	Completion Date: April 3, 2023
Reviewed By: GM	Page 1 of 1

BC Tree Fruits

Borehole No: **BH23-06**

Project: BC Tree Fruits Geotechnical Services	Project No: 704-ENG.KGEO03799-01
Location: 327 Co-op Road	Ground Elev: 296.2 m
Oliver	UTM: 314457 E; 5450395 N; Z 11 NAD83

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Clay (%)	Field Blowcount (blows/300 mm)	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
0	Solid stem auger		SAND, gravelly, (FILL), trace silt, dry, very dense, brown; fine to coarse sand; fine to coarse subrounded to subangular gravel								DCPT: 64	Post-Peak 10 20 30 40 Peak; Plastic Limit 20 40 60 80 Liquid Limit	296
1			SAND, some gravel, trace silt, damp, loose to compact, tan; fine sand to coarse sand; fine to coarse subrounded gravel			GS1							295
2			-water table encountered at 2.7 m										294
April 03, 2023													April 03, 2023
3			End of Borehole at 3.0 m, target depth reached										293
4													

TETRA TECH

Contractor: On the Mark Locates Ltd.	Completion Depth: 3 m
Equipment Type: B53 Truck Mount	Start Date: April 3, 2023
Logged By: DB	Completion Date: April 3, 2023
Reviewed By: GM	Page 1 of 1

APPENDIX C

LABORATORY TESTING

MOISTURE CONTENT TEST RESULTS

ASTM D2216

Project:	BC Tree Fruits , Geotechnical Assessment	Sample No.:	KS-10133
Project No.:	704-ENG.KGEO03799-01	Date Tested:	September 20, 2022
Client:	BC Tree Fruits Cooperative	Tested By:	CP
Address:	327 Co-op Road, Oliver BC	Page:	1 of 1

B.H. Number	Depth (m)	Moisture Content (%)	Visual Description of Soil
BH22-02, SPT 3	1.5 - 2.1	42.9	
BH22-05, SPT 2	1.5 - 2.1	42.2	

Reviewed By: _____

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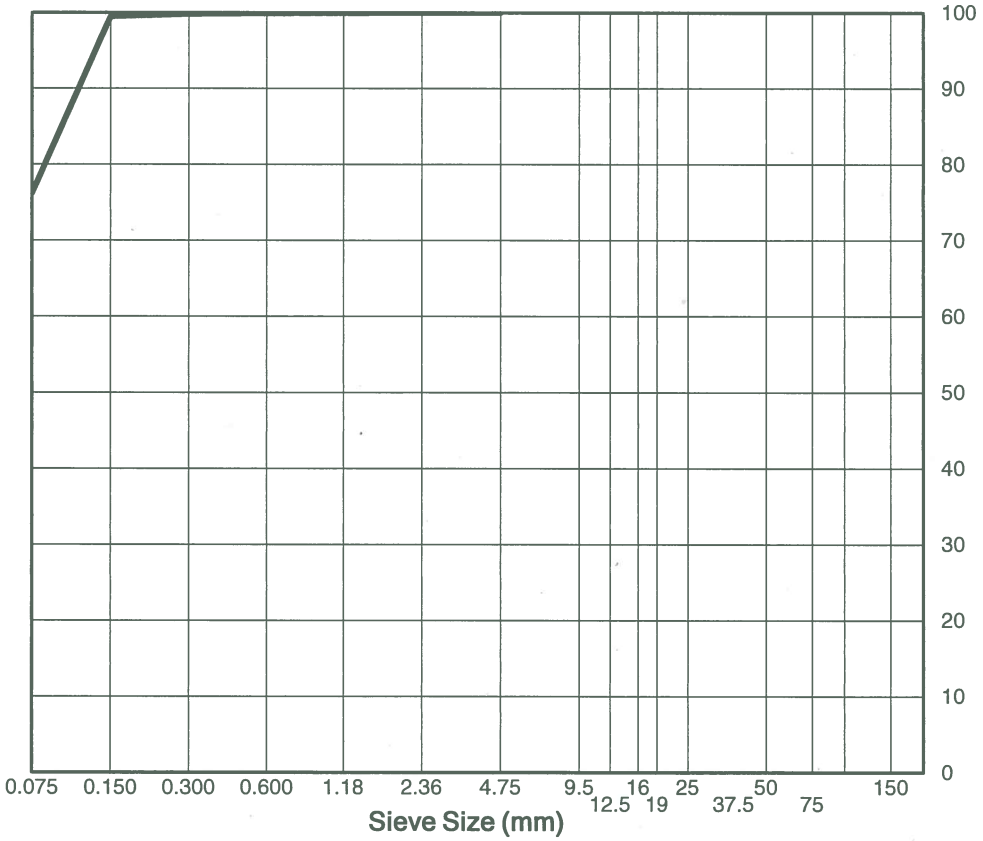
TETRA TECH

SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10134
Project:	BC Tree Fruits, Geotechnical Assessment	Date Sampled:	September 13, 2022
		Sampled by:	DB
Client:	BC Tree Fruits Cooperative	Date Tested:	September 20, 2022
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	29.3%
Description:	4.75 mm (-) SILT, sandy	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	9.1 - 9.8 m		
Sample Location:	BH22-01, SPT 7		
Specification:	N/A		

Sieve Size	Percent Passing
4.75	100
2.36	100
1.18	100
0.600	100
0.300	100
0.150	99
0.075	76.2



Remarks:

Reviewed By: _____ C.Tech.

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TETRA TECH

SIEVE ANALYSIS REPORT

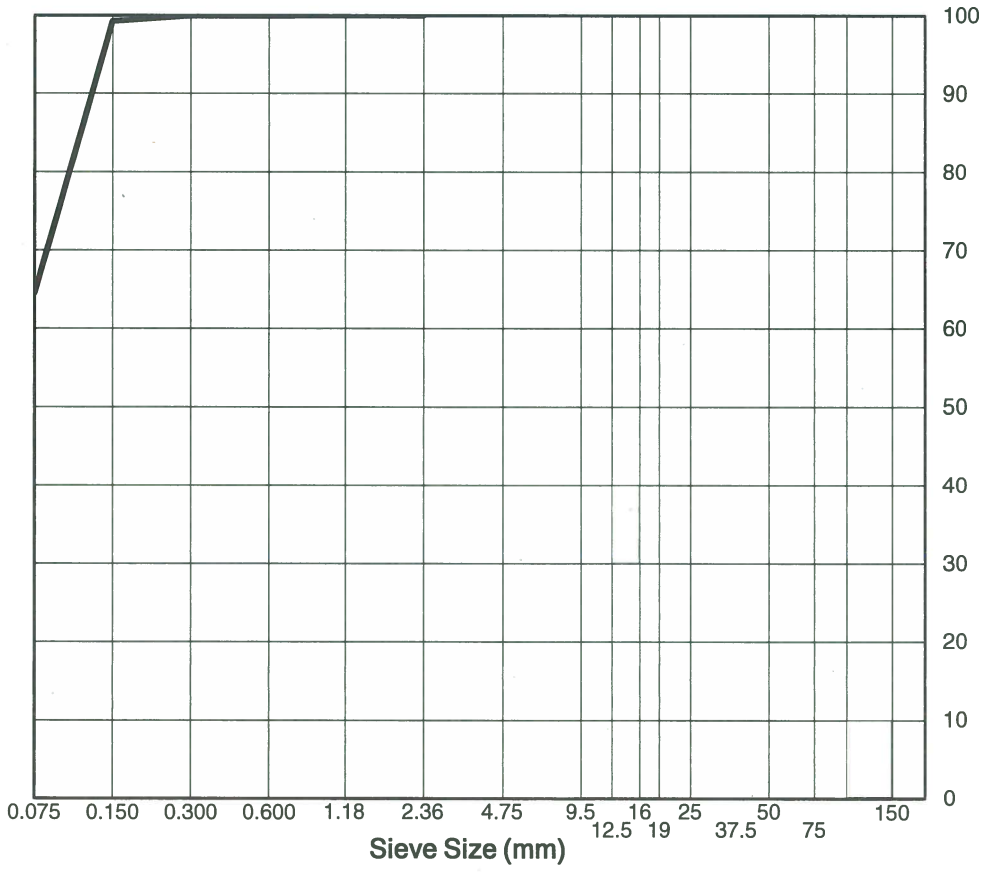
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10135
Project:	BC Tree Fruits, Geotechnical Assessment	Date Sampled:	September 14, 2022
		Sampled by:	DB
Client:	BC Tree Fruits Cooperative	Date Tested:	September 20, 2022
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	27.5%
Description:	2.36 mm (-) SILT and SAND	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	12.2 - 12.8 m		

Sample Location: BH22-02, SPT10

Specification: N/A

Sieve Size	Percent Passing
2.36	100
1.18	100
0.600	100
0.300	100
0.150	99
0.075	64.5



Remarks:

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TETRA TECH

SIEVE ANALYSIS REPORT

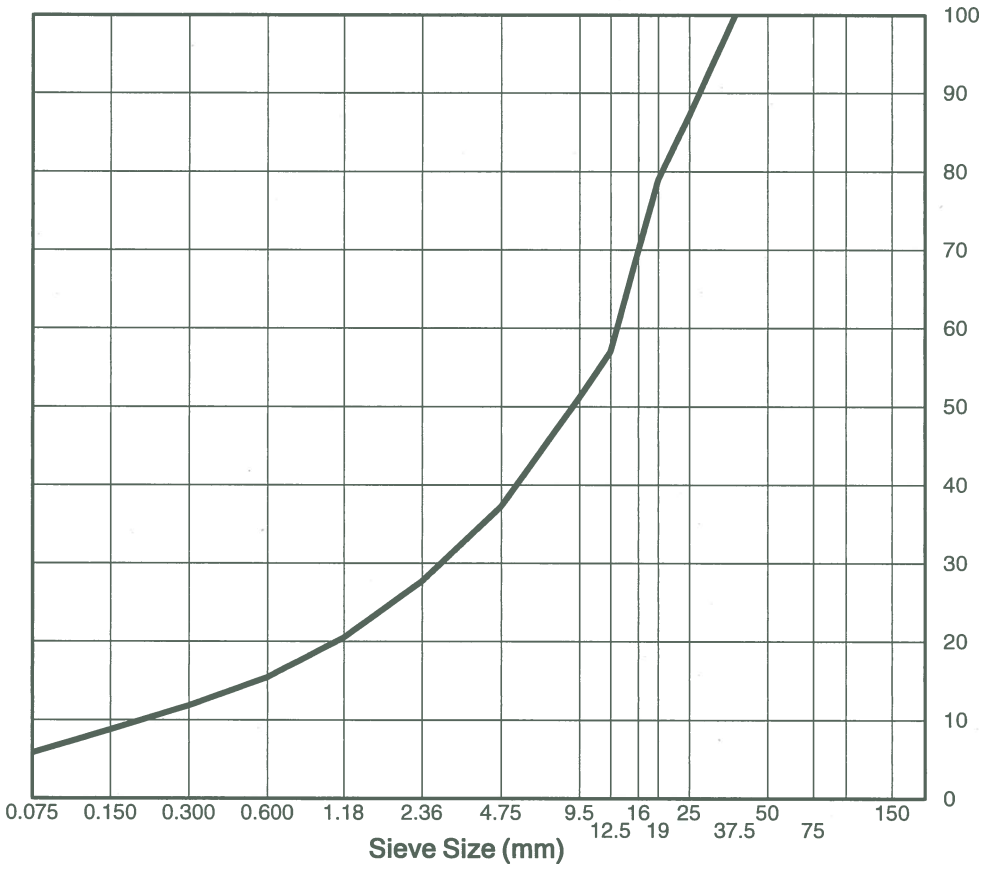
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10136
Project:	BC Tree Fruits, Geotechnical Assessment	Date Sampled:	September 15, 2022
		Sampled by:	DB
Client:	BC Tree Fruits Cooperative	Date Tested:	September 20, 2022
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	9.4%
Description:	37.5 mm (-) GRAVEL, sandy, trace silt	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	3.1 - 3.7 m		

Sample Location: BH22-04, SPT4

Specification: N/A

Sieve Size	Percent Passing
37.5	100
25	87
19	79
12.5	57
9.5	51
4.75	37
2.36	28
1.18	21
0.600	15
0.300	12
0.150	9
0.075	5.8



Remarks:

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TETRA TECH

SIEVE ANALYSIS REPORT

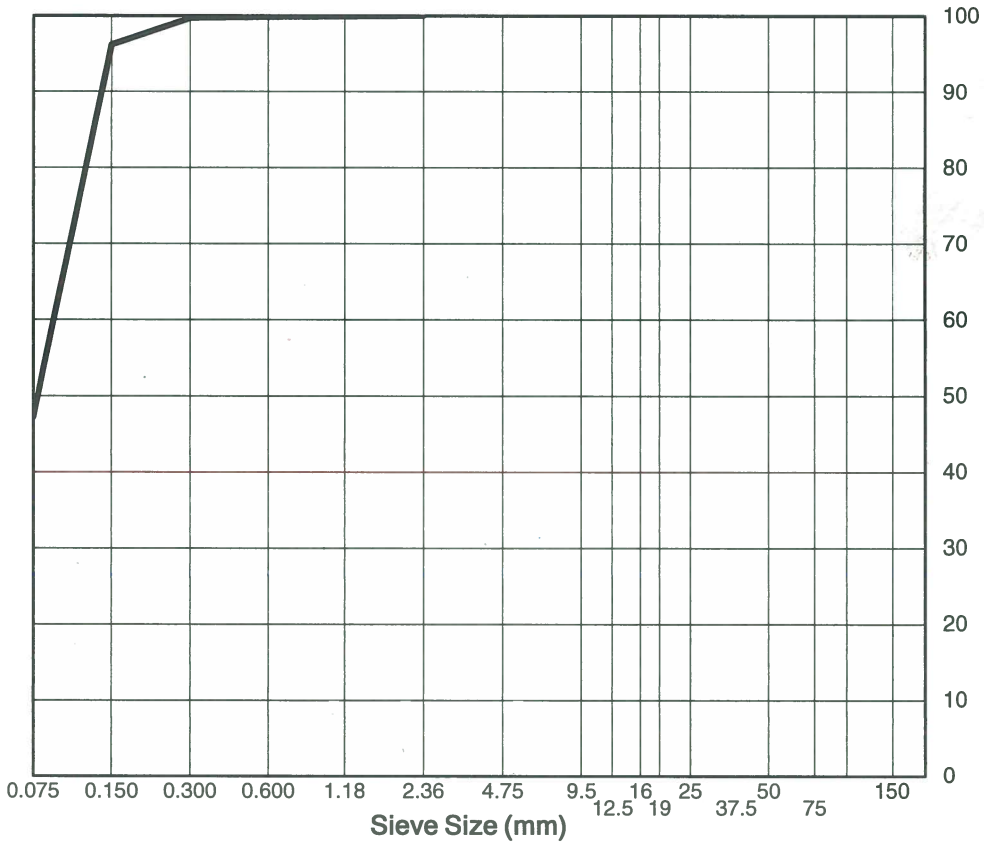
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10137
Project:	BC Tree Fruits, Geotechnical Assessment	Date Sampled:	September 13, 2022
		Sampled by:	DB
Client:	BC Tree Fruits Cooperative	Date Tested:	September 20, 2022
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	27.4%
Description:	2.36 mm (-) SAND and SILT	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	6.1 - 6.7 m		

Sample Location: BH22-05, SPT5

Specification: N/A

Sieve Size	Percent Passing
2.36	100
1.18	100
0.600	100
0.300	100
0.150	96
0.075	47.2



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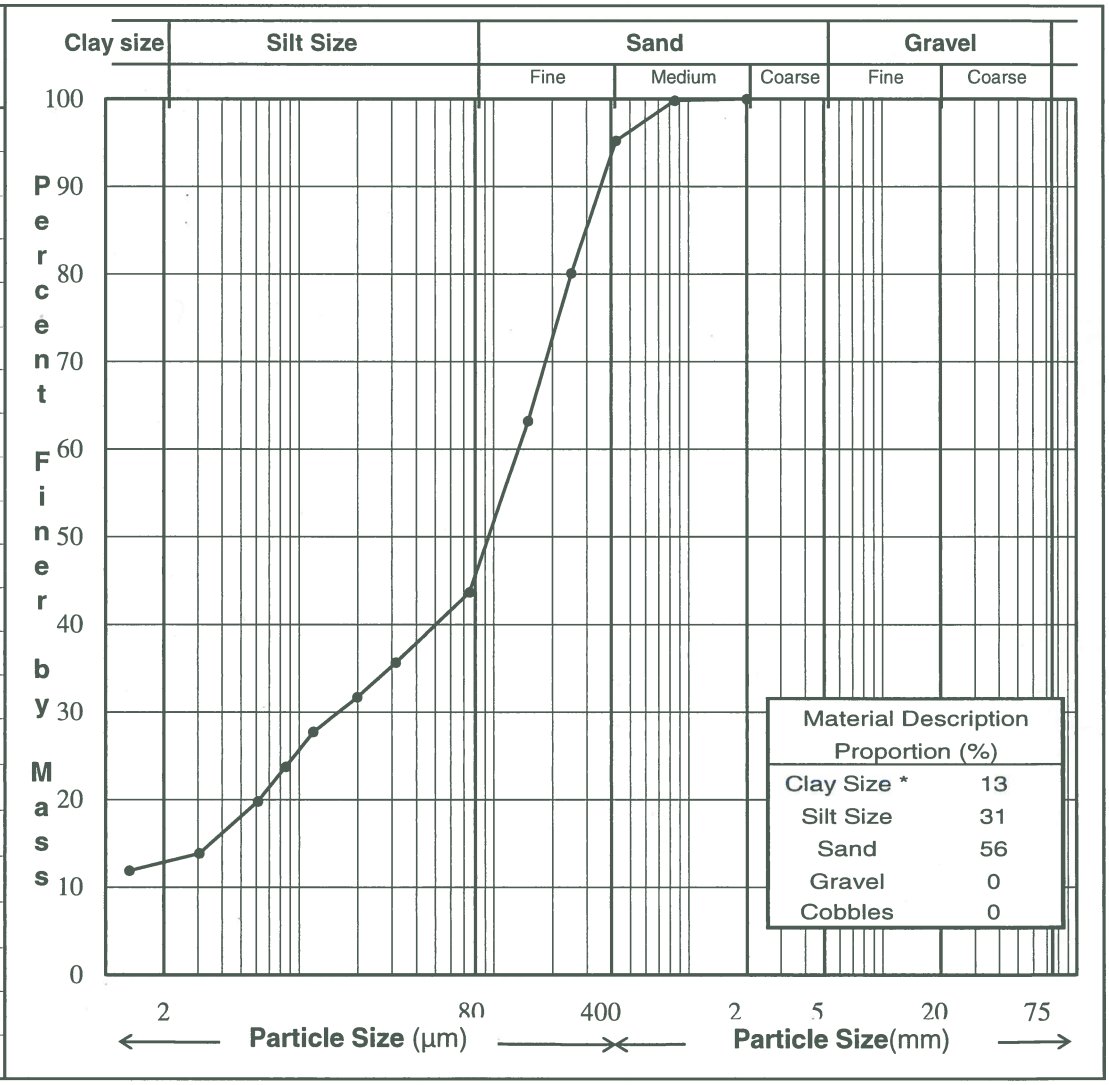
TETRA TECH

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D7928

Project:	BC Tree Fruits, Geotechnical Assessment	Sample No.:	KS-10138
Client:	BC Tree Fruits Cooperative	Borehole/ TP:	BH22-02, SPT 3
Project No.:	ENG.KGEO03799-01	Depth:	1.5 - 2.1 m
Location:	Oliver, B.C.	Date Tested	September 21, 2022
Description **:	SAND, silty, some clay	Tested By:	CP

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	
10 mm	
5 mm	
2 mm	100
850 µm	100
425 µm	95
250 µm	80
150 µm	63
75 µm	44
31 µm	36
20 µm	32
12 µm	28
9 µm	24
6 µm	20
3 µm	14
1 µm	12



Remarks: * The description is behaviour based & subject to Tetra Tech description protocols.

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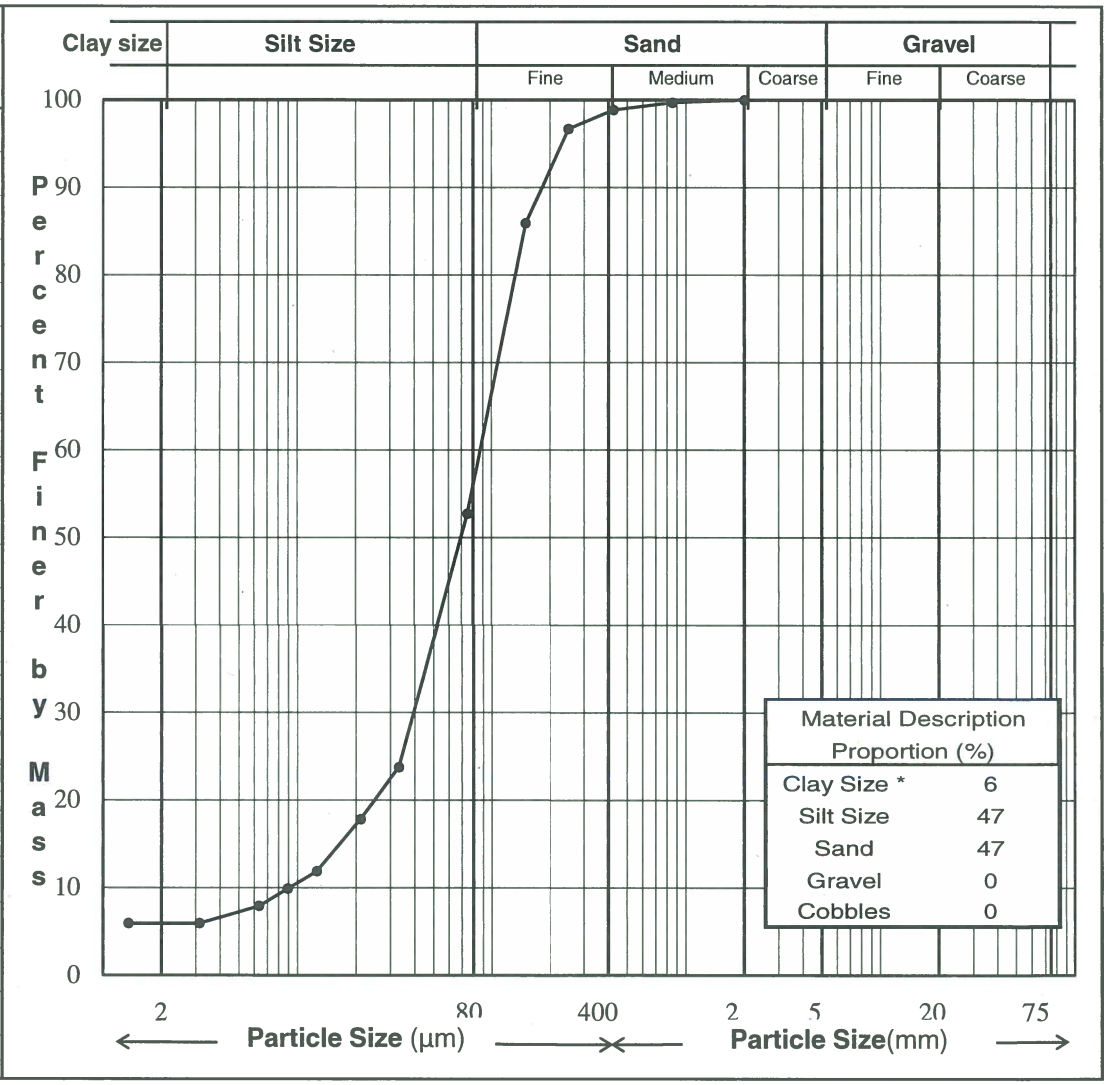
TETRA TECH

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D7928

Project:	BC Tree Fruits, Geotechnical Assessment	Sample No.:	KS-10139
Client:	BC Tree Fruits Cooperative	Borehole/ TP:	BH22-05, SPT 2
Project No.:	ENG.KGEO03799-01	Depth:	1.5 - 2.1 m
Location:	Oliver, B.C.	Date Tested	September 21, 2022
Description **:	SAND and SILT, trace clay	Tested By:	CP

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	
38 mm	
25 mm	
19 mm	
13 mm	
10 mm	
5 mm	
2 mm	100
850 µm	100
425 µm	99
250 µm	97
150 µm	86
75 µm	53
33 µm	24
21 µm	18
13 µm	12
9 µm	10
6 µm	8
3 µm	6
1 µm	6



Remarks: * The description is behaviour based & subject to Tetra Tech description protocols.

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TETRA TECH

Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

Project No:	ENG.KGEO03799-01	**Sample No.:**	KS-10140
Project:	BC Tree Fruits Geotechnical Assessment	**Date Sampled:**	Sept. 14, 2022
Client:	BC Tree Fruits Cooperative	**Sampled By:**	DB
		Date Tested:	Sept. 20, 2022
Attention:	See E-mail Distribution **Ph:**	**Tested By:**	TJ
Email:	See E-mail Distribution	**Office:**	Kelowna

Description:	SAND, silty, some clay
Source:	BH22-02
Depth:	1.5 - 2.1 m
Supplier:	N/A

Moisture Content	
Moisture Content, %	42.9

Ash Content	
Ash Content, %	95.3

Organic Matter Content	
Organic Matter Content, %	4.7

* Furnace Temperature: **440 °C**

Remarks: Sample oven dried prior to sieving through 2.0 mm sieve

Fraction of Aggregate Sample Tested: **100%** passing 2.0 mm sieve

Organic Content, Total Sample: **4.7%** by dry mass of sample

Reviewed By: _____ P. Eng.

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TETRA TECH

Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

Project No:	ENG.KGEO03799-01	**Sample No.:**	KS-10141
Project:	BC Tree Fruits Geotechnical Assessment	**Date Sampled:**	Sept. 13, 2022
Client:	BC Tree Fruits Cooperative	**Sampled By:**	DB
		Date Tested:	Sept. 20, 2022
Attention:	See E-mail Distribution **Ph:**	**Tested By:**	TJ
Email:	See E-mail Distribution	**Office:**	Kelowna

Description:	SAND and SILT, trace clay
Source:	BH22-05
Depth:	1.5 - 2.1 m
Supplier:	N/A

Moisture Content	
Moisture Content, %	42.2

Ash Content	
Ash Content, %	97.9

Organic Matter Content	
Organic Matter Content, %	2.1

* Furnace Temperature: **440 °C**

Remarks: Sample oven dried prior to sieving through 2.0 mm sieve

Fraction of Aggregate Sample Tested: **100%** passing 2.0 mm sieve

Organic Content, Total Sample: **2.1%** by dry mass of sample

Reviewed By: _____ P. Eng.

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TETRA TECH

SIEVE ANALYSIS REPORT

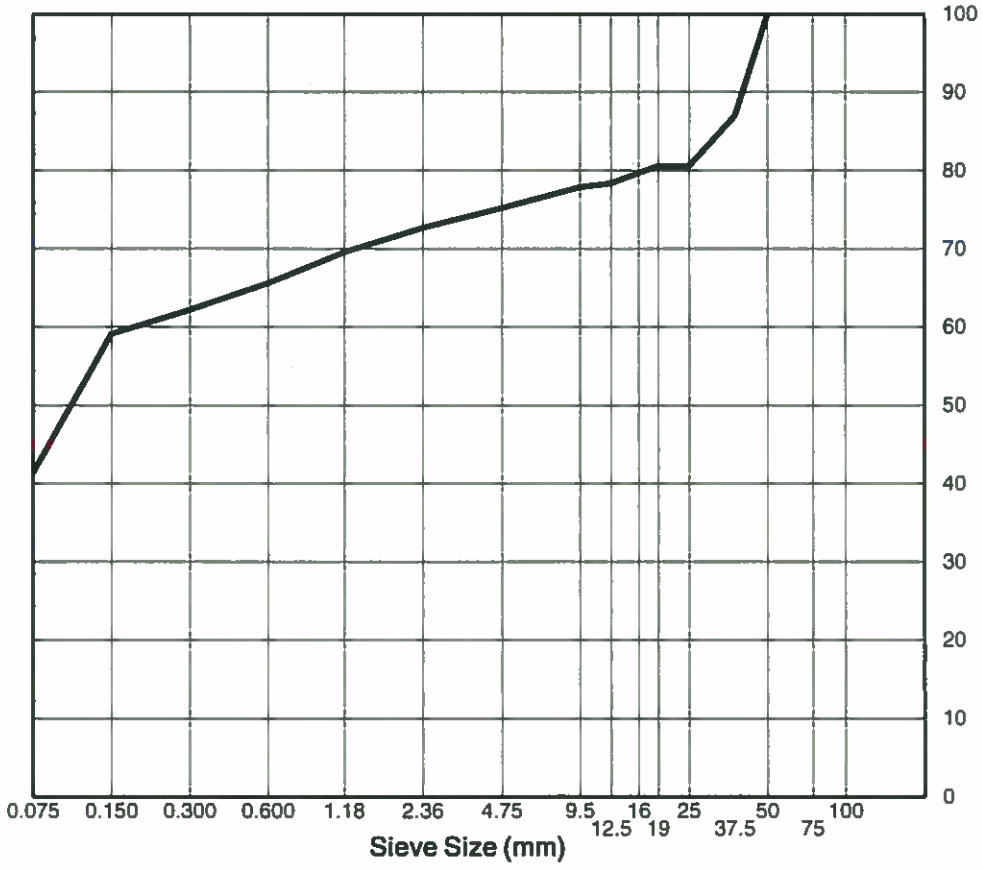
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10314
Project:	BC Tree Fruits, Geotechnical Services, Oliver, BC	Date Sampled:	April 5, 2023
		Sampled by:	DB
Client:	BC Tree Fruits	Date Tested:	April 10, 2023
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	17.0%
Description:	50 mm (-) SILT, sandy, gravelly	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	16' - 18'		

Sample Location: BH23-01, GS6

Specification: N/A

Sieve Size	Percent Passing
50	100
37.5	87
25	81
19	81
12.5	78
9.5	78
4.75	75
2.36	73
1.18	70
0.600	66
0.300	62
0.150	59
0.075	41.5



Remarks:

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TETRA TECH

SIEVE ANALYSIS REPORT

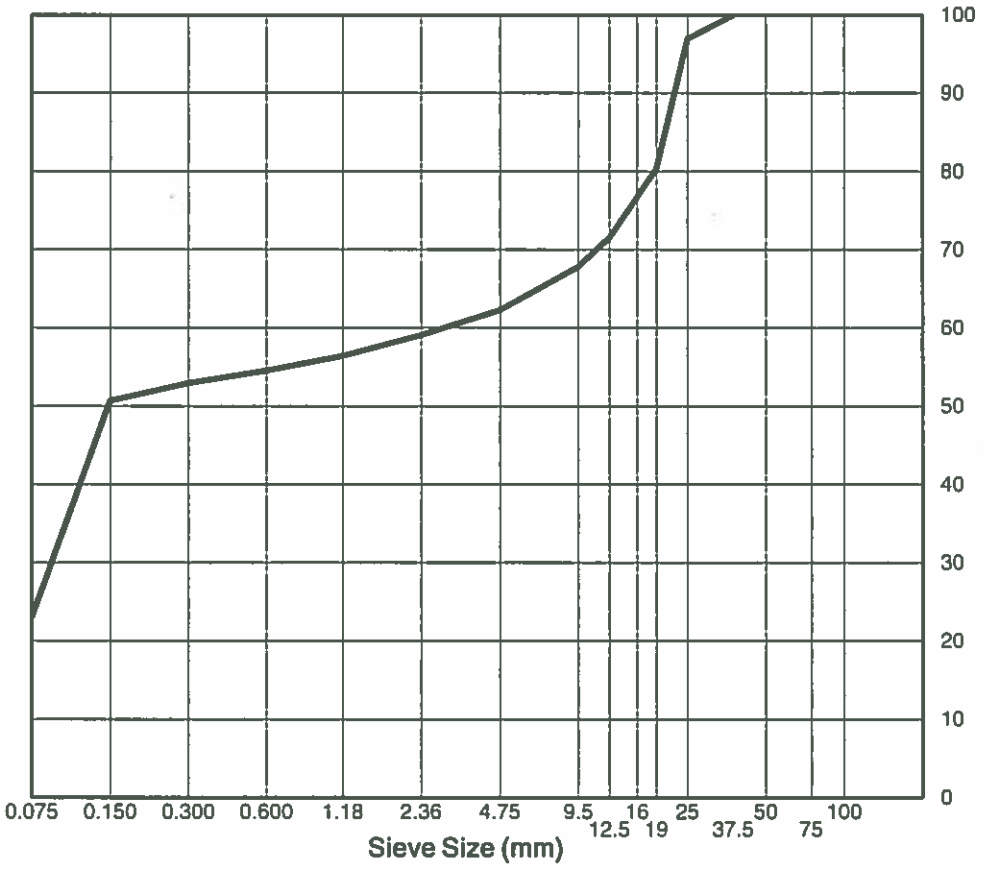
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10315
Project:	BC Tree Fruits, Geotechnical Services, Oliver, BC	Date Sampled:	April 5, 2023
		Sampled by:	DB
Client:	BC Tree Fruits	Date Tested:	April 10, 2023
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	17.1%
Description:	37.5 mm (-) SAND and GRAVEL, silty	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	22' - 23'		

Sample Location: BH23-01, GS7

Specification: N/A

Sieve Size	Percent Passing
37.5	100
25	97
19	80
12.5	72
9.5	68
4.75	62
2.36	59
1.18	56
0.600	55
0.300	53
0.150	51
0.075	23.1



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TETRA TECH

SIEVE ANALYSIS REPORT

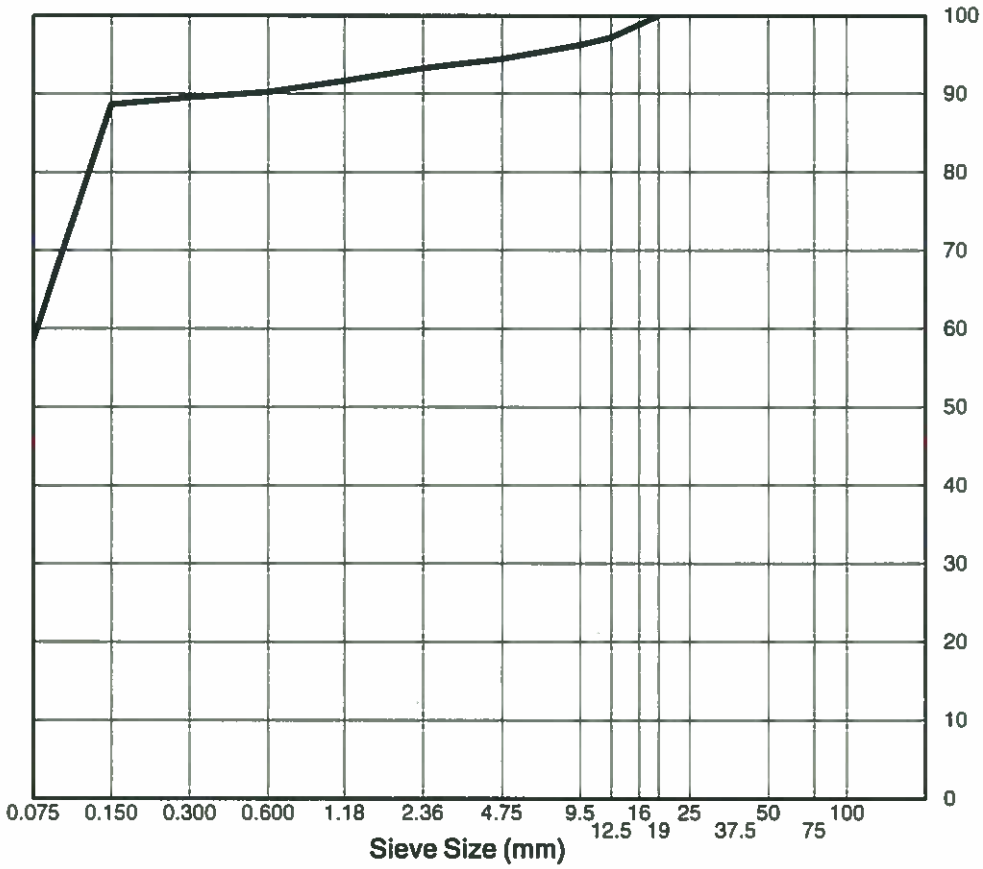
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10316
Project:	BC Tree Fruits, Geotechnical Services, Oliver, BC	Date Sampled:	April 5, 2023
		Sampled by:	DB
Client:	BC Tree Fruits	Date Tested:	April 10, 2023
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	27.4%
Description:	19 mm (-) SILT and SAND, trace gravel	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	27' - 28'		

Sample Location: BH23-01, GS8

Specification: N/A

Sieve Size	Percent Passing
19	100
12.5	97
9.5	96
4.75	94
2.36	93
1.18	92
0.600	90
0.300	90
0.150	89
0.075	58.7



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TETRA TECH

SIEVE ANALYSIS REPORT

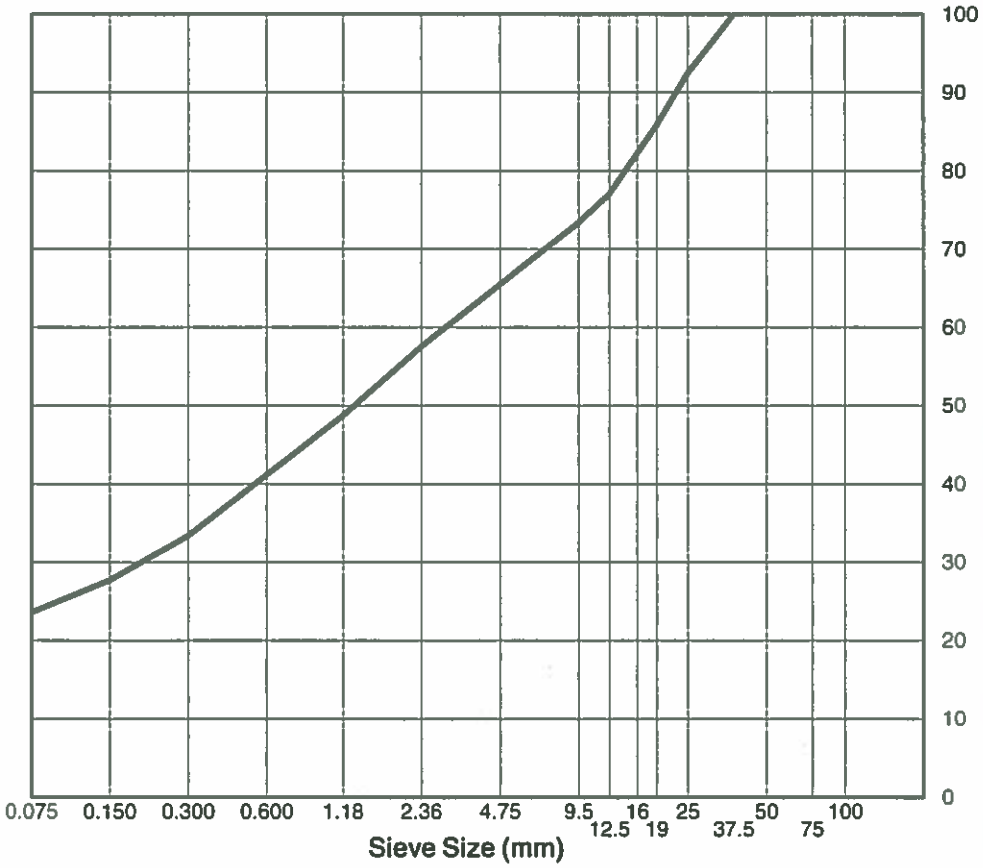
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10317
Project:	BC Tree Fruits, Geotechnical Services, Oliver, BC	Date Sampled:	April 5, 2023
		Sampled by:	DB
Client:	BC Tree Fruits	Date Tested:	April 10, 2023
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	17.2%
Description:	37.5 mm (-) SAND, gravelly, silty	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	1' - 2'		

Sample Location: BH23-02, GS1

Specification: N/A

Sieve Size	Percent Passing
37.5	100
25	92
19	86
12.5	77
9.5	73
4.75	65
2.36	57
1.18	49
0.600	41
0.300	33
0.150	28
0.075	23.6



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TETRA TECH

SIEVE ANALYSIS REPORT

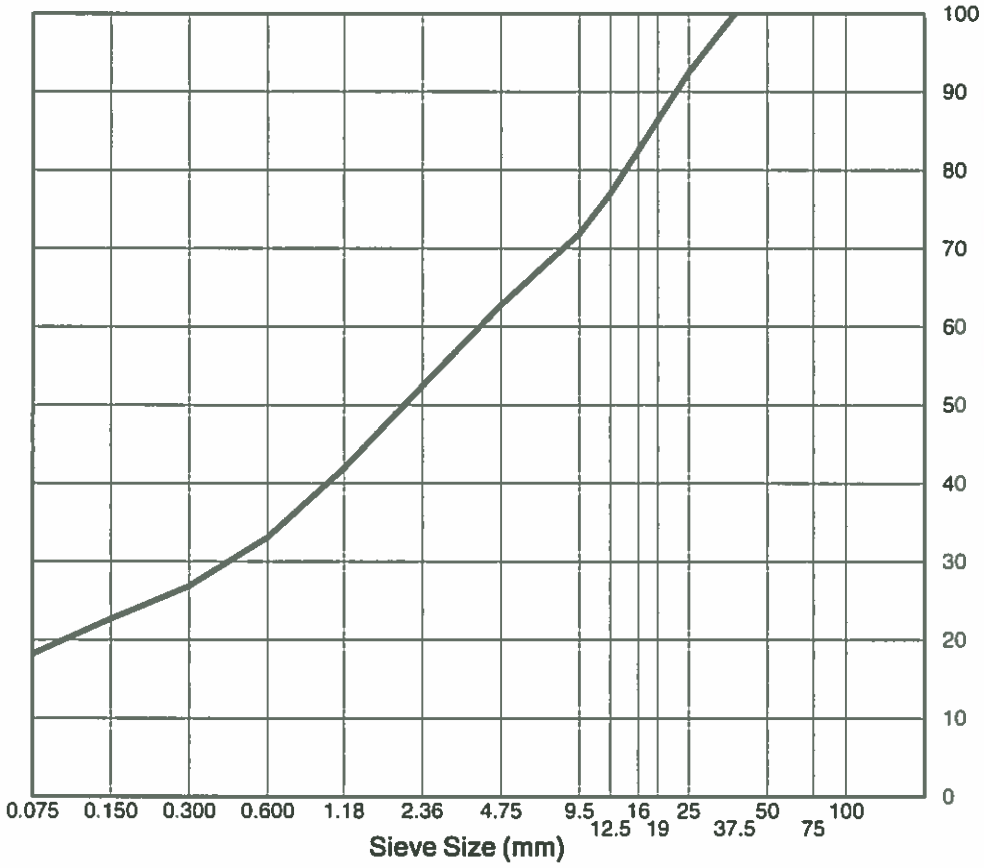
Washed Sieve: ASTM C136 and C117

Project No.:	704-ENG.KGEO03799-01	Sample No.:	KS-10318
Project:	BC Tree Fruits, Geotechnical Services, Oliver, BC	Date Sampled:	April 5, 2023
		Sampled by:	DB
Client:	BC Tree Fruits	Date Tested:	April 10, 2023
Attention:	See e-mail distribution	Tested by:	CP Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	11.4%
Description:	37.5 mm (-) SAND and GRAVEL, some silt	No. Crushed Faces:	One (1) or Two (2)
Source:	N/A	By particle mass:	
Depth:	3' - 4'		

Sample Location: BH23-02, GS2

Specification: N/A

Sieve Size	Percent Passing
37.5	100
25	92
19	86
12.5	77
9.5	72
4.75	63
2.36	52
1.18	42
0.600	33
0.300	27
0.150	23
0.075	18.2



Remarks:

Reviewed By: _____ C.Tech.

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